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METHODOLOGY, TRENDS, AND FORECAST

by

ARNOLD MARTIN McCOMBS


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We accept this thesis as conforming to the required standard.

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Department of **Commerce**

The University of British Columbia
Vancouver 8, Canada

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The basic objective of this thesis is to identify some of the basic trends tending to shape the Canadian economy. The procedure followed was to examine economic theory and previous forecasting studies to determine methodological principles and apply these principles to estimate the possible future course of the Canadian economy between 1965 and 1980.

No comprehensive economic theory appears to be presently developed to explain and therefore to form a complete basis for predicting the economic growth of a nation. In an effort to make economic theory manageable, many variables affecting economic growth and development such as those of sociology tend to be ignored in quantitative terms. Together with these unquantifiable variables, it is not known how many non-economic factors affect economic growth. It would seem to be these many unknown factors that tend to cause errors in the results of long range economic forecasts.

Economic growth, defined as the expansion of a nation's capacity to produce, in an already advanced industrial economy, is heavily dependent on the quantity and quality of the nation's labour force, natural resources, real capital, and the technological level in the society.
These basic determinants are tempered by the sociological, institutional, and consumption trends or factors within the economy.

Although many articles have been written on various aspects of economic growth, the present state of knowledge does not appear to be appreciably past the theorizing stage. As no complete theory of economic growth and development appears to exist, the long range economic forecaster may gain some insights from economic theory but depend very much on his own resources to make various forecasts.

The most common method to determine output appears to necessitate a population forecast from which a labour force estimate is made and then with assumptions regarding per-man productivity, an estimate for total output can be made.

Sophisticated population and labour force forecasts tend to divide the population into age and sex specific cohorts and then analyze the trends within each of these cohorts. The methodology used in this thesis was based on broad estimates for various trends per thousand population. Due mainly to an expected high birth rate in Canada, the population is anticipated to increase at about 3.8 percent per year to about 25,800,000 by 1980. Of this figure, about 10,000,000 are expected to make up the labour force. The two significant trends expected in the labour force are a large influx of young people and a
greater participation of women in the labour force.

In this thesis, the total output was separated into agriculture, government and public administration, and commercial non-agricultural sectors. This enabled the analysis of the trends in the work force, productivity, and output in each sector to be examined.

The significant trends in output expected are an increase in per-man productivity, but a declining labour force in agriculture, a rather constant productivity per man, but an increase in the total labour force in the government and public administration sector, and an increase in both the labour force and productivity per-man in the commercial non-agricultural sector. The real increase in output of the combined sectors is estimated to approximate 4.6 percent per year between 1965 and 1980 for the Canadian economy.

With the total output estimated, an estimate was made as to the division of the output between capital accumulation, government expenditures, consumer expenditures, imports and exports. It was found that the division of the output between these broad sectors tended to be rather stable in relation to the gross national product. Because of this stability, future estimates for the broad categorical spending were based mainly on simple trend projections. From the historical spending patterns, it would appear difficult to justify any drastic changes in the basic spending patterns.
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I. INTRODUCTION

A. Purpose

Many financial decisions, be they made by individuals, corporations, or governments, are based on future expectations. Such future expectations are generally based on forecasts of varying degrees of sophistication. Basically, this thesis reviews the methodology that may be used in long-range economic forecasting and applies some of this methodology to forecast various aspects of the Canadian economy to 1980.

Because one would expect economic theory to offer some direction or basis for economic forecasting, economic theory will be briefly examined in an effort to determine what aspects of economic theory may be incorporated or used in long-range economic forecasting.

Subsequent to the review of economic theory, a review of long range economic forecasting methodology, from both past economic studies and the literature, will be made to determine the commonly used methodology for forecasting economic variables such as the gross national product and major components of the gross national product and gross national expenditure. It would seem that in many long-range forecasts,
these major components of gross national product and gross national expenditure would form the basis for more detailed long range forecasts.

Following the methodological review, an examination of the indicated pertinent trends affecting a long-range economic forecast for Canada together with an examination of the major factors which appear to be affecting such trends will be made. This is attempted not only to make estimates for future values of the economic variables but also to identify some of the major factors or trends which appear to be affecting the development of the Canadian economy.

Combining various methodological procedures with the identification of the basic trends established, the two factors are brought together in the form of a forecast for the Canadian economy to 1980.

B. Scope

In almost any forecast analysis, the detail and depth of the study is primarily limited by the resources of those undertaking the forecast. For the Canadian case, the most detailed and thorough forecast was that of the Royal Commission on Canada's Economic Prospects which was sponsored by the Canadian government and entailed the expenditure of millions of dollars to publish the multi-volume work. From this
thorough study, the effort made to forecast the future size and structure of the Canadian economy ranges down to the expression of a casual opinion on the matter.

Although the depth of study for this thesis is necessarily limited, the attempt was made to examine what would appear to be the main points of the factors tending to affect the development of the Canadian economy and to do so in sufficient depth so the results could be used with a fair degree of confidence. Because one of the main objectives was to identify basic trends, however, no effort was made to study the statistical relationships between the variables.

C. Methods.

As has been indicated, the methods employed in this thesis for determining the methodology of long range economic forecasting was to examine recent studies that have been done on this topic in relation to the Canadian economy. From these studies, together with a review of available literature on the topic, various forms or types of methodology was established.

The methodology would then indicate the necessary historical data to be reviewed and the basic trends to be identified.

In most cases, the forecast necessitated some form of trend
extension. Such trends were often adjusted on the basis of qualitative judgment by the author but such adjustments were based on the necessary adjustments in previous forecasts and on the author's personal opinion based on knowledge gained from reading in the relevant area.
II. ECONOMIC THEORY

A. Introduction

The main purpose of this section is to examine the concepts and principles of economic theory that seems relevant to long range projections or forecasting and examine briefly the theory of economic growth at its present stage of development in an effort to formulate some possible methodology for purposeful long range growth projection.

From this brief review of the current theory, it is also hoped that some of the more important problems of long range forecasting will be observed and indications on how they may affect the forecast or how one might minimize their adverse effects on the accuracy of such forecasts.

Certainly after studying such economic theories and relating these with what actual data is available for study and analysis, a suitable methodology of long term forecasting should emerge.

B. Economic Theory

Economic theory, it would seem, has rather arbitrarily
narrowed its own field of theory by making certain simplifying assumptions such as the rationality of man. By making these fundamental assumptions, economic theory has been able to build its principles and theories within a rather sharply delineated area without becoming involved in the complexities and uncertainties that exist in such related fields as political science, sociology, or other non-economic areas which in fact do have economic consequences.

For the above reasons then, economics tends to be essentially abstract and deductive proceeding from a few general principles. Any science which explains phenomena in terms of measured cause and effect must be abstract and as such, economics is often compared with theoretical mechanics based on "frictionless conditions".

The variables which come into question when one studies the relationship between the social sciences and economic behavior become almost innumerable and many of the interesting forces and casual relationships become most uncertain.

It is because of these very uncertain complexities in mainly the non-economic areas that one must consider when contemplating a long-run forecast and that gives rise to the uncertainties of the forecast. Such forecasts go wrong because we are aware of only some of the casual relations affecting our forecast for growth and change.
Possibly the uncertainties of these non-economic forces are the main reason why no all inclusive satisfactory theory for economic growth has been developed. As indicated, most economic models or theories are built mainly on the premise of a few economic concepts. Under such conditions, it could hardly be expected that such models or theories of growth could properly explain all aspects of economic growth.

It would seem a complete economic theory of economic growth as well as the general theory would necessitate becoming involved in the behavioral sciences which in themselves are very indefinite and inconclusive. As a result then, economics is forced to retract within the limits set by the theory, recognize that there are forces outside those considered in the theory and make subjective judgments or allowances for such effects when utilizing economic theory.

Applied economics must try to take account of the role in business life of error and of motives which do not conform to the pattern of economic rationality. It appears that economic principles alone do not make it possible to predict the course of real events or the results of action. They must be filled in with data secured by inductive investigation, as well as modified to allow for various departures from the pattern of economic rationality. This may, of course,
be interpreted to mean that the other approaches to economic data, and most notably, historical research and statistical investigation are not to be taken as a substitute for sound theory, but rather as complementary to it. In most cases, the interpretation of records covering averages and aggregates and their movements can add much to what can be inferred from common sense principles or observation of particular cases.

Because of their apparent simplicity, any brief statement of general principles is bound to make abstract economic theories appear thinner and more remote from the concrete facts of economic life than they are. As in most sciences, there is a need for all degrees of generality. Recently, the "econometric" approach has developed, with the principle value of such elaborate and abstract systems being in forcibly reminding the inquirer that a change in practically any economic variable has direct or indirect effects on innumerable other magnitudes, thus preventing him from totally over simplifying conceptions of economic cause and effect.

It would seem then that since most general principles of economics are necessarily abstract, the more theoretical parts of economics cannot be taken to be a complete and adequate account of the mechanism of modern economic life.
Although economic theories often afford serviceable approximations to partial aspects of the true economic workings, new problems constantly appear and challenge attention as facts change and new interests emerge. As a result, it does seem that with improved knowledge of the actual workings of the economy, economists have attempted to incorporate more realisms into their theories and have brought them more into line with facts.

Possibly the best example of this re-thinking about economic theory could be the role of money in the economy. Early classical economists held the view that money was merely an instrument or tool. The phenomena of inflation and deflation and of boom and depression have, however, forced modern economists to recognize that the use of money and credit has important effects on the character of effective demand and on production and distribution.

It may be stated then that although the interests of economics have become more varied and concrete, and although conceptions have become better adopted to handling the facts of economic life as those facts present themselves, economics remains a political or social science and remains in a sense, a "theoretical" discipline.
C. Economic Growth

1. Definitions and Concepts

In very general terms, economic growth may be defined simply as "the expansion of a nation's capacity to produce the goods and services its people want". In a country such as Canada where the economy is relatively open and the people's income and satisfaction of wants rely heavily on imported goods, the definition would necessitate the extension to include the ability to export goods in return for goods that have greater want satisfying power than those exported. Certainly without Canada's ability to export, economic growth would have been much slower.

A more specific concept of economic growth would indicate the expansion of a nation's capacity to produce and also involves the process of expanding and improving the determinants of productive capacity. Although productive capacity is the important concept of economic growth, actual growth depends not only on the changes in the economy's potential production, but also upon the extent to which that capacity is utilized, an important point that will be discussed in a later section.

Economic growth can be used to describe three historically and conceptually quite distinct phenomena. These are indicated
below:

a) An expansion of activity and production in a pre-industrial economy not accompanied by any far reaching technological or structural change.

b) A sharp acceleration in production accompanied by dramatic technological and structural changes which transform an economy from a relatively undeveloped to at least a developing status.

c) A sustained expansion of production in an already advanced industrial economy by means of economic, social and technological changes of a type already familiar to it.

Although each of the above may not be distinctly identified in any one economy, each illustrates an important aspect of economic progress.

As will be discussed more thoroughly in the next section, technological progress plays a very important role in economic progress. It would seem that, possibly because of the unprecedented era of innovation in which they lived, many classical economists tended to take technological progress and increasing productivity for granted. Today, however, it seems generally accepted that modern economic
growth is, in substance, an application of the industrial system or a system of production based on increasing use of modern scientific knowledge.

2. Theories of Economic Growth

Although as mentioned previously, there is no all inclusive theory or model describing or explaining all aspects of economic growth. Because there are some insights on the factors to be considered in the determination of economic growth, however, it would seem advisable to briefly consider some of these models or theories at this point.

Most modern growth theories acknowledge that continuous technological progress and underlying it, a series of new scientific discoveries are the necessary conditions for a high rate of growth in per capita income that is combined with a substantial rate of population growth.

Science is seen as the base of modern technology and modern technology is in turn the base of modern economic growth. The tendency for scientific discovery, invention, and innovation, because of the limited intellectual resources available and because only a few areas appear most promising at any time, is to be concentrated in only a few fields at any given time. The consequence of this, especially in
a more advanced economy, is to greatly effect the pattern of economic growth. There is a tendency toward retardation in the rate of growth of older industries as the economic effects of technological progress and innovation within them slacken and as they feel increasingly the competition of the new industries for the limited resources. A high rate of growth in an economy is then necessarily accompanied by considerable shifting in relative importance among industries, as the old decline and the new increase in relative weight in the nation's output.

The above discussion was intended to only briefly explore the role of technology behind growth. A fuller discussion of structural change is left until the last section of this chapter.

Modern economic growth theory seems to have developed along two distinct lines. The first group of theories regarding economic growth tend to be concerned with the problems confronting the "undeveloped" economies. As may be expected, such theories must go far beyond the boundaries defined by pure economics and grapple with not only economic variables as the supply of labour, the stock of capital, or the quantity of natural resources available, but must also consider such factors as the political, cultural, institutional, and population behavior patterns.
The other group of theories concentrate more on the growth and changes within industrialized economies.

Very often the critical problem in an advanced economy is not one of productive capacity so much as the insurance of sufficient demand so that existing and anticipated capacity is fully utilized. Post Keynesian theories of growth do not seek to explain the change in such key determinants of productive capacity as the stock of capital, the labour force, the level of technology, but simply assume that these determinants are changing and then analyze the effects of the change.

The two most famous theories of economic growth which have quantified the changes in the economy seem to be those of E.D. Domar and R.F. Harrod. Without examining these models in detail, both the Domar and Harrod approaches consider investment as the central determinant in the growth process. Both tend to see the central problem of growth as the conditions under which planned investment will be continuously equated with a growing absolute volume of planned saving.

The Domar and Harrod models differ mainly in the way in which they look at the investment process.

The Domar analysis is concerned mainly with the technical question of the effect of present investment on future capacity and
seeks to determine the rate at which the economy must grow if future productive capacity is to be absorbed into use in the future. Harrod's model, however, uses the accelerator concept to link current investment to changes in the output level and seeks to determine if output has actually grown enough in the past so as to induce an amount of net investment sufficient to absorb the present full employment saving.

Although both the Domar and Harrod models do provide important insights into the operation of the real world economy, both tend to be very abstract and much dependant on rather rigid assumptions concerning the values and fixity of such critical determinants as the propensity to save and the capital coefficients. They do, however, point out the strategically important ideas of the capacity creating effects of net investment or the phenomenon of induced investment.

3. **Purpose and Measurement**

The fundamental purpose of economic growth is to improve the welfare of the nation's population. The economic growth or increased potential for production serves this purpose by not only increasing the amount of goods and services available for private consumption, but also provides the government with resources to meet its increasing obligations without having to reduce private consumption.
Because of the most meaningful measure of the improvement of a country's well being is on a per capita basis, an analysis of economic growth requires that not only changes in a nation's productive potential be considered, but also the accompanying changes in population. Although an increase in a nation's output of goods and services will not necessarily mean an improvement for the population if much of this output has, for instance, been directed toward defence or a war effort, it is generally assumed that an increase in gross national product per capita does mean a higher standard of living for the population.

As a possible alternative, consumption expenditures per capita for privately produced goods and services are not entirely adequate as a measure of material welfare because many of the goods and services supplied by the government contribute to the welfare of an individual but would not be included in the means of measurement. If such real outlays on total benefits received could be included, consumer expenditure would possibly be a better measurement of economic growth. Since "real consumption" is statistically almost impossible to measure effectively, it would seem that some measure of real output or income per capita would be the most reliable standard of economic growth.

As mentioned previously, economic growth depends to a great extent on the utilization of existing productive capacity. While this
determination of actual output potential would be the true estimate of future capacity and with an estimate of utilization of this capacity would lead to a fair estimate of the future gross national product, such an approach would seem most difficult without estimates on the demand side leading to the stimulation of investment. Changes in demand are the direct result of changes in population and changes of tastes and preferences within this population. If one must estimate the population figures and the preference characteristics of this population first, the question arises whether it is easier to predict capacity or output arising from the estimated demand or is it more accurate or logical to estimate capacity or output on the basis of the ability of this population to produce.

It would seem that both reasoning and the statistical data available would indicate that the estimation of potential output rather than potential demand would be more amendable to forecasting techniques.

4. **Determinants and Sources of Economic Growth**

It seems generally accepted that the four fundamental determinants of economic growth for a nation may be taken as indicated below:

a) The quantity and quality of the labour force.
b) The quantity and quality of the nation's natural resources.

c) The quantity of real capital.

d) The level of technological attainment of the society.

Taken together, these determinants will largely define the growth potential for any economy.

Although the above factors can be fairly readily analysed or compared, three other determinants not quite so easily recognized will certainly have some effect on a nation's economic growth. These other determinants tend to be:

a) The economic and non-economic factors such as the level of ambition of the population which in themselves tend to affect or determine the changes in the supply of labour, the level of technology, the stock of capital, etc.

b) The factors of an institutional character which might include the underlying competitive nature of the economy, the distribution of income and wealth, the pattern of consumer taste and forms of business organization.

c) All the factors that tend to determine aggregate demand such as personal consumption, investment trends, possibility of inflation, money and interest policies, etc.
Although the above factors can all exert much influence, economic growth tends to stem from two main sources. The first main source is the increase in the quantity of productive resources of the economy and refers mainly to the inputs of labour and productive capacity in the form of equipment, building, and natural resources.

The second sources of growth is an increase in productivity which can result from improvements in the productive quality of the factors of production and from improvements in the efficiency with which the productive factors are combined.

The two important aspects of growth that must be considered is first, that although the actual potential growth of output is determined by the quality, quantity and efficiency of use of productive resources, the actual growth tends to deviate around this potential due to changes in demand. The second consideration is that there have been no comprehensive analysis done on the source of economic growth of the Canadian economy.

Although it would be very difficult to determine the exact proportion that each has contributed to the economic growth of Canada, the primary or essential ingredients of Canadian productive growth seems to have been:
a) **Labour Input**

Besides the actual increase in the number in the work force due to population increases, the increased participation by women have tended to accelerate the growth of the labour force in recent years. Accompanying this increase in numbers in the work force, there has been and will probably continue to be a gradual increase in the quality of the labour force as measured by the level of education attained by those leaving the labour force as compared to those entering the labour force.

b) **Increased Efficiency.**

During the post-war period, the capital stock has been increasing rapidly in Canada. Taken on a capital per worker basis, the investment in Canada is very high and, especially in the non-farm sectors, is generally higher than in the United States. The main reasons for this seems to be the short production runs in Canada resulting in high machinery overhead and that much of Canadian industry tends to be concentrated in capital intensive industries such as mining and newsprint.

c) **Increased Efficiency.**

Resulting from a continued increase in population, larger scales
of production and specialization of production has allowed greater efficiency in the use of productive resources.

d) Industry Shifts

It has been estimated by the Economic Council of Canada\(^1\) that as much as twenty percent of the real income per person employed may be accounted for by the labour moving from low productive industries such as agriculture or fishing, to high productive sectors such as utilities or finance and insurance services.

With the above sources of economic growth in mind, studies in both Canada and the United States indicate that even in highly industrialized countries, the most important productive resource of any economy is its people.\(^2\) From such studies, it is indicated that approximately seventy-six percent of Canadian national income accrues to the labour and approximately twenty-two percent accruing to property. As these proportions have persisted for many decades, it would seem reasonable to assume that any change that might occur in the future would take place at a very gradual rate.


Concerning two of the major elements in economic progress, technological improvement and capital accumulation interact in various ways but in principle they can be separated and either could result in economic progress without the other.

Theoretically, continued and possibly unlimited economic progress may become possible even if the quantity of capital is kept constant. This would mean the fixed quantity of capital could be reshaped to higher and higher technological efficiency with at least the abstract possibility of substantial progress with capital at a constant level.

It would seem, however, that technological knowledge or progress and the forces which tend to increase it are extremely diverse and therefore little amendable to treatment by the tools of economic analysis.

On an aggregate view, capital formation raises output and productivity and is therefore closely associated with economic expansion. But capital accumulation alone, however, is not the most effective stimulant to raising productivity. For product per worker to increase, it is most advisable to utilize capital of a "better" quality or introduce advanced techniques. With the result that capital is not a homogenous product and depending on the particular location, nature
and timing of the investment, its effect on growth can be substantial.

One of the crucial questions concerning growth in a country such as Canada, is the allocation of capital between primary production and manufacturing industries. To avoid restricting bottlenecks in both sectors, both must grow in a balanced fashion with the course of development depending on such variables as the existing level and distribution of population, the state of employment, the relative efficiency of labour and capital in the two sectors and the respective markets for food, raw materials, and manufactured goods.

The theory of growth can identify the factors to be considered, but it cannot propose an "answer" which is applicable to all instances nor can it offer any final decision concerning the long-term structure of the economy.

The allocation of capital between economic sectors seems to be really a choice about means rather than ends with the implication that productivity and output is both primary and secondary sectors should ultimately be raised.

If the assumption of a closed economy in the above discussion is removed, tendency for the international market for food and raw materials to be inelastic, both theory and logic would suggest purposefully directing capital into manufacturing as a means of reducing the
dependence on primary exports and secondary imports.

The concept of "balance" is also a factor in the question of allocation of capital between industrial sectors of the economy. Especially in less developed countries, an important question arises as to whether capital should be directed toward large-scale units using advanced technology which use up capital in the employment of relatively few people, or to smaller scale labour intensive enterprise which will tend to lower the capital output ratio. The choice between the two would certainly appear to have different effects in the long run process of generating further growth, although there is as yet no systematic knowledge of how these effects will in fact work themselves out.

Although capital formation depends primarily on the willingness of individuals to save, not all accumulation of capital depends on the action of individuals. The ability of governments and public agencies not only to influence the actions of individuals but to accumulate and dissipate capital on their own account in large and increasing volumes can have large effects on the rate of capital accumulation in an economy. For example, if a government changes its method of financing a given budget of expenditures by increasing taxes and reducing the amount of borrowing, a considerable increase in the total capital
accumulation of the economy will take place.

The other major factor in long-term economic development is population. The fundamental factors that affect the growth or declines of populations are not well understood, and of those that do appear significant, few appear to be readily embodied in a precise theoretical framework.

It seems fluctuations of populations cannot be explained by acute poverty, specific moral interdictions, spent luxury, or other possible variables. It appears that increasingly population growth is affected by the entire sociological environment as well as by economic factors. As such, the fundamental fact remains that the population problem has not been solved.

Concerning governments and economic growth, possibly their greatest effect in recent years has been their ability to affect aggregate demand through appropriate policies in an effort to ensure a level adequate to absorb into use whatever productive capacity exists in the economy. It follows then that the ability to affect aggregate demand also yields the power to influence the determination of productive capacity. Certainly the problem is not so simple as indicated above and the complex problems involved in disaggregating government demand and priorities must receive the fullest consideration for an analysis of
government demand to be fully meaningful. It appears, however, that the problem of determining the way in which the activities of the public sector affect the economy's productive capacity is extremely complex and economic analysis of this sector is just beginning to be concerned with the quantitative aspects of this sector.

As a result, most existing economic theory dealing with the public activity centers primarily on the way in which such aggregates as government purchases of goods and services, government transfer expenditures and taxes affect the level of aggregate demand. Again, however, the effect of the above variables on changes in the productive capacity tends to be purely economic theorizing where no entirely satisfactory theoretical structure has yet been developed.

One conclusion, however, which appears to be validated from the above considerations is that the accumulation of capital is not in itself the central aspect of the process of economic growth. For example, depending on one's view of the investment in human resources, certainly raising the educational and degree of skill of the population will increase productivity independent of the accumulation of capital.

Or again, as defined on a per capita basis, changes in population may overshadow the rate of capital accumulation and the direction to which it is channelled.
To summarize the above comments then, to what extent actual industrialization is a necessary concomitant of growth; the changing distribution of output and employment between primary production, secondary manufacture, and the service sector; the tendency of long-term growth rates to decline in specific industries or sectors; the apparent universal appearance of long-term fluctuations or trends in economic variables would all find an integral place in the ideal theory of economic development and progress. Needless to say, such a theory does not exist and its possibility still seems rather remote.

5. **Structural Change**

Defined, structural change may be taken to mean both the changes in the sectorial origin of a nation's income and the changes in the occupational distribution of the nation's labour force.

Although much work has been done in analyzing structural changes within advancing economies, the basic causes seem to remain complex and somewhat obscure. The three main factors which seem to emerge, however, as the most influential are:

a) the change in the physical quantity of economic resources

b) changes in the techniques of production

c) changes in the demand for final goods and services.
Although a change in the supply of economic resources will have an immediate effect upon the economy's productive capacity and the conditions under which the productive capacity can be utilized, the ultimate impact of such changes on the economy's basic structure will depend upon the character of the demand for the product whose supply function is affected.

Such changes of the relative importance of industries or sectors of the economy depend mainly on the elasticity of both price and income of the demand for the sectorial product. The impact of technological development which tends to reduce the relative costs of production or to increase the general income levels will cause price and income elastic industries to have increased demand for their products and will tend to draw additional resources into the industry or sector and thereby increase its relative importance.

In cases where the industry tends to be price and income inelastic, the most important effect of technological advance or capital investment is not to expand production or reduce price, but rather to free labour and other resources for employment elsewhere in the economy. An outstanding example of this could be the case of agriculture.

It would seem then that both the logic of pure theory and
existing empirical evidence points to the fact that a developing economy will be undergoing constant and important changes in its productive structure. The importance of final demand dictates that whatever the social and political framework within which a country attempts to grow, and however for strategic aspects of savings, population and aggregate investment policies may be controlled, the pace, path, and outcome of expansion will depend upon the choices and actions of many men.
Ill. POPULATION

A. Introduction

As discussed in the theory concerning population forecasting, there is no concrete theory indicating exactly how even the known variables affecting population growth may be used in effecting an accurate population forecast. The result is that demographers do not presume to have any mysterious talent for forecasting the future in making population projects.

They do, however, have the ability and the tools for calculating what the future population would be if rates of natality, mortality, and net immigration should either remain constant or operate at more or less arbitrarily assumed levels. The calculation can also systematically take into consideration the trend in age-specific rates of natality, mortality and immigration.

The large errors of past population forecasts have occurred mainly because large and unpredictable changes have occurred in the basic economic, social, and cultural factors affecting vital processes.

The making of reasonable and justifiable assumptions about future trends in natality, mortality, and immigration and about basic
forces affecting such trends is a necessary and important part of making population projections. The main problem is that of deciding just what assumptions to make and how many alternate projections to make.

If only one projection is to be provided, the most reasonable assumption would seem to be that the vital rates of natality, mortality, and immigration of the recent past will continue unchanged into the future. Because all that we really "know" of the future is what we know of the past, the actual, the concrete, measurable facts of the recent past provide a solid, objective basis for the making of projections.

The chief weakness of using events and trends of the recent past as a basis for projections is that some unusual event of the recent past such as war or a depression may have disturbed the normal trends to such an extent that the projections would be abnormal and unreliable. The problem of selection of a period on which to base projections is a serious one but it cannot be avoided.

The forecasts in this study are based mainly on trends and experience of the 1945-1965 period. During the post-war period, the Canadian economy has experienced a vast array of economic conditions but at the same time, there has not been any serious wars or depressions that might significantly affect the variables upon which the population
forecasts are made.

B. Methodology

The standard population projection technique requires a population distribution by age and sex for the forecast base date. Each cohort of the base age-sex distribution is distinguished to account for mortality rates with the passage of time. This step requires a set of mortality rates by age and sex which are deemed adequate to represent mortality in each cohort during specific periods of time subsequent to the base rate.

Estimates of future births requires a set of assumptions about the trend of fertility in each cohort of the female population. The computations to yield estimates of the number of births during particular periods of time requires the application of these fertility rates to the size and structure of the female population.

In the case of immigration, again the assumed total figure for each year or time period is generally broken down by age and sex distribution. Although the total number of immigrants may be assumed to vary with different time periods, most forecasts assume the age and sex structure of the immigrants to remain constant.

It can be seen that with estimates for mortality for each age
and sex band of the population and the assumed addition to each age and sex band due to immigration, it becomes purely a mechanical calculation to follow each age and sex group through the chosen age bands for the period of the forecast. The natural increase making up the first age group will, as indicated previously, depend on the fertility rate assumed over time and the age structure of the female population.

Although the size of the age band chosen to segment the population is rather arbitrary, it seems that five years is the most common interval chosen.

It is to be noticed that the effect of the margin of error in the natality, mortality, and immigration rates assumed is cumulative and projections of the total population for even ten or fifteen years can be wide of the mark.

It also seems the projection of population figures is convention for two main reasons. First, leaving aside immigration, the projection of the number of women in the child bearing age bracket is based on females already born and second, nearly all the workers potentially available in fifteen years have already been born with the result that changes in birth rates will thus have virtually no effect on the labour supply during the next fifteen years.
Another method of forecasting future population estimates is much simpler and much cruder. With this method, the population is not broken down into age or sex groups but trends in birth and death rates are made on the basis of per thousand population and applied over the period of the forecast. Again the assumed immigration are lump sum figures and added to the existing population during each time period.

Because of the many uncertainties involved in either of the two mentioned forecast methods, the crude method may prove just as accurate as the more sophisticated age-sex specific method. The most important advantage of the latter method, however, would be the identification of structural changes taking place within the population.

A third method of estimating population growth that shows signs of becoming more important as a basis for future forecasts is based on econometric analysis. The attempt is made in this analysis to correlate age specific birth and death rates with several economic and sociocultural indicators.

The conclusion was reached that there is a systematic dependence of age specific birth and death rates upon some of the important socioeconomic variables. It was also concluded, however, that the influence of socioeconomic variables upon the demographic features of

a society is very much smaller than the effect of population growth upon economic development.

The method used in this study will be the application of the crude birth and death rates to the total population. The main reasons for accepting this method is that the uncertainties in all the methods would indicate the possible sacrifice in accuracy would be minimal as compared to the simplicity and convenience of the method.

In subsequent sections, the methodology and assumptions used to determine the birth, death and immigration rates are explored to greater depth not only for the method used in this study but also for the age-sex specific technique. In doing so, it is hoped that comparisons of accuracy may be possible and specific problem areas of the two methods may be examined.

C. Birth Rate

At present, Canada has one of the highest birth rates of any industrialized country and one of the main questions to be asked is whether this high birth rate will remain at this high level.

Historically, the crude birth rate declined in Canada from about 25 per thousand population in 1920 to about 19 in 1937. Since that time, the birth rate has been increasing and between 1948 and
1959, the crude birth rate has remained remarkably stable between 27.1 and 28.5. Recently, however, the rate has been declining and in 1962 stood at 25.3.

The same general pattern can be seen in age-specific groups for women during this same period. The most confusing aspect of this pattern was that the secular decline in birth rates was expected to continue shortly after the war instead of its steady increase until 1959.

Some of the more important reasons that tend to maintain the crude birth rate at 25 to 28 rather than the depression rate of 20 to 21 would be as follows:

1) High birth rates tend to be correlated with high periods of economic activity and the high confidence in the economic future of Canada will tend to maintain a high birth rate.

2) Increased opportunities for women to work as the Canadian economy becomes more industrialized seems to mean early household formation, early families, and larger families.

3) Family Allowance Plans tend to make the burden of families lighter, especially in the lower income groups.

1 Canada Year Book, 1965, p. 234.
4) Although based on only one study, a positive correlation was found between the size of income and size of family.

5) The fact that the French Canadian population relative to the non-French Canadian population has risen from one to two to about one to one and one-half has shown two significant factors affecting the Canadian birth rate. 

a) it tends to raise the birth rate as the French make up a growing share of the total population because their birth rates are above the rates for the non-French population.

b) the French birth rates are, however, declining.

There are, however, reasons why the crude Canadian birth rates may be expected to decline. The main reasons are as follows:


2. N. B. Ryder, Components of Canadian Population Growth, p. 78.
1) The Canadian marriage rate is falling as indicated below in Table 1:

<table>
<thead>
<tr>
<th>Year</th>
<th>Marriage Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1933</td>
<td>11.0</td>
</tr>
<tr>
<td>1941</td>
<td>10.6</td>
</tr>
<tr>
<td>1951</td>
<td>9.2</td>
</tr>
<tr>
<td>1960</td>
<td>7.3</td>
</tr>
<tr>
<td>1962</td>
<td>7.0</td>
</tr>
</tbody>
</table>

2) The industrialization of a country is generally associated with a long-run decline in birth rates.

3) At present, the current birth rate of Canada is one of the highest in any developed country and it would be expected that the rate would decline so as to be more in line with other industrialized countries.

1 Canada Year Book - 1965, p. 260.
Any forecast, whether it is based on crude birth rates or fertility rates for women with age specific classes, must consider the above factors and using past data, make some assumptions about the expected future trends in birth rates.

In this regard, the Royal Commission on Canada's economic prospects expected the birth rate to drop from 28.4 in 1955 to between 24.2 and 25.6 over the 1960 to 1980 period. This same pattern of declining birth rates was assumed in all the age specific groups of women over the same period except in the 15-19 year age group. Here the assumption of a jump in fertility rates from 55.0 in 1955 to 60.0 in 1965 and then a continual decline to 57.0 to 1980 reflects the assumption of the trend toward earlier marriages and earlier family formation.

In the Caves and Holton study\(^1\) instead of choosing some sort of median birth rate projection and basing a single projection on that rate, the study used a high, low, and median birth rate for each age group to compute three alternative population projections. The reason for doing this was to discern the margin of error in their population forecast arising from any poor prognostications of the birth rate. The

median projection of this study correctly assumed the high crude birth rate of approximately 28 would be maintained until 1960 after which it would return toward the lower birth rates of 20-22 as indicated by the long-run prewar trend.

Upon reviewing the two studies, it would appear the Royal Commission's estimate may be too high and the Caves and Holton study slightly low.

After considering the factors tending to maintain the high birth rate and those tending to lower the birth rate and assuming a temporary surge in the marriage rate during the late 1960's and the early 1970's due to the post-war "baby boom", the present study assumed a crude birth rate of between 23.5 and 24.5 would be reasonable for the 1965-1980 period. Although using the median rate of 24.0 will give a point estimation, some degree of the expected variation may be derived by studying the results of the Caves and Holton study. This expected variation in the population forecast will be discussed in the latter part of this chapter.

D. Death Rates

In marked contrast to the variations in the birth rates, the death rates in Canada have followed a much more stable course. Even
this apparent steady decline in the death rate, however, does not leave the forecaster without certain problems.

With the gradual increase in population density and urbanization and improved sanitation and medical services, the crude death rate has gradually halved during the 80 years between 1850 and 1930, dropping from 22 to 11. It declined to slightly over eight in the late 1950s and dropped to a low of 7.7 in 1961 and 1962. This is one of the lowest death rates in the world.

For comparative purposes, the death rates in the United States are shown below:

TABLE 2.

UNITED STATES DEATH RATES
(deaths per 1000 population)

<table>
<thead>
<tr>
<th>Year</th>
<th>Death Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910</td>
<td>14.7</td>
</tr>
<tr>
<td>1940</td>
<td>10.8</td>
</tr>
<tr>
<td>1950</td>
<td>9.6</td>
</tr>
<tr>
<td>1961</td>
<td>9.3</td>
</tr>
<tr>
<td>1962</td>
<td>9.5</td>
</tr>
<tr>
<td>1963</td>
<td>9.6</td>
</tr>
<tr>
<td>1964</td>
<td>9.4</td>
</tr>
</tbody>
</table>

1Canada Year Book - 1965, p. 244.
When the population is divided into age-sex groups to estimate sector death rates, two features stand out. First is the generally lower mortality rates for women in all age groups except those in the early childbearing age. Second, the mortality rates have shown a pronounced tendency to decline at a relatively constant rate with the rate of decline being higher for lower ages. The death rate has been most significant for men under 50 and for women under 55 years. Above these ages, the death rate has remained relatively constant.

One reason that the death rate in Canada may be expected to decline is the scope available in reducing infant mortality. This is one field where Canada has lagged behind other advanced countries and may be seen from the Table below.

**TABLE 3.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Canada 1</th>
<th>United States 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1940</td>
<td>60</td>
<td>47</td>
</tr>
<tr>
<td>1950</td>
<td>39</td>
<td>27</td>
</tr>
<tr>
<td>1960</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>1964</td>
<td></td>
<td>18</td>
</tr>
</tbody>
</table>

---


Another factor tending to cause the decline in the death rate is the fact that most immigrants are below 50 years of age where the death rate is declining. If immigration remains relatively constant, this will of course be a decreasing effect as the population grows.

It is interesting to note that the Royal Commission has assumed a declining death rate for its forecast period to 1980 whereas the Caves and Holton study feels the recent low death rate has been caused by the influx of young immigrants and that the death rate is at an artificially low rate that cannot be maintained for an extended period.

With the population divided into age and sex groups, the standard procedure is to plot historical death rates against time on semi-logarithmic paper and simply extend the trend traced out for the forecast period for each of the age-sex factors. The effect of this method is to assume a decline over the forecast period but that the rates are constant within each time period.

When plotting mortality rates against time it becomes necessary to use semi-logarithmic paper because using straight linear projections would indicate death rates to become zero in about fifteen years.

To obtain the estimate for the survivors of each cohort that will make up the next highest age bracket, the number of persons expressed
in thousands in each given age and sex class would be multiplied by the power of the number of years in each age group of one minus the estimated mortality rate for persons in that age group.

As with possible subjective adjustments of the age specific groups, not only is it necessary to decide whether the rate of decline in the crude rate is likely to continue, but a judgement is also necessary about whether the pattern of specific death rates will continue.

In considering the above factors and assuming the growing Canadian Economy will continue to require a substantial number of young immigrants to meet manpower needs, this study assumed the crude death rate would lie between 7 and 8 between 1965 and 1980.

E. Immigration

The immigration rate is the most volatile component of population growth and greater uncertainty surrounds the forecast of net immigration than either the birth rate or the death rate. Because of its smaller absolute number, however, a 20 percent error in the migration forecast will affect the population forecast less than a 20 percent error in the birth rate.

The main factors responsible for the high volatility of the
immigration figures seem to be:

1) The economic cycles of both Canada and those of the countries from which the immigrants come.

2) The relative economic opportunities or real wages of Canada compared with other countries.

3) Political events and policies of Canada and other countries.

The effect of the factors on the volatility of immigration can be appreciated by the fact that immigration reached a low of 7,600 in 1942 and a high of 400,000 in 1913. Recently, however, the gross immigration rate has been as indicated below.


<table>
<thead>
<tr>
<th>Year</th>
<th>Gross Immigration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1943</td>
<td>8,504</td>
</tr>
<tr>
<td>1944</td>
<td>12,801</td>
</tr>
<tr>
<td>1945</td>
<td>22,722</td>
</tr>
<tr>
<td>1946</td>
<td>71,719</td>
</tr>
<tr>
<td>1947</td>
<td>64,127</td>
</tr>
<tr>
<td>1948</td>
<td>125,414</td>
</tr>
<tr>
<td>1949</td>
<td>95,217</td>
</tr>
<tr>
<td>1950</td>
<td>73,912</td>
</tr>
<tr>
<td>1951</td>
<td>194,391</td>
</tr>
<tr>
<td>1952</td>
<td>164,498</td>
</tr>
<tr>
<td>1953</td>
<td>168,868</td>
</tr>
<tr>
<td>1954</td>
<td>154,227</td>
</tr>
<tr>
<td>1955</td>
<td>109,946</td>
</tr>
<tr>
<td>1956</td>
<td>164,857</td>
</tr>
<tr>
<td>1957</td>
<td>282,164</td>
</tr>
<tr>
<td>1958</td>
<td>124,851</td>
</tr>
<tr>
<td>1959</td>
<td>106,928</td>
</tr>
<tr>
<td>1960</td>
<td>104,111</td>
</tr>
<tr>
<td>1961</td>
<td>71,689</td>
</tr>
<tr>
<td>1962</td>
<td>74,586</td>
</tr>
<tr>
<td>1963</td>
<td>93,151</td>
</tr>
</tbody>
</table>
Over the post-war years, movement of people in and out of Canada has been large. For example, 2.24 million immigrants and 1.0 million emigrants. This estimated 1.24 million net immigration accounted for 19.5 percent of the growth in population over those years.  

It can also be seen from the above table, the periods of large inflow of immigrants coincide with high periods of economic development.

The main factors given in the 1965 Canada Year Book for the 1958-1961 decline in immigration were as follows:

1) The upsurge in the economies of the European countries from which Canada got most of its immigrants.

2) The increasing emphasis placed on selecting the immigrant with qualifications to permit him to integrate into Canadian business or the Canadian labour force.

Accurate emigration figures for Canada are virtually non-existent but it has been estimated by the Royal Commission that emigration for the 1945-55 and 1951-55 periods were approximately 50,000

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1 Louis Parai, Immigration and Emigration of Professional and Skilled Manpower during the Post-War Period, 1965, p. 9.
and 60,000 respectively. In 1955 about 32,000 left for the United States, but by 1963 this figure had dropped to 26,000.

The most important factor which seems to have explained the high volatility of Canada's immigration has been the hypothesis that differentials in economic opportunity generally determine the direction and rate of migration. This hypothesis was reviewed by Clark with the basic work being on the relation of migration and the business cycle. Given that migration depends primarily on the differential in economic opportunity assumes, however, the absence of any significant barriers to the international movement of persons.

Underlying the discussion of potential immigration is some pre-conception about whether population growth in general, as well as migration in particular, is a result of or a cause of increases in the country's national income. In most population forecasts, the natural population increase is considered to be independent of the growth of the national income if a reasonably high level of employment is maintained.

In general, however, Canada's ability to absorb immigrants is determined primarily by the absorptive capacity of her export industries

and the industries dependent on them. Because the performance of
the export industries is largely determined by world prices, it seems
most hazardous to express firm views about the magnitude of the im-
migration into Canada or to formulate any theory that could purpose-
fully be used to predict immigration.

As such, the forecaster is left with little alternative but to
simply review the past data and establish a "best guess" migration
rate for the forecast period.

Where age-sex specific groups are used for forecasting, a
constant age-sex distribution is generally determined and is assumed
to be constant for both the immigrants and the emigrants for the fore-
cast period and it is also assumed that the birth and death rates will
be the same for the immigrants as for the natural population.

Again to estimate the possible variation in the forecast, the
Caves and Holton study made high, low, and median immigration rate
assumptions and were as follows: ¹ The low immigration rate assump-
tion considers the net rate to decline linearly from 120,000 in 1951 to
30,000 in 1970; the median rate assumes a linear decline to 40,000 a

year in 1970; and the high rate assumes the rate to hit a 1970 low of 50,000.

The Royal Commission expected the net immigration figure to range between 50,000 to 100,000 per year with a constant 75,000 per year being the most likely for the 1955-1980 period.

The report, Economic Goals for Canada to 1970, assumed for the 1965-70 period, an average gross immigration of 125,000, an average emigration of 75,000, resulting in an average annual net immigration of 50,000.¹

As can be seen from the above examples, estimates of immigration figures depend heavily on the most recent experience and upon the judgement of the forecaster as to what is likely to be Canada's requirements for immigrants as compared to the likely magnitudes of the increases in national income.

In the present study, a figure of 45,000 for net immigration for the 1965 to 1980 period was accepted as being reasonable. This in effect is agreeing with the outlook presented in the Economic Goals for Canada to 1970 and assumes the forces tending to decrease

immigration in the Caves and Holton study will continue to operate through to 1980.

F. Future Estimates

Based on a crude birth rate of 24 and a crude death rate of 7.5 and assuming a net immigration of 45,000 per year, the future estimates of Canada's population are shown below in Table 5 and Figure 1. For comparative purposes, the population estimates of the Economic Council of Canada, the Royal Commission and the Caves and Holton study are included.

TABLE 5

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Caves &amp; Holton</th>
<th>Economic Goals for Canada to 1970</th>
<th>Royal Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>19,600</td>
<td>19,430</td>
<td></td>
<td>19,200</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>19,520</td>
</tr>
<tr>
<td>1970</td>
<td>21,500</td>
<td>20,980</td>
<td>21,730</td>
<td>21,160</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>21,640</td>
</tr>
<tr>
<td>1975</td>
<td>23,570</td>
<td></td>
<td>23,310</td>
<td>23,990</td>
</tr>
<tr>
<td>1980</td>
<td>25,810</td>
<td></td>
<td>25,770</td>
<td>26,650</td>
</tr>
</tbody>
</table>

1 Based on annual net immigration of 50,000 per year.

2 Based on annual net immigration of 75,000 per year.
FIGURE I - POPULATION ESTIMATES 1965 - 1980
Concerning the variability of population estimates, it may be recalled that in the Caves and Holton study, the fertility rates for the age specific female population were assumed as follows:

1) High Rate - the constant high fertility rate of 1951 would continue through to 1970.

2) Median Rate - the high 1951 fertility rate would continue to 1960 after which it would decline by approximately 16 percent between 1960 and 1970.

3) Low Rate - the high 1951 rate would show a steady decline down to the 1940 levels, a total decrease of 32 percent.

Because of the relative stability of the mortality rates, a point estimation was used for death rates. The high, median, and low net immigration rates were assumed as previously discussed.

The ranges of the assumed fertility and death rates are illustrated below.
TABLE 6.

SAMPLE BIRTH AND IMMIGRATION RATES

Birth Rates  (20-24 age group)

Net Immigration Rates

A combination of both "high" estimates combined with the point estimates for the mortality rates gives a population estimate of
21,515,000; the combination of both "low" estimates give 20,190,000; and the two "median" rates give 20,984,000 for 1970. The spread between the high and low figures amount to 3.8 percent above the median figure and 2.6 percent below the median figure.

In the Royal Commission study, a net immigration figure of 50,000 was selected as the low limit of the range, 75,000 the most probable, and 100,000 as the upper limit. Point estimates were made for both fertility and mortality rates. The fertility rates assumed, however, were much higher than those of the Caves and Holton study. For example, in the 20-24 age group, the Royal Commission assumed the fertility figures would decline from 212 in 1955 to about 205 in 1975, both considerably higher than the figures as shown in Table 6.

With the Royal Commission assumptions about immigration the range indicated is from minus 3.3 percent to plus 3.8 percent of the median range.

The above percentages, however, cannot be taken as an estimate of the expected accuracy of a population forecast. If one takes the spread between lowest of the two low forecasts and the highest of the highs, the spread becomes plus or minus 4.6 percent.
It would therefore appear that it would be quite possible for any point estimate to be in error as much as five percent or possibly more.
IV. LABOUR FORCE

A. Introduction

During the immediate past, the pattern of labour force participation has been a slowly but steadily declining rate for men and a rapidly rising rate for women. Some of the contributing factors to these developments seem to have been the increase in the number of pension plans, prolonged school attendance and the increase in the number of women remaining in or re-entering the labour force after marriage.

The two most striking features that are expected to take place in the Canadian labour force within the next fifteen years will be the great influx of young people and the continued increase in the participation by women.

According to the Economic Goals for Canada to 1970,¹ the number of people in the 20-24 age group in the labour force is expected to increase by 33 percent between 1965 and 1970 and by 57 percent between 1965 and 1975. Whereas the number of males in the above age group entering into the labour forces during the 1950s

¹Page 33.
totalled 25,000, it is expected that during the 1960's, this increase will amount to 270,000.

The above report also expects that married women will account for 30 percent of the women in the labour force by 1970 as compared with 10 percent in 1950.

B. Methodology

Once a projection for the population estimates have been derived, it becomes a rather straightforward exercise to estimate the size of the future labour force. This does not mean, however, that the estimates are without a degree of uncertainty as a result of assumptions.

As a natural follow-up to a population estimate based on age and sex distribution, a forecast of the labour force is derived by applying projected labour force participation rates specific to each sex and each age class.

In an effort to make the forecast as accurate as possible, several deductions from the total population figures should be made before calculating past and estimating future participation rates. The three main deductions that would be made in Canada's case, at least,
would be:

1. Assuming the armed forces to be all male, of a given size and a constant age distribution, the resulting figures would be subtracted from the appropriate age classes.

2. An estimate of Indians on reservations by age and sex would be deducted.

3. An estimate of the population by age and sex in institutions such as jail, hospitals, etc. are generally assumed to be a constant percentage of the total population and are deducted before labour force figures are calculated.

With the above three deductions, the, and by the official definition of the labour force used by the Bureau of Statistics, the total of the population fourteen years of age and over would be eligible to be included in the labour force.

While the assumptions as to the participation rates are crucial in projecting the labour force, the record of labour force participation rates by age and sex only go back to 1945 for Canada. Although as more data becomes available and firmer trends become apparent, the accuracy of the expected participation rates may be expected to improve.
The actual estimates of the participation rates are derived in much the same manner as derived for fertility rates or mortality rates, namely an analysis of the past experience and then some "educated guess" as to what extent the past trend will be followed in the future and if changes are likely to occur, what is the most probable direction and how much.

In the present study, a simpler method was used to estimate the size of the labour force but because of the uncertainties involved in both techniques, it would seem the degree to which accuracy is sacrificed is open to question. The main disadvantage of the method to be outlined is, of course, as with the simple method of estimating the total population, no age structure is obtained for the estimated labour force.

This simple method, the one used in the present study, was to calculate the actual percentage of both men and women of the total population making up the labour force. Again based on the past trends, some assumption was made as to the possible participation rates to be expected in the future. A more detailed discussion follows in subsequent sections as the calculations and estimates are actually made.

Although the two above examples are possibly the two extreme
choices in breaking down the population to calculate and estimate participation rates, any number of population break-downs are possible, the choice depending mainly on the desired form of the labour force forecast.

What follows now, then, is the method and reasoning used in the present study to obtain the future labour force estimates.

Because of the aforementioned trends, it is expected that the labour force during the 1960's will grow faster than the rate of population increase during the 1960's as compared with a growth of the labour force during the 1950's which was less than the rate of the population growth during the 1950's.

C. Women in the Labour Force

Because predicting the participation rate of women in the labour force requires in essence, a forecast of the changes in sociological values and attitudes of society, such a forecast can be little more than 'guesswork.'

In the light of the apparent increased opportunity for employment of women and the long-run drift of Canadian attitudes or patterns to duplicate those of the United States, it would seem that Canadian women will continue to increase their participation rate in the work force.
The historical pattern of men and women in the labour force may be seen from the data in Table 7.

If the rate of increase of the percentage of women in the work force between 1954 and 1963 is extended to 1980, the participation rate of women would increase from 9.8 percent in 1963 to about 12.5 percent in 1980.

Upon reviewing the American data of Table 8, it is seen that only recently has the participation rate of women climbed significantly above the 12 percent level.

**TABLE 7**

**DISTRIBUTION OF CANADIAN LABOUR FORCE**

| Year | Population (Millions) | Labour Force | | | |
|------|-----------------------|--------------|--------|--------|
|      |                       | Men          | Percent of Population | Women | Percent of Population |
| 1946 | 12.31                 | 3.75         | 30.2   | 1.08   | 8.8 |
| 1954 | 15.29                 | 4.25         | 27.8   | 1.23   | 8.1 |
| 1957 | 16.61                 | 4.56         | 27.5   | 1.43   | 8.6 |
| 1960 | 17.87                 | 4.75         | 26.6   | 1.66   | 9.3 |
| 1963 | 18.90                 | 4.87         | 25.8   | 1.85   | 9.8 |

---

1Canada Year Book - 1965, p. 723-724.
TABLE 8

DISTRIBUTION OF AMERICAN LABOUR FORCE

WITH PROJECTIONS TO 1980\(^2\)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>POPULATION (Millions)</th>
<th>LABOUR FORCE</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Men</td>
<td>Percent of</td>
<td>Women</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Population</td>
<td></td>
</tr>
<tr>
<td>1946</td>
<td>141.9</td>
<td>46.0</td>
<td>32.4</td>
<td>16.3</td>
</tr>
<tr>
<td>1954</td>
<td>163.0</td>
<td>19.7</td>
<td>19.7</td>
<td>11.5</td>
</tr>
<tr>
<td>1957</td>
<td>172.0</td>
<td>21.5</td>
<td>12.5</td>
<td>12.5</td>
</tr>
<tr>
<td>1960</td>
<td>180.7</td>
<td>26.4</td>
<td>12.0</td>
<td>12.0</td>
</tr>
<tr>
<td>1963</td>
<td>189.0</td>
<td>26.8</td>
<td>13.0</td>
<td>13.0</td>
</tr>
<tr>
<td>1965</td>
<td></td>
<td>26.6</td>
<td>13.5</td>
<td>13.5</td>
</tr>
<tr>
<td>1970</td>
<td></td>
<td>26.7</td>
<td>14.7</td>
<td>14.7</td>
</tr>
<tr>
<td>1975</td>
<td></td>
<td>26.7</td>
<td>14.8</td>
<td>14.8</td>
</tr>
<tr>
<td>1980</td>
<td></td>
<td>26.6</td>
<td>14.8</td>
<td>14.8</td>
</tr>
</tbody>
</table>

The figures from Table 8 also indicate that the participation rate of American women is expected to climb to about 14.7 percent by 1970 after which it is expected to level out.

If the difference in participation rates of Canadian and American women in the labour force continue to converge at the same rates as in the past, an indicated participation rate of 13 percent would result. It

---

would seem a fair hypothesis that in the light of the very low participation rate of Quebec women and the generally more conservative nature of Canadians that Canadian women will not likely participate in the labour force to the extent of American women within the forecast period.

The rates used in this study to estimate the participation of women in the labour force are given below.

**TABLE 9.**

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated Population</th>
<th>Projected Participation</th>
<th>Number of Women in Labour Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>19.60</td>
<td>10.0</td>
<td>1,960,000</td>
</tr>
<tr>
<td>1970</td>
<td>21.50</td>
<td>10.9</td>
<td>2,340,000</td>
</tr>
<tr>
<td>1975</td>
<td>23.57</td>
<td>11.7</td>
<td>2,760,000</td>
</tr>
<tr>
<td>1980</td>
<td>25.81</td>
<td>12.5</td>
<td>3,230,000</td>
</tr>
</tbody>
</table>

It may be noted in passing that the above participation rates are substantially higher than those used by the Royal Commission on Canada's Economic Prospects. The rates used in that report increased from 8.7 to 9.6 percent in 1980. From Table 9, it can be seen that unless there is a distinct levelling out or slight decline in the rates of the future, the
Royal Commission will have substantially underestimated the participation rate of women in the Canadian work force.

D. Men in the Labour Force

The direction with which the participation rate for men will take in the next fifteen years presents a rather perplexing problem.

Although the participation rates have been declining rather steady since at least 1954, it would seem obvious that this continued decline could not go on indefinitely. Also, if the American projections of Table 8 prove to be correct, there does not seem to be any logical reason why the Canadian participation rate should continue to decline in the face of a rather stable American participation rate. The Royal Commission actually foresaw an increase in the participation rates for men rising from 27.1 percent in 1965 to 27.6 percent in 1980.

It would seem, in the light of American experience and projections and large number of both high school and university graduates begin to come onto the labour market, the Canadian participation rate for men has possibly reached a low and will possibly stabilize around the present rate. Although it is far too short a period to be taken as evidence, it is interesting to note that the 1964 participation rate was exactly the same as in 1963.
It will be assumed in this study that the participation rate will tend to stabilize around the present level as is shown in Table 10 below.

TABLE 10

ESTIMATE OF MEN IN THE CANADIAN LABOUR FORCE

<table>
<thead>
<tr>
<th>Year</th>
<th>Estimated Population (Millions)</th>
<th>Projected Participation</th>
<th>Number of Men in Labour Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>19.60</td>
<td>25.8</td>
<td>5,050,000</td>
</tr>
<tr>
<td>1970</td>
<td>21.50</td>
<td>26.0</td>
<td>5,600,000</td>
</tr>
<tr>
<td>1975</td>
<td>23.57</td>
<td>26.1</td>
<td>6,150,000</td>
</tr>
<tr>
<td>1980</td>
<td>25.81</td>
<td>26.2</td>
<td>6,760,000</td>
</tr>
</tbody>
</table>

It may be noted at this point that the figures both in Table 9 and 10 are for the civilian work force and do not include the men and women employed in the armed forces.

E. Conclusions and Comments

The table below then is the resultant estimated work force up to 1980 and includes the estimates made by the Royal Commission.\(^1\)

The estimates are also shown in Figure 2.

\(^1\) W. C. Hood and A. Scott; Output, Labour and Capital in the Canadian Economy, 1957, P. 185.
FIGURE 2 - LABOUR FORCE ESTIMATES 1965 - 1980
For comparative purposes, the total work force in 1970 was estimated by the Caves and Holten study to be 7,230,000 and by the Economic Goals for Canada to 1970 to 7,883,000. Although the Caves and Holten study did not give any breakdown of their figures, considering the work force in 1964 was 6,920,000, it would seem their estimate for 1970 will be considerably low.

TABLE 11

TOTAL ESTIMATED WORK FORCE
(Thousands)

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Royal Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Men</td>
<td>Women</td>
</tr>
<tr>
<td>1965</td>
<td>5,050</td>
<td>1,960</td>
</tr>
<tr>
<td>1970</td>
<td>5,600</td>
<td>2,340</td>
</tr>
<tr>
<td>1975</td>
<td>6,150</td>
<td>2,760</td>
</tr>
<tr>
<td>1980</td>
<td>6,760</td>
<td>3,230</td>
</tr>
</tbody>
</table>

Because the estimates of the labour force are directly dependant on the population estimates together with the estimates for the participation rates, it might be expected that the variability of the labour

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1 Assuming Immigration to be 75,000 per year.
force would be at least equal to that of the population estimates or plus or minus five percent.

Cumulative errors in the participation rates would not seem to be too great a problem, however, because it might be expected that an over estimate in one group would likely be accompanied to some extent by an underestimate in another group. This is not denying, however, that errors can be made in estimating participating rates without it affecting the accuracy of the labour force forecast.
V. OUTPUT

A. Methodology

National output has long been regarded as a relatively accurate measure of the welfare of a nation because changes in national output may be taken as indicative of changes in production capacity, employment, consumption and earnings.

Conceptually, national output or total economic activity can be defined or measured in the following three ways:

1. The value of production or output for a period expressed in the form of an index number or in monetary units.
2. The value of the total consumption of goods and services consumed by an economy during a period.
3. The total of all incomes accruing to all individuals and income-receiving entities in an economy during the period in question.

The pivotal axiom in the national-income accounting scheme may be expressed as the "controlling measure of total economic activity and accomplishment shall be production of valued goods and services for end users" and as such, results in the adoption of production or output
as the key concept of economic activity.

The adoption of output as the key to economic activity and recalling the determinants of productive capacity enunciated by Domar in Chapter II, most of which were concerned with quantity and quality of input factors, would seem to indicate long-term economic forecasting should concentrate on output estimates, rather than some of the other possibilities to be mentioned shortly.

Following then the procedure indicated by the implications for forecasting, again estimation of output becomes the key economic variable. With output defined as the total quantity of goods and services produced during a given time period expressed in current prices, an accurate analysis would attempt to segregate the contributions of each of the main contributors, namely, labour, capital, and land. However, since the author knows of no study that has made such an analysis and observed the change in the contributions of each factor to changes in total productivity, it seems the forecaster must be satisfied with assuming most of the productivity can be attributed to labour. This trend, in effect, is to consider that the ratio of total output to labour moves in a time pattern similar to that being described by the assumed ratio of total output to the sum of all the factors of production.

The common approach of taking the available labour force and estimating its division between the two or three main sectors of the economy and applying the estimated productivity figures requires a careful analysis of total output.

Although various alternatives to measure total output are available, the measurement of output and changes in output seems best effected using an industrial index based on the difference between the value of goods and services produced and materials, fuel, power, and the services purchased. Although not available for all industries, such indices are available for a large number of industries with their records in Canada going back to 1935. Because the weights of the indices are essentially independent of changes in the price level. The other advantages of using such an industrial price index is that similar to their independence of price level changes, the indices are essentially independent of depreciation adjustments and business profit estimates.

Although not perfect, the industrial production index does seem to provide the best of the possible measures of output. The actual measure of estimated future output is the gross domestic product. From these figures, a reasonably reliable estimate of gross domestic product can be derived by making adjustments for such factors as indirect taxes, rents, and net flow of dividends and interest.
Although the above approach seems by far the most common, at least conceptually, other methods of determining output would seem feasible. The first of these is the National Income approach which is based on the aggregation for all industries of the rewards of the factors of production employed in that industry and would be the total of the uses side of the National Income and Product account. The main problem with this approach is to what to count as income. In the income approach, depending on the particular measure of national income under consideration, various kinds of payments are excluded such as transfer payments, interest on government debt, etc. But some nonmonetary activities such as imputed wages and salaries, the imputed rental value of owner-occupied homes, etc. are valued at current market prices and placed in the national income accounts.

A second problem area with this approach is that contributions to national income can not always be neatly segmented between the various industries and that although the output may be produced domestically, income generated by productive activity may partly be paid to foreigners.

Another problem area, although not entirely unique to this method, is that industrial contributions to national income are expressed in terms of current income, and because of the vast array of different sources of income, it would be most difficult to deflate such a series of
income figures.

A third possible alternative to measuring total output is the summation of value added by industrial sectors measured at current cost. A problem here, as in the above case, is that generally while a fine break-down is available for some parts of the economy, there are industrial sectors of the economy with no break-down at all. Also the problem exists of trying to construct a deflator index for such a series; the problem arising from the fact that the value added figures include such diverse components as a complex of incomes, depreciation and payment for other business services.

The above problems discussed in the contributions to national income and value added approaches to measuring total output, would seem to present even more serious problems and possibilities of inaccuracies if used to estimate future outputs. Possibly the greatest problem areas would be the estimation of the imputed incomes and the changing structure of the classification of the industries for purposes of estimating value-added and contributing incomes of the various sectors.

Besides the method of correlating the estimated labour force with total output, one other method that correlates changes in productivity with changes in gross national product was used by Raushenbush. The rational of the study is based on the supposition that when output

per man-hour or man-year increases, there is a decreased demand for labour to produce any one unit of output but that demand for the total number of units will increase and that the demand for "labour" will increase by the amount that the increase in demand for the product exceeds the increase in output per unit of time.

This then leads to a relationship between increased productivity and the increase in the real gross national product. For example, in the United States between 1950 and 1955, the real increase in gross national product amounted to 1.2 percent for every 1.0 percent that output per man-year increased. The reason this study used this method was not necessarily because it was more accurate, but because the attempt was made to estimate gross national product independent of the labour force to determine possible unemployment figures for the period of forecast.

Having decided then, that the estimation of future output is based on the productivity and size of the future labour force, the subsequent discussion deals with this method in greater detail and uses this method to estimate the output for Canada up to 1980.

B. Division of Output

In attempting to draw up a forecast for the total productivity of
the economy as measured by the gross domestic product, three separate studies were reviewed. Each of the three studies used slightly different methods in calculating the gross domestic product.

The Caves and Holten study simply divided the labour force between the agricultural and the non-agricultural components and estimated the rate of change of employment and productivity in each of the two components to arrive at a gross domestic product figure.

The main reasons for separating out agriculture in both the above study and the others is that the absolute figure of productivity on a per man year basis of farmers is less than half of the non-farm average. Two other points of significance is that the proportion of the total labour force employed in agriculture is declining and also their rate of increase of productivity is above that of the national average.

The two other studies reviewed - the Royal Commission and the Drabble Study further divided the non-agricultural component into


a Government and Community services section and a Business or Commercial section.

The Royal Commission study followed in essence the same format as used in the Caves and Holten study. The Drabble study, on the other hand, approached the problem somewhat differently. Because it was the latter approach that was followed in the present study, it will be briefly outlined below.

In the agricultural section, the Drabble study estimated total agricultural output to 1970 and divided by the estimated agricultural labour force to obtain the productivity per man.

For the government and community section, total output for this section was again estimated and an estimate of the output per man derived to calculate the potential employment in this section.

The total employment in the Commercial section was then a residual figure from the above two sections. This figure was further divided into paid workers and self-employed or unpaid workers. The number of paid workers was then multiplied by a productivity figure to obtain the total output in this section.

In the last two studies mentioned, the Royal Commission and the Drabble study, the main reasons given for separating out the
government and service sector is because the employment rate has
been increasing rapidly and because the absolute level of productivity
tends to be low. The changes over time in productivity show no
clear trend but as employment in this sector grows in relative impor-
tance, its impact on over-all measures of productivity increases.

The remaining section, that of the business or commercial
section is by far the most important and accounted for about 80 per-
cent of the output and about 70 percent of the total employment in
1963.

Two major assumptions made by all the above mentioned
studies and the present study is first, the appropriate level and
pattern of aggregate demand can be generated to absorb the output
and second, the composition of the required level of demand will not
be inconsistent with the assumptions that underlie the way in which
the various inputs are combined.

Some studies have separated out labour and capital components
to estimate productivity and total output but because of simplicity most
studies use only output per man as an over-all measure of productivity.

C. Agriculture

1. General

As mentioned earlier, the agriculture section has a low
productivity but that productivity per man is increasing relatively rapidly.

The main factors which tend to be increasing productivity in the agricultural section seem to be as follows:

a) increased mechanization.
b) higher earnings outside the agricultural section tending to draw off marginal labour leaving a more efficient core of workers.
c) the trend towards larger and more efficient farms.
d) the better use of fertilizers, drainage and raising higher valued products.

The two main factors which are tending to offset the above gain in productivity in the agriculture section seem to be:

a) the considerable surplus of U.S. wheat in storage and the U.S. productive capacity of wheat seems to give little improvement in terms of trade for Canada's major farm product, barring any drastic harvest failures.
b) the historic growth rate for the Canadian agriculture productivity is biased upward because harvests on the average have been much better in the latter years than in the earlier ones for which the statistics are available.
It would seem, however, in the light of post war experience the factors tending to increase productivity have far outweighed those tending to hold back productivity even though the two offsetting forces have not always been of constant magnitude.

2. **Employment**

Looking first at employment in the agricultural sector, the rate of decline in farm employment has been somewhat sporatic as shown in the Table below:

**TABLE 12**

**RATES OF DECLINE IN FARM EMPLOYMENT**

<table>
<thead>
<tr>
<th>Average</th>
<th>Annual</th>
<th>Percentage</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1928 to</td>
<td>1928 to</td>
<td>1946 to 1956 to 1956</td>
<td></td>
</tr>
<tr>
<td>1946</td>
<td>1956</td>
<td>1956</td>
<td>1963</td>
</tr>
<tr>
<td>-.03</td>
<td>-1.7</td>
<td>-4.1</td>
<td>-2.7</td>
</tr>
</tbody>
</table>

The trend in agriculture employment is determined to a large extent by such factors as variations in the input of capital or machinery in the farm sector and the general level of employment in the rest of

---

1 B. J. Drabble, P. 79.
the economy. Canada, as in most countries, tends to experience an element of disguised unemployment in the agriculture section, especially periods in periods of high unemployment in the rest of the economy.

It is believed that a substantial amount of disguised unemployment persisted until the early postwar period and this combined with rapid farm mechanization seems to explain the rapid decline in farm employment between 1946 and 1956.

The Drabble study assumed a constant rate of decline in agricultural employment of 2 percent for the 1963-1970 period, a rate which corresponds closely to the rate of decline at the end of a trend curve to 1963.

The Royal Commission also recognized the declining labour force in agriculture but suggested that the rate of decline would diminish due to agriculture pursuits tending to switch from grain growing to the more labour intensive livestock farming.

In the light of the above factors, the following rates of decline would appear feasible for the agricultural section: - 2% for 1964-1970 period; 1.75% for the 1970-75 period; and 1.5% for the 1975-1980 period.
Using the above figures then and considering the farm labour force was 624,000 in 1964, the labour force in agriculture to 1980 would be as indicated in Table 13. The estimate of the Royal Commission and Drabble studies are included for comparison.

**TABLE 13**

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Royal Commission</th>
<th>Drabble</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>618,000</td>
<td>760,000</td>
<td>601,000</td>
</tr>
<tr>
<td>1970</td>
<td>556,000</td>
<td>744,000</td>
<td>543,000</td>
</tr>
<tr>
<td>1975</td>
<td>507,000</td>
<td>742,000</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>470,000</td>
<td>735,000</td>
<td></td>
</tr>
</tbody>
</table>

As can be seen from the above Table, the Royal Commission tended to view the 1946-1956 rates of decline as being very temporary and that rates of decline would follow more closely those of the long run period before World War II.

3. **Output in Agriculture**

The overall increase in agricultural output in Canada between 1946 and 1963 has increased at a rate of about 1.5 percent. This is substantially above the long run increase of .7 percent experienced in
the 1928-1956 period but below the substantial increases (2.6 percent) experienced in the 1946-1956 period.

Annual variations in farm output are wide, reflecting primarily the degree of dependence on such random and exogenous factors as weather conditions, especially in the major grain-growing regions of the country. The above rates are the results then of using seven year moving averages of actual farm output. Also, in the context of output analysis, the wide yearly fluctuations in grain harvests have no immediate relevance to the level of employment or to the general level of resource utilization in the economy because they do not come about as a result of corresponding changes in the volume of factor inputs.

In estimating the total output in 1970, the Drabble study assumed the high rate of growth of 1.5 percent per year would continue, mainly because this rate fitted the post-war experience better than the long-run rates. The Royal Commission foresaw a rate of increase for the 1955-1980 period of .97 percent, a figure just above the long-term rate.

In the light of our most recent experience but considering the much lower long-term rates, the rates of increases in total agriculture output adopted by this study are: 1.5 percent up to 1970, 1.25 percent

This assumes a gradual trend back to the long-run rates, the results of which are given in Table 14.

TABLE 14

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Royal Commission</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>2.269</td>
<td>2.280</td>
</tr>
<tr>
<td>1970</td>
<td>2.444</td>
<td>2.500</td>
</tr>
<tr>
<td>1975</td>
<td>2.602</td>
<td>2.710</td>
</tr>
<tr>
<td>1980</td>
<td>2.735</td>
<td>2.910</td>
</tr>
</tbody>
</table>

4. Productivity in Agriculture

By combining the results of Tables 13 and 14, an estimate of productivity can be derived. This is shown in Table 15.
below:

TABLE 15.

**OUTPUT PER MAN-YEAR IN AGRICULTURE**
(1949 Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Royal Commission</th>
<th>Drabble</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>3,680</td>
<td>3,000</td>
<td>3,770</td>
</tr>
<tr>
<td>1970</td>
<td>4,400</td>
<td>3,360</td>
<td>4,500</td>
</tr>
<tr>
<td>1975</td>
<td>5,130</td>
<td>3,660</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>5,820</td>
<td>3,960</td>
<td></td>
</tr>
</tbody>
</table>

The average rate of increase in productivity per man amounts to 3 percent for the 1965-1980 period. This compares with the Royal Commission assumption of a 3 percent increase between 1955 and 1970 and a 2.5 percent increase between 1970 and 1980. This also compares with 2.4 percent actually experienced between 1928 and 1956 and the 5.2 percent experienced between 1946 and 1963.  

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D. Government and Public Administration

Unlike the Drabble study that divided this section into Public Administration and Community services components and made separate forecasts of productivity and total output for each component, it was felt for this study, considering the many uncertainties in this area, that sufficiently accurate results could be obtained by using grouped or undivided data.

The significant statistics that are used in this section are given below in Table 16.

TABLE 16

HISTORICAL OUTPUT, EMPLOYMENT AND PRODUCTIVITY IN GOVERNMENT AND PUBLIC ADMINISTRATION

<table>
<thead>
<tr>
<th></th>
<th>Average</th>
<th>Annual</th>
<th>Percentage</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1928</td>
<td>1928</td>
<td>1946</td>
<td>1956</td>
</tr>
<tr>
<td>to</td>
<td>to</td>
<td>to</td>
<td>to</td>
<td>to</td>
</tr>
<tr>
<td>1946</td>
<td>1956</td>
<td>1956</td>
<td>1963</td>
<td></td>
</tr>
<tr>
<td>G.D.P.</td>
<td>+4.1</td>
<td>+3.8</td>
<td>+3.3</td>
<td>+3.8</td>
</tr>
<tr>
<td>Employment</td>
<td>+4.4</td>
<td>+4.0</td>
<td>+3.3</td>
<td>+5.7</td>
</tr>
<tr>
<td>Output per man</td>
<td>- .3</td>
<td>- .2</td>
<td>0</td>
<td>-1.8</td>
</tr>
</tbody>
</table>
The Drabble study foresaw an annual increase of 4.3 percent in the total output of this sector between 1963 and 1970. The Royal Commission estimated the overall annual increase between 1955 and 1980 at 2.9 percent for government administration and services.

It would seem that in the light of the long term rate of increase in total output of 3.8 percent and a rate of 3.5 percent for the 1946 to 1963 period, a figure of 3.8 percent would not appear too far out of line for the 1965-1980 period. Using the figure of 3.8 percent to calculate the total output and allowing a modest rate of -.5 percent for the decline in productivity in this sector, the total output, output per man year and employment would be as indicated in Table 17.

TABLE 17

ESTIMATED OUTPUT, PRODUCTIVITY AND EMPLOYMENT IN THE GOVERNMENT AND PUBLIC ADMINISTRATION TO 1980

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Output (Millions 1949 dollars)</th>
<th>Output per Man-Year (1949 Dollars)</th>
<th>Employment¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1963</td>
<td>2,660</td>
<td>2,244</td>
<td>1,290,000</td>
</tr>
<tr>
<td>1965</td>
<td>2,860</td>
<td>2,220</td>
<td>1,580,000</td>
</tr>
<tr>
<td>1970</td>
<td>3,430</td>
<td>2,170</td>
<td>1,960,000</td>
</tr>
<tr>
<td>1975</td>
<td>4,130</td>
<td>2,110</td>
<td>2,400,000</td>
</tr>
<tr>
<td>1980</td>
<td>4,950</td>
<td>2,060</td>
<td></td>
</tr>
</tbody>
</table>

¹This includes the armed forces which amounts to approximately 120,000.
The reason the decline in productivity in this section cannot be explained easily but suggestions put forward by the Drabble study indicate that the increased use of part-time workers, the increase in the ratio of less skilled to professional employees in certain areas, and changes in the "mix" of individual services may indicate partial explanations.

The Royal Commission expected a slight increase in productivity through the 1955-1980 period, but so far experience has not proved this to be correct.

E. Commercial Non-Agricultural

1. Introduction

As mentioned previously, this by far is the most important section as it accounts for approximately 80 percent of the output and 70 percent of the employment.

It should be noted that the definition of the commercial non-agricultural sector for the purposes of this study is less rigorous than that used by the Dominion Bureau of Statistics classification. In this study it is used to include all non-farm sectors other than public administration and community services.
2. Employment

To obtain the total employment expected in this sector, the residual from the total available force after deducting the estimates for the expected labour force in agriculture and the government and public administration was calculated. To this residual figure was added 120,000 to allow for the armed forces. This figure of 120,000 is the ceiling set by parliament and was not included in the total labour force but was included in calculating the output of government and public administration.

The table below is the net result of the above calculations.

<table>
<thead>
<tr>
<th>Year</th>
<th>Present Study</th>
<th>Royal Commission</th>
<th>Drabble</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>5,222,000</td>
<td>5,090,000</td>
<td>5,100,000</td>
</tr>
<tr>
<td>1970</td>
<td>5,924,000</td>
<td>5,850,000</td>
<td>5,800,000</td>
</tr>
<tr>
<td>1975</td>
<td>6,563,000</td>
<td>6,660,000</td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>7,240,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
This would indicate a rate of growth of 2.3 percent in the commercial labour force and would seem to compare favourably with the 1928-1963 rate of growth of 2.2 percent and the 1946-1963 period of 2.5 percent. As indicated by both the Drabble study and the Economic Goals for Canada to 1970, the rate of increase will be slightly higher during the late 1960's and may be as high as 3.2 percent.¹

A procedure that was followed by both Drabble and Denison² was to separate out from total commercial non-agricultural employment or unpaid family workers. The reasons given for following this procedure is that the self-employed and unpaid family workers group in the non-agricultural labour force consists of a hard core of highly productive and skilled persons and a much larger group of workers whose productivity level is much below the average of paid workers. It is, in other words, an area like agriculture that contains an element of disguised unemployment.

Between 1948 and 1955, the percentage of self employed and unpaid workers declined from about 16.5 percent to about 12 percent where it has remained essentially to the present.

¹B. J. Drabble, P. 79.

The Drabble study assumed that this percentage would drop from its present 12 percent in 1970. If this rate was extended to 1980 it would indicate a figure of 8.5 percent. If, however, the indicated rapid rise in the labour force is not adequately absorbed into the expanding economy, this figure may not drop as significantly as expected.

It is not stated in the Drabble study why the figure of 10 percent was chosen and no indication was given as to what may be influencing these rates.

In the light of this then, it was felt the rapid increase in the labour force would tend to retard the rate of decline, but that the past forces would continue to operate. It was assumed on this basis then that the 10 percent figure would not be reached until 1980.

With these assumptions then the size of the paid workers or labour force would be as indicated below.

<table>
<thead>
<tr>
<th>Year</th>
<th>Labour Force</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>4,600,000</td>
</tr>
<tr>
<td>1970</td>
<td>5,240,000</td>
</tr>
<tr>
<td>1975</td>
<td>5,860,000</td>
</tr>
<tr>
<td>1980</td>
<td>6,520,000</td>
</tr>
</tbody>
</table>
3. **Productivity and Total Output**

To estimate the total output in this section, the same method as followed in the Drabble study was used. The estimated total man hours of input was multiplied by the estimated productivity per man-hour.

Upon examining a curve fitted to the average number of hours worked per worker per week during the past twenty years, it is found that the curve has been falling at a diminishing rate rather consistently. If this curve is extended, with the slope diminishing at the same rate as in the past, the number of hours worked per worker week would be as indicated in Table 20.¹

**TABLE 20**

**ESTIMATED HOURS WORKED IN COMMERCIAL NON-AGRICULTURAL SECTOR**

<table>
<thead>
<tr>
<th>Year</th>
<th>Hours Worked Per Week</th>
<th>Hours Worked Per Year</th>
<th>Total Man-Hour Input ²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>38.4</td>
<td>2,000</td>
<td>9,200,000</td>
</tr>
<tr>
<td>1970</td>
<td>37.6</td>
<td>1,955</td>
<td>10,250,000</td>
</tr>
<tr>
<td>1975</td>
<td>37.0</td>
<td>1,925</td>
<td>11,300,000</td>
</tr>
<tr>
<td>1980</td>
<td>36.5</td>
<td>1,900</td>
<td>12,400,000</td>
</tr>
</tbody>
</table>

¹The curve used for this estimate is Chart 6 found on Page 28 of the Drabble Study.

²To obtain the total man hour input, the hours worked per man year were multiplied by the estimated labour force in this section as indicated by Table 19.
The estimate for the productivity increase per man hour worked is probably the most important factor which will affect the estimate for the total output in this section.

Although this figure has increased at an average annual rate of 2.4 percent between 1946 and 1963, it has not increased perfectly evenly over time. It seems that productivity tends to increase or slow down in response to changes in the intensity of resource utilization in the economy which are associated in turn with the changing pressures of demand.

The Drabble study used a rate of 2.5 percent because of the slightly higher rates experienced during the last few years. For the longer period of this study, however, it was felt that the more conservative figure of 2.4 percent would be more appropriate. It may be of interest to note, also, that the average annual percentage increase in output per man-hour for almost the same area of the economy in the United States during the 1947-1963 period was also 2.4 percent.

The Royal Commission felt that output per man-hour would increase at a rate between 2.5 percent and 3.25 percent. The Caves

\[1\] Drabble, P. 30.
and Holten study was aware of this estimate but felt it was definitely too high mainly on the grounds of pre-war experience and the trends up to 1955. The Caves and Holten study themselves estimated the average increase would be 2 percent between 1955 and 1970, a figure which appears to be too low.

Of two other American studies that have been made, the estimated increase in the man-hour output made by America's Needs and Resources\(^1\) for the 1950-1960 period was 2.3 percent whereas the Paley Commission\(^2\) estimated the figure to be 2.5 percent for the 1950-1975 period.

Using then the figure of 2.4 percent as the estimated annual increase in per man hour productivity, the productivity per man hour and the total output in the commercial non-agricultural section would be as indicated in Table 21.\(^3\)

\(^1\) J. F. Dewhurst and Associates, America's Needs and Resources, 1955, P. 42.


\(^3\) Total output being the product of the output per man hour and the total hours worked as estimated by Table 20.
Table 21

**ESTIMATED PRODUCTIVITY PER MAN HOUR AND TOTAL OUTPUT IN COMMERCIAL NON-AGRICULTURAL SECTOR**

<table>
<thead>
<tr>
<th>Year</th>
<th>Productivity Per Man Hour (1949 Dollars)</th>
<th>Total Output (Billions of 1949 Dollars)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>2.831</td>
<td>26.00</td>
</tr>
<tr>
<td>1970</td>
<td>3.188</td>
<td>32.70</td>
</tr>
<tr>
<td>1975</td>
<td>3.588</td>
<td>40.60</td>
</tr>
<tr>
<td>1980</td>
<td>4.039</td>
<td>50.20</td>
</tr>
</tbody>
</table>

Table 22 then is a summary of the component sectors that was used as a basis in estimating the future gross national products.

For comparative purposes, Table 23 shows rates of changes expected in employment, gross domestic product and productivity of the present study and for various periods taken from the Drabble study.

The rates of increase estimated for both the total employment and the total gross domestic product seem to be fairly well in line with past experience and current trends. The estimated productivity per man in the total economy, however, may prove to be slightly low.
It would seem that this low figure for total productivity is the result of cumulative estimates biased in the direction to under-estimate total productivity rather than a single estimate that is strongly out of line. For example, if productivity in the government and public services sector was assumed to be constant rather than declining at the rate of .5 percent and productivity in the commercial non-agricultural sector proved to be 2.5 percent rather than the assumed 2.4 percent, the total productivity would increase at the rate of approximately 1.9 percent based on present assumptions.

It was felt, however, that rather than changing any one or all of the assumptions leading to the calculations of total productivity, it would suffice to accept the 1.9 percent figure in light of the long run past experience but to bear in mind that it may prove to be slightly low for an estimate of the increase in productivity for the next fifteen years in light of the most recent experience.
### TABLE 22

**SUMMARY OF COMPONENTS OF EMPLOYMENT AND OUTPUT**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Agriculture</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment (thousands)</td>
<td>618</td>
<td>556</td>
<td>507</td>
<td>470</td>
</tr>
<tr>
<td>G.D.P. (@ factor cost, billions 1949 $)</td>
<td>2.27</td>
<td>2.44</td>
<td>2.60</td>
<td>2.74</td>
</tr>
<tr>
<td>Index of G.D.P. Growth</td>
<td>1.00</td>
<td>1.08</td>
<td>1.15</td>
<td>1.21</td>
</tr>
<tr>
<td><strong>Government and Public Administration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment (thousands)(^1)</td>
<td>1,290</td>
<td>1,580</td>
<td>1,960</td>
<td>2,400</td>
</tr>
<tr>
<td>G.D.P. (@ factor cost, billions 1949 $)</td>
<td>2.86</td>
<td>3.43</td>
<td>4.13</td>
<td>4.95</td>
</tr>
<tr>
<td>Index of G.D.P. Growth</td>
<td>1.00</td>
<td>1.20</td>
<td>1.44</td>
<td>1.73</td>
</tr>
<tr>
<td><strong>Commercial Non-Agriculture</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment (thousands)</td>
<td>5,222</td>
<td>5,924</td>
<td>6,563</td>
<td>7,240</td>
</tr>
<tr>
<td>G.D.P. (@ factor cost, billions 1949 $)</td>
<td>26.00</td>
<td>32.70</td>
<td>40.60</td>
<td>50.20</td>
</tr>
<tr>
<td>Index of G.D.P. Growth</td>
<td>1.00</td>
<td>1.26</td>
<td>1.56</td>
<td>1.93</td>
</tr>
<tr>
<td><strong>Total Economy</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employment (thousands)</td>
<td>7,010</td>
<td>7,940</td>
<td>8,910</td>
<td>9,990</td>
</tr>
<tr>
<td>G.D.P. (@ factor cost, billions 1949 $)</td>
<td>31.13</td>
<td>38.57</td>
<td>47.33</td>
<td>57.89</td>
</tr>
<tr>
<td>Index of G.D.P. Growth</td>
<td>1.00</td>
<td>1.24</td>
<td>1.52</td>
<td>1.85</td>
</tr>
</tbody>
</table>

\(^1\)Includes 120,000 for the armed forces not included in total.
TABLE 23

COMPARATIVE AVERAGE ANNUAL PERCENTAGE INCREASES IN EMPLOYMENT, TOTAL OUTPUT AND PRODUCTIVITY FOR THE TOTAL ECONOMY

<table>
<thead>
<tr>
<th></th>
<th>Present Study</th>
<th>Drabble Study ¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1965 to 1980</td>
<td>1946 to 1963</td>
</tr>
<tr>
<td>Employment</td>
<td>2.4</td>
<td>1.8</td>
</tr>
<tr>
<td>Total G.D.P.</td>
<td>4.2</td>
<td>4.1</td>
</tr>
<tr>
<td>Productivity Man</td>
<td>1.9</td>
<td>2.3</td>
</tr>
</tbody>
</table>

F. Conversion of Output to Gross National Product

To convert the estimate of the gross domestic product to gross national product figures, reference was made to the chart or outline in the Hood and Scott study. ²

¹Drabble, P. 77

²W. C. Hood and A. Scott; Output, Labour and Capital in the Canadian Economy, 1957, P. 194.
Here it is seen that to obtain gross domestic product of factor cost it is necessary to add in an amount equal to real rent paid or imputed to owners including any depreciation associated with this property. To this figure is added the total of government indirect taxes less governmental subsidies to obtain the gross domestic product at market prices. From this figure then all that is necessary to obtain the gross national product figure is to add interest and dividend payments paid abroad.

Except for the depression years, total rent paid both implicit and explicit, has averaged very close to 4.1 percent, the actual average of the 1946-1955 period. For this reason, this figure was accepted to compute the estimate for the total rent correction.

From the tabulated data dating back to 1926, the total of the indirect taxes less subsidies has been a relatively constant proportion of the gross domestic product at factor cost and like the assumption made in the Hood and Scott study, it was assumed in the present study that this average proportion would hold for the forecast period.

For the 1946-1955 period, this proportion was 12.7 percent, whereas for the 1956-1963 period the average increased to 14.0

1 Hood and Scott, P. 222.
percent. Upon reviewing this data, however, it is seen that there have been periods of up to ten years where the indirect taxes less subsidies expressed as a percent of gross domestic products have been approximately 14 percent but that this high rate did not persist. Assuming this will be the situation in the present case then, an average rate of 13.3 percent was used in this study.

In considering the net interest and dividend payments made abroad, the absolute figures have been growing constantly since 1945. The Royal Commission expected gross outflows to amount to about 1,100 million dollars by 1980 and that gross inflow would amount to about 300 million dollars by 1980.¹

Because it is very difficult to be very precise about these matters and because they amount to such a small fraction of the total gross national product, the figures used by the Hood and Scott study were used in this study and are indicated below.

¹Hood and Scott, P. 223.
## TABLE 24

### ESTIMATED INTEREST AND DIVIDEND PAYMENTS ON INTERNATIONAL ACCOUNT

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Outflow</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>$575,000,000</td>
</tr>
<tr>
<td>1970</td>
<td>675,000,000</td>
</tr>
<tr>
<td>1975</td>
<td>750,000,000</td>
</tr>
<tr>
<td>1980</td>
<td>800,000,000</td>
</tr>
</tbody>
</table>

Using the figures and methodology outlined above then, a summary of the calculations to convert the gross domestic product to gross national product figures are given below. The historic and projected values are illustrated in Figure 3.

---

1 As mentioned in a footnote on page 223, the Hood and Scott study made no attempt to deflate these figures as no generally satisfactory way of deflating such a series is known.
FIGURE 3. GROSS NATIONAL PRODUCT ESTIMATES 1965 - 1980
TABLE 25

CONVERSION OF GROSS DOMESTIC PRODUCT

TO GROSS NATIONAL PRODUCT

(All figures in billions of 1949 dollars except where noted previously)

<table>
<thead>
<tr>
<th>Year</th>
<th>G.D.P.</th>
<th>Residential Rents</th>
<th>G.D.P. @ Factor Cost</th>
<th>Indirect Taxes Less Subsidies</th>
<th>G.D.P. @ Market Prices</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>31.13</td>
<td>1.28</td>
<td>32.41</td>
<td>4.31</td>
<td>36.72</td>
</tr>
<tr>
<td>1970</td>
<td>38.57</td>
<td>1.58</td>
<td>40.15</td>
<td>5.34</td>
<td>45.49</td>
</tr>
<tr>
<td>1975</td>
<td>47.33</td>
<td>1.94</td>
<td>49.27</td>
<td>6.55</td>
<td>55.82</td>
</tr>
<tr>
<td>1980</td>
<td>57.89</td>
<td>2.37</td>
<td>60.26</td>
<td>8.02</td>
<td>68.28</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Net Outflow of Interest and Dividend Payments</th>
<th>Estimated Gross National Product</th>
<th>Royal Commission Estimates</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>.57</td>
<td>36.15</td>
<td>31.4</td>
</tr>
<tr>
<td>1970</td>
<td>.67</td>
<td>44.82</td>
<td>36.9</td>
</tr>
<tr>
<td>1975</td>
<td>.75</td>
<td>55.07</td>
<td>47.2</td>
</tr>
<tr>
<td>1980</td>
<td>.80</td>
<td>67.48</td>
<td>57.0</td>
</tr>
</tbody>
</table>

The rate of increase in gross national product as shown in Table 25 would be 4.26 percent. Between 1955 and 1970, the Caves and Holton study expected the increase to be 3.8 percent whereas the Royal Commission expected the rate to be 4.0 percent for the 1955-1980 period. The range of estimates that were encountered were from a low of 3.5 percent estimated by the Resources for Freedom study to a high of 5.1 percent expected by Van der Valk.  

---

1 Based on 2.5 compound rate of increase in productivity of business sector and net immigration of 75,000 per year.

It would seem then that an estimate of 4.26 percent as the annual growth rate for Canada's gross national product is compatible with postwar experience and is within the general range as forecast by others viewing this problem.
VI. CAPITAL ACCUMULATION

A. Introduction

With estimates made for the total output or gross national expenditures, it remains to examine how this output may be expected to be divided between the final demand components.

The four main categories of demand to be considered are investment expenditure or capital accumulation, government expenditure and foreign trade.

As with the analysis of other sectors of demand, the general procedure in this section is to review the methodology used in their estimation and to identify what would appear to be the main weaknesses of the methodology and some of the possible sources of errors which might result from such methodology.

Since the forecasting of almost any economic variable is preceded by an analysis of past data, such a procedure is followed here and pertinent past trends identified where possible.

B. Methodology

There appears to be three main methods to estimate the future
capital accumulation that may be expected in a growing economy. All the methods, however, are dependent in one way or another on the forecasts made for total output as indicated by the estimates for the gross national product.

The first method to be discussed tends to be fairly simple but not necessarily any less accurate than other possible methods. The essence of this method is to multiply the expected increases in total output by the estimated capital output ratio.

Because it is generally desired to obtain an investment figure for a specific year, this means multiplying the expected annual increase in the net national product by the capital output ratio to obtain net investments. Gross investment would be obtained by adding back the depreciation figure subtracted from the gross national product estimate to obtain the net national product estimate.

When one uses this method, it is found that depreciation accounts for almost half the estimated gross investment expected. It would seem fortunate then that depreciation consists of a fairly stable portion of gross national product. This may be expected, however, since in the long run one would expect output to be a fairly constant function of gross stock of capital and depreciation to be a reasonable stable function of the gross stock.
The second method to be reviewed was the method used by the Royal Commission and since it is a rather sophisticated method, only the essential features will be presented here.

The method consists of building up a model for estimating the stock of capital in each industry by means of estimating the current additions, the average life of the assets, and current "discards"\(^1\) for both plant or construction and machinery and equipment sections. Having the industrial gross domestic product figures, the capital output ratios for construction and machinery and equipment sectors were calculated separately and then totalled to obtain the aggregate capital output ratio.

The reason for separating construction and machinery and equipment is that the capital output ratios for construction tends to be falling whereas the capital output ratios for machinery and equipment tends to be rising. In the aggregate, however, the ratio has been rising slightly since World War II.

With the estimates for gross domestic product, the model used to estimate the yearly net additions to the stock of capital, investment

\(^1\) Discards being equal to the investment made the life of the asset years previously, constant dollars being used throughout to make the dollar value representative of the physical quantity of capital stock.
expenditures are mechanically calculated in much the same way as the increases in population can be calculated.

For a given year \( n \), the increase in net investment was obtained by multiplying the expected increase in the gross national product between the \( n \) and \( n-1 \) years by the forecasted capital output ratio and to this was added the "discards" or replacement needs to obtain the gross investment.

Net investment was then obtained by subtracting depreciation from the gross investment figures. Depreciation was estimated to equal the gross stock of year \( n-1 \) divided by the service life of the assets in the section. The net stock of capital in year \( n \) would then equal the net investment added to the previous year's stock of capital.

Formulated, the above would be:

\[
Net\ Stock = N_n = N_{n-1} + I_n - \frac{G_{n-1}}{L}
\]

Where:

- \( N_n \) = Net stock of capital in year \( n \)
- \( I_n \) = Investment expenditure in year \( n \)
- \( G_n \) = Gross stock in year \( n \)
- \( L \) = Service life of the assets.
Again the crucial elements in this method of forecasting investment expenditures are the expected gross national output and the capital output ratio together with the assumed life of the assets.

Although not entirely correct in determining the expected assets life within each industry, it was assumed that investment expenditures represented the purchase of investment goods with a given service life. Following from this assumption, it must be assumed that the service lives of all the kinds of assets in each industry can be represented by a single figure and that the annual expenditures by each industry contain unchanging proportions of each of the main kinds of assets. Since the service life assumed affects the depreciation figures and depreciation, as pointed out, accounts for a large portion of annual investment, the simplifying assumptions are necessary to allow the method of determining the capital stock in each industry to be workable.

Another possible method for determining the growth in capital stock is to attempt to relate various economic variables of the demand side to the level of certain types of investments. It may be noted that the determinants of year to year changes in the level of investments are not necessarily the same as the long-run determinants of its secular growth and that the considerations presented here are those that
apply in the long-run rather than the short-run.

If the total investment demand is categorized into construction, inventory accumulation, investment for machinery and equipment, and non-residential construction, the first three can be related fairly well to various economic variables. The fourth, however, is somewhat difficult to explain.

It was found in the Caves and Holton study\(^1\) that residential construction tends to have a cycle of its own quite independent of the business cycle and is fairly well correlated with the long-run trend of the gross national product and the rate of population growth.

Inventory accumulation, as with depreciation allowances, tend to be very closely tied to the gross national product in the long run.

Investment in machinery and equipment have also exhibited a very close relationship to the level of gross national product. It is seen that the "marginal propensity to invest" approach could be used to forecast machinery and equipment investment given the estimates for the gross national product.

\(^{1}\) Chapter 4, Structure of the Canadian Economy: Statistical Studies.
Unlike the above investment categories, the non-residential construction category which would include factories, institutional construction, transportation systems, dams, etc. is the most difficult to explain and does not seem to be well correlated with the gross national product, population growth or to the level of Canadian exports as has been thought.

Briefly, the method used to obtain an estimate for the non-residential construction was to estimate total industrial investment, subtract the above estimates for machinery and equipment, from which the residential construction was subtracted to obtain the estimates for the non-residential construction. ¹

As can be seen, all the above methods of determining future investment estimates depend heavily on the estimates for the gross national product and any errors in these figures will tend to result in similar and proportional errors in the various categories of investment estimates.

¹ This is a very condensed formulation of the method used and does not indicate some critical assumptions that were made about the composition of the machinery and equipment in the total investment estimates. For a detailed outline, the reader should consult the Caves and Holton Study, P. 348.
C. Capital Output Ratio

Because two of the methods described above depend heavily on a forecast for the capital output ratio and because the ratio is a measure of the productivity of capital and is an indicator of the need for capital accumulation to produce a certain flow of goods, it would seem advisable to comment briefly on the forces tending to affect the capital output ratio.

It would seem that the five main forces that have tended to affect the capital output ratio in Canada have been the following:

1. The size, richness and location of the stock of natural resources. As one must go farther afield to exploit new stocks of natural resources, the increased cost of development will tend to increase the capital output ratio.

2. It seems generally conceded that as the Canadian economy expands and fills out, the possible economies of scale will allow a decline in the capital output ratio.

3. Possibly one of the most significant but most difficult to isolate and analyze is the change in the industrial composition of the national output. There seems considerable belief among economists that industrial growth in Western
countries implies a gradual change in the industrial
distribution from dependence on agriculture and primary
industries towards a rising importance of service and
 tertiary industries. This would tend to indicate a general
decline in the capital output ratio. In Canada, however,
this may or may not be true because included in the
services are transportation and communication which have
ratios much higher than the economy as a whole.

4. The change in the relative availability of labour and capital
and hence their relative prices will affect the ratio. An
increase in the supply of capital relative to that of labour is
likely to have an influence on increasing the capital-output
ratio. This, however, is not divorced from the productivity
of the new capital goods relative to those which are already
in place.

5. Although not entirely independent of the previous four points
mentioned, technological changes which tend to increase the
productivity of all factors of production, including capital,
will tend to be reflected in a lower capital output ratio.

D. Past Trends

Upon reviewing Canadian gross capital formation as a percentage
of the gross national product, except for the chaotic years of the depression and the wars, the figures have been remarkably constant between 18 and 20 percent.

Within this rather stable gross capital formation, both the residential construction and the net inventory accumulation have also been relatively stable functions of gross national product. Non residential construction and machinery and equipment expenditures have been the volatile components of gross domestic investment.

The impact of both residential and non residential expenditures on domestic activity is very concentrated because of the high domestic content of such expenditures. The investment in machinery and business, however, has a high import content with the effect of considerably diluting the resulting domestic activity.

One of the major problems in evaluating the probable magnitude of investment over time, especially private investment, is that of forming an estimate of the probable variations in levels of resource-related expenditures. Such expenditures depend very heavily on the performance of, and expectations concerning the U.S. economy and to a great extent, the international economy.

These resource industries require a far larger capital stock
for a given value of output than the balance of the economy and hence, their tremendous leverage on the Canadian economy during periods of development in response to expected increases in U.S. and world demands for raw and semi-processed materials.

Although Canada's investment program is high relative to many western countries, its high investment in relation to gross national product is quite similar to other specialized northern countries such as Norway or Finland. Both of these two countries have ratios of almost 30 percent as compared with Canada's 18 - 20 percent and compared with the 15 - 17 percent figures for the U.S. and United Kingdom. ¹

A number of explanations have been advanced to explain the high relative level of Canadian investment. The factors most commonly stressed are as follows:

1. The need for more expensive buildings because of extreme winter climate.

2. The size and geographic features of the country.

3. The sparseness of the population.
4. The east-west orientation of the communication networks.

Concerning the capital output ratio and as discussed by the Caves and Holton study\(^1\) and the D. A. White Study,\(^2\) there has been a secular decline in the capital output ratio. It was concluded in the Caves and Holton study that the decline in the capital output ratio would fall from the 3.12 figure in 1911 and the 2.91 figure in 1955 to about 2.88 in 1970. They felt that this was not an unreasonable assumption considering in 1955 the U.S. ratio was 2.5.

In the D. A. White study, however, it was felt that the recent stock growth far in excess of rates of aggregate capital stock growth and the accompanying decline in aggregate capital output ratios appear unlikely to persist for long. Examples given are the development of iron ore mining and handling facilities, the St. Lawrence Seaway project, the expansion of hydro-electric power for aluminum smelting.

**E. Forecast to 1980**

In arriving at estimates for investment expenditures, the first method outlined in the methodology section will be used.

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\(^1\)Page 342.

\(^2\)Page 22.
Upon reviewing the factors affecting the capital output ratio, it would seem that the impact of any single factor could be significant but individually, the factors tend to work in off-setting directions. The absence of qualitative tools for appraising the importance of each factor determining the direction the capital output ratio is likely to take in the future probably accounts for the conflicting assumptions regarding the ratio. The Royal Commission, for example, expected a slight increase in the ratio, the D. A. White study assumed a constant ratio, and the Caves and Holton study assumed a decline in the ratio.

In the light of the forementioned factors, it would seem difficult to assume a definite trend in either direction for the capital output ratio. For this reason it will be assumed that the capital output ratio will remain constant for the forecast period and will approximate its present value of 3.00 inclusive of inventories.

If depreciation is assumed to equal 12 percent of gross national product and the output to be increasing at the rate of 4.25 percent as developed in Chapter V, the estimates for investment expenditures would be as indicated in Table 26 and illustrated in Figure 4.

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1 12 percent being the average for the 1955-63 period, the range of which was 11.7 to 12.6 percent.
### TABLE 26

**ESTIMATED INVESTMENT EXPENDITURES**

(Billions of 1949 Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>GNP (12% of GNP)</th>
<th>Depreciation</th>
<th>NNP</th>
<th>Output Increase @ 4.25%</th>
<th>Net Capital Required</th>
<th>Total Capital Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>36.15</td>
<td>4.33</td>
<td>31.82</td>
<td>1.35</td>
<td>4.05</td>
<td>8.38</td>
</tr>
<tr>
<td>1970</td>
<td>44.82</td>
<td>5.37</td>
<td>39.45</td>
<td>1.68</td>
<td>5.04</td>
<td>10.41</td>
</tr>
<tr>
<td>1975</td>
<td>55.07</td>
<td>6.61</td>
<td>48.46</td>
<td>2.06</td>
<td>6.17</td>
<td>12.78</td>
</tr>
<tr>
<td>1980</td>
<td>67.48</td>
<td>8.09</td>
<td>59.39</td>
<td>2.52</td>
<td>7.55</td>
<td>15.64</td>
</tr>
</tbody>
</table>
VII. GOVERNMENT EXPENDITURE

A. Methodology

Forecasting government expenditures seems to be one of the most difficult economic variables to cope with. The main reasons are that government spending tends to be the least dependent upon the general level of economic activity and not exactly tied to any of the economic variables such as income or investment expenditures. Government spending is geared rather to policy changes, decisions to increase or decrease spending on defence, education, roads, health and welfare, etc.

As a percentage of gross national product, government expenditures are likely to fluctuate through wider swings than other components of the gross national product should periods of extreme depression or war be experienced. As mentioned under the section on general assumptions, however, long range projections circumvent this problem by specifying the forecast to assume general peacetime prosperity. One other basic assumption that must be made regarding the government is that no major changes in economic policy will result from changes in political power. Given these assumptions then, it would appear that one could attempt to forecast government expenditures
by one or a combination of the methods outlined below.

One might first examine the past per capita spending of the government and assume some continued trend into the future which could be modified by an expected policy changes that appear likely to be effected.

A similar approach would be to extrapolate or compound into the future current trends of the aggregate figures for government spending.

Both of the above methods are very crude and open to large errors due to the sheer guesswork as to the interpretation of the assumed trends. It is also difficult to estimate the possible size of the errors that one might expect.

Better results would seem to result if government expenditures are broken down into their functional categories and future estimates made in each category by various ad hoc methods. While this method has the advantage of gaining insight as to the changing pattern of government expenditure, it is somewhat difficult to determine the increase in accuracy one might expect.

A final method that may be used to either check the results of
other methods or to make original aggregate governmental expenditure estimates is to link the government expenditures to the gross national product. The main reason for accepting this link would be that historical patterns of economic growth show that increasing wealth has often been associated with increasing demand for public services.

B. Past Trends and Forecast to 1980

Peace time total public spending in Western democracies over the past twenty years have shown that net combined expenditures by all levels of government have usually ranged between 18 and 30 percent of the annual gross national product.

The historical record for Canadian governmental expenditure reveals successively higher plateaus of spending of considerable stability. This may be seen in the table below.
<table>
<thead>
<tr>
<th>Year</th>
<th>GNP</th>
<th>Government Expenditure Total of GNP</th>
<th>Percent of GNP</th>
<th>Year</th>
<th>GNP</th>
<th>Government Expenditure Total of GNP</th>
<th>Percent of GNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>12.0</td>
<td>3.63</td>
<td>30.2</td>
<td>1956</td>
<td>31.2</td>
<td>8.25</td>
<td>26.4</td>
</tr>
<tr>
<td>1947</td>
<td>13.7</td>
<td>3.05</td>
<td>22.4</td>
<td>1957</td>
<td>31.4</td>
<td>8.59</td>
<td>27.4</td>
</tr>
<tr>
<td>1948</td>
<td>15.5</td>
<td>3.20</td>
<td>20.6</td>
<td>1958</td>
<td>32.9</td>
<td>8.74</td>
<td>27.5</td>
</tr>
<tr>
<td>1949</td>
<td>16.4</td>
<td>3.63</td>
<td>22.2</td>
<td>1959</td>
<td>34.9</td>
<td>9.86</td>
<td>27.4</td>
</tr>
<tr>
<td>1950</td>
<td>17.8</td>
<td>3.83</td>
<td>21.5</td>
<td>1960</td>
<td>36.3</td>
<td>10.50</td>
<td>29.0</td>
</tr>
<tr>
<td>1951</td>
<td>21.5</td>
<td>4.85</td>
<td>22.3</td>
<td>1961</td>
<td>37.5</td>
<td>11.10</td>
<td>29.6</td>
</tr>
<tr>
<td>1952</td>
<td>23.3</td>
<td>6.17</td>
<td>26.5</td>
<td>1962</td>
<td>40.6</td>
<td>12.19</td>
<td>29.4</td>
</tr>
<tr>
<td>1953</td>
<td>24.5</td>
<td>6.42</td>
<td>26.2</td>
<td>1963</td>
<td>43.2</td>
<td>12.96</td>
<td>30.0</td>
</tr>
<tr>
<td>1954</td>
<td>24.0</td>
<td>6.59</td>
<td>27.4</td>
<td>1964</td>
<td>47.0</td>
<td>14.60</td>
<td>31.0</td>
</tr>
<tr>
<td>1955</td>
<td>27.1</td>
<td>7.35</td>
<td>27.2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

One area where the predictions of the Caves and Holton study were considerably in error was their estimate of the division of governmental spending between levels of government. The table below indicates the size and direction of the errors.

**TABLE 28**

**ACTUAL GOVERNMENT EXPENDITURE DIVISION**

**AS COMPARED WITH ESTIMATES**

**BY CAVES AND HOLTON STUDY**

(Billion 1949 Dollars and percent of total)

<table>
<thead>
<tr>
<th>Level of Government</th>
<th>Actual 1953</th>
<th>Actual 1964</th>
<th>Assumed 1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Federal</td>
<td>3.58</td>
<td>4.20</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>67%</td>
<td>45%</td>
<td>60%</td>
</tr>
<tr>
<td>Provincial</td>
<td>.97</td>
<td>3.34</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>18%</td>
<td>36%</td>
<td>20%</td>
</tr>
<tr>
<td>Municipal</td>
<td>.81</td>
<td>2.69</td>
<td>2.00</td>
</tr>
<tr>
<td></td>
<td>15%</td>
<td>29%</td>
<td>20%</td>
</tr>
</tbody>
</table>

|               | 5.36        | 10.23       | 10.00        |
|               | 100%        | 100%        | 100%         |

The two basic assumptions that appeared to cause this underestimation of government expenditure are as follows:

1. In a predominately private enterprise economy, it was assumed a continuing tendency for most of the gross

---

1 D.B.S.
national product to be spent by firms and households. This meant no sharp increase in the percent of the gross national product going to public finance.

2. It was also believed that any attempt to increase spending in any level of government would be at the expense of the others and the implied conflict would tend to stabilize the ways of using the total government funds and to lessen the margin of error in long range projections of government expenditures.

However appropriate these assumptions may seem or may have seemed, past experience would seem to indicate their inappropriateness. In particular, the composition of government expenditure has changed significantly. For example the Federal expenditures which amounted to 18 percent of gross national product in 1953 dropped to 14 percent in 1964 whereas the Provincial expenditures increased from 4.4 percent in 1953 to 11 percent in 1964. As will become apparent in Appendix I, the main reason for this is that sectors of government expenditures experiencing greatest public demand tend to be those supplied by Provincial governments.

In an effort to arrive at an estimate for aggregate government expenditure, as indicated in Appendix I, the government expenditure was divided along functional lines and estimates made within each
category. Most of the estimates made in Appendix I are based on information presented in the First Annual Review of the Economic Council of Canada. The results of the estimates made in Appendix I are summarized in Table 29.

It can be seen from Table 29 that the categories expected to show the most rapid growths in expenditure include education, social welfare and transportation. Because these categories tend to be under the jurisdiction of provincial and municipal governments, the trends in the division of government expenditure indicated in Table 28 would seem likely to continue.

As indicated in Table 29, it would appear that while the growth in aggregate government expenditure will approximate the rate of growth of real output in the economy, the growth rate in per capital figures are expected to approximate 2.6 percent which equals the 1930-1960 rate of growth.

The net contribution of government expenditure to gross national expenditure has historically amounted to approximately 66 percent of total government expenditure and is included in Table 29. The historic and projected values are shown in Figure 5.
Figure 5 - Government Expenditure Estimates 1965 - 1980
TABLE 29.

**ESTIMATES OF GOVERNMENT EXPENDITURE**

**BY FUNCTION**

(Millions of 1963 dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>National Defence$^1$</td>
<td>1,940</td>
<td>1,810</td>
<td>1,680</td>
<td>1,560</td>
</tr>
<tr>
<td>Education</td>
<td>2,350</td>
<td>3,080</td>
<td>4,140</td>
<td>5,940</td>
</tr>
<tr>
<td>Social Welfare</td>
<td>2,140</td>
<td>2,610</td>
<td>3,180</td>
<td>3,860</td>
</tr>
<tr>
<td>Transportation</td>
<td>1,850</td>
<td>2,440</td>
<td>3,200</td>
<td>4,120</td>
</tr>
<tr>
<td>Health and Hospital Services</td>
<td>1,450</td>
<td>1,940</td>
<td>2,600</td>
<td>3,020</td>
</tr>
<tr>
<td>Interest Costs</td>
<td>1,150</td>
<td>1,270</td>
<td>1,400</td>
<td>1,530</td>
</tr>
<tr>
<td>Others</td>
<td>3,460</td>
<td>4,330</td>
<td>5,430</td>
<td>6,800</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>14,340</td>
<td>17,480</td>
<td>21,630</td>
<td>26,830</td>
</tr>
</tbody>
</table>

Total in 1949 Dollars$^2$

| 8,000 | 9,700 | 12,010 | 14,890 |

Net contribution to G.N.E.

| 5,260 | 6,400 | 7,920 | 9,810 |

G.N.P. (1949 Dollars)

| 36,150 | 44,820 | 55,070 | 67,480 |

Net Government expenditures as a percent of G.N.P.

| 15.0   | 14.5   | 15.2   | 14.8   |

Population Estimates (Millions)

| 19.6   | 21.5   | 23.6   | 25.8   |

Per Capita Expenditure (1949 Dollars)

| 409    | 451    | 508    | 578    |

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$^1$ Assuming a constant 2,000 million 1963 dollars and a 1.7 percent annual change in the price level.

$^2$ Using G.N.P. deflator index from D.B.S. Statistics.
VIII PERSONAL CONSUMPTION EXPENDITURE

A. Introduction.

Because the importance of the consumption-income relation to the theory of employment has prompted many studies in this area, a fair amount of knowledge is known about consumption and changes in consumption in the short run. For the long run consumption-income relationship it seems very few empirical studies have been made and the state of knowledge is not far beyond the hypothesis stage.\(^1\)

The basic problem is that in the short run, the marginal propensity to consume is different from the average propensity to consume and that the average propensity to consume is different for different levels of income. In the long run, however, the consumption-income ratio tends to be constant\(^2\) and in an arithmetical sense, the average and marginal propensities to consume are not only constant, but equal.

\(^1\)The most recent theories would include those of:

All of these theories attempt to reconcile the acknowledged short-run consumption function with the stable long-run propensity to consume by explaining the secular upward drift over time of the consumption. It would appear, however, that the theories offer little help in forecasting the long-run consumption except for the fact that they acknowledge the stability of consumer spending with income as first noted by Kuznets.¹

B. Methodology

It would seem mainly on the basis of Kuznets' findings indicating the long run constancy of the shares of capital formation and personal consumption in national income, most estimates for aggregate consumer expenditures are based on the estimates for the gross national product.

The strongest force determining any years personal consumption expenditure is current personal disposable income. This relation is strong so that for the years 1926-1955 (omitting 1942-1945) undeflated personal disposable income explains 99.85 percent of the variance of undeflated personal consumption.²

For purposes of estimating future total consumer expenditure on goods and services, it would seem as accurate to relate consumer

²Caves and Holton, p. 314.
expenditure to gross national product directly as to attempt to relate personal disposable income to gross national product and functionalize consumer expenditure to personal disposable income.

Part of the problem in attempting to analyse the relationship between personal disposable income and consumer expenditure is the definitions used in the national accounts. For example, net accumulation of assets in the form of durable consumer goods is not considered part of personal savings and savings in the form of owner occupied houses is considered business rather than personal savings.

The method used in the national accounts to estimate personal savings itself also leaves room for error. Both the estimate for consumer expenditure on goods and services and personal disposable income tend to be estimated directly and rely heavily on census data taken in 1930, 1941 and 1951 and from surveys taken in 1948, 1953 and later years.¹

Because the estimate of personal savings is the difference between personal disposable income and consumer expenditure on goods and services, the possibility of compounded errors in its estimate

combined with the definitional problem indicated above would seem to make the figures for personal savings somewhat tentative rather than precise.

For these reasons the, relating consumer expenditures on goods and services directly to estimates of gross national product would seem to attain an acceptable level of accuracy.

In analyzing the trends of consumer spending within the aggregate figures, a great deal of sophisticated research has gone into this area but the results of this effort in the measurement, analysis and prediction of consumer demand have been somewhat disappointing. Perhaps the situation has best been summed by Richard Stone who has done extensive work in this area:

"The apparent importance of terms involving time in analysis of market demand indicates a serious situation, particularly from the point of view of prediction. For it suggests that the main long-term factors determining market demand are not income and prices at all, but are the influences which are hard to specify and still harder to measure. In such a situation prediction, except over a very short period, must be extremely unreliable, since the prediction depends largely on the extrapolation of a simple function of time and not on the response to clearly specified and measured influences."  

\[^1\]Richard Stone: The Measurement of Consumers' Expenditure and Behaviour in the United Kingdom, 1920-38; Cambridge University, 1954.
In view of the above comments then, possibly the approach taken by the Royal Commission to estimate consumer spending by sectors, although relatively simple, would indicate segmental spending within the accuracy one could expect in this type of forecasting.

The basic approach taken here was to analyze the past trends of spending in such consumer sectors as food, shelter, transportation, etc., with such segmented trends being expressed as a percentage of total consumer expenditure on goods and services. Certainly the attempt was made to understand the factors affecting the volume and value pattern shifts that were discovered.

In predicting future spending patterns, the process was mainly simple extrapolation with adjustments being made on the basis of subjective judgment as to how the significant factors affecting the various trends are likely to influence the spending patterns in the future. About the only check and further adjustments to the subsection totals was that of comparing with and equating them to the aggregate expenditure estimates.

Another method which approximates the previous method uses income elasticities for estimating various spending categories. Here a

---

1 D. W. Slater; Consumption Expenditures in Canada: Report for the Royal Commission on Canada's Economic Prospects, 1957.
time series of total personal income and deflated categorized spending are correlated to calculate the income elasticity of the various spending categories. These income elasticities are then applied to the expected changes in income for the forecast period to estimate the change in consumption of each category.

Although the above methods of analysing consumption expenditure do very little to describe the factors affecting various expenditure groups or the importance of these facts, due to an almost entire lack of long-run consumption theory, such methods would at least give workable estimates as to the size and distribution of consumer expenditure. The extent to which changing consumer tastes, changes in the distribution of income and changing relative prices will affect such trends can only be subjectively estimated.

C. Trends and Forecast

Since the purpose of this paper is concerned mainly with broad trends, only aggregate figures for consumer spending will be examined.

As may be expected from the above discussion, the consumer spending on goods and services in Canada as shown in Table 30 has been fairly constant as a portion of the total gross national product. The indicated average of 66.6 percent has tended to be the pattern for
the past four decades where in the 1926–28 period the portion amounted to 67.2 percent.

TABLE 30

CONSUMER EXPENDITURE ON GOODS AND SERVICES
(Billions of 1949 Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Gross National Product</th>
<th>Consumer Expenditure Total</th>
<th>Percent of GNP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1947</td>
<td>15.4</td>
<td>10.7</td>
<td>69.5</td>
</tr>
<tr>
<td>48</td>
<td>15.7</td>
<td>10.4</td>
<td>66.3</td>
</tr>
<tr>
<td>49</td>
<td>16.3</td>
<td>10.9</td>
<td>66.8</td>
</tr>
<tr>
<td>50</td>
<td>17.5</td>
<td>11.6</td>
<td>66.4</td>
</tr>
<tr>
<td>51</td>
<td>18.5</td>
<td>11.8</td>
<td>64.0</td>
</tr>
<tr>
<td>52</td>
<td>20.0</td>
<td>12.6</td>
<td>63.0</td>
</tr>
<tr>
<td>53</td>
<td>20.8</td>
<td>13.3</td>
<td>64.0</td>
</tr>
<tr>
<td>54</td>
<td>20.2</td>
<td>13.6</td>
<td>67.4</td>
</tr>
<tr>
<td>55</td>
<td>21.9</td>
<td>14.7</td>
<td>67.2</td>
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<tr>
<td>56</td>
<td>23.8</td>
<td>15.6</td>
<td>65.5</td>
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<td>57</td>
<td>24.1</td>
<td>16.1</td>
<td>66.8</td>
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<tr>
<td>61</td>
<td>26.5</td>
<td>18.5</td>
<td>70.0</td>
</tr>
<tr>
<td>62</td>
<td>28.1</td>
<td>19.2</td>
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<tr>
<td>63</td>
<td>29.4</td>
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<td>68.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1149.8</td>
<td>67.5</td>
</tr>
</tbody>
</table>

1 Economic Council of Canada; Economic Goals for Canada to 1970; 1964, p. 56.

Although because of changing relative prices, changing consumer tastes, and changes in the distribution of income substantial changes in the spending pattern within the total may be expected, there appears to be little reason to expect the stability of the aggregate consumer spending as a percentage of gross national product exhibited in the past to change significantly within the forecast period.

If this constancy is assumed, the expected consumer spending on goods and services would be as indicated in Table 31.

**TABLE 31.**

**ESTIMATES OF CONSUMER SPENDING ON GOODS AND SERVICES.**

*(Billions of 1949 Dollars)*

<table>
<thead>
<tr>
<th>Year</th>
<th>G.N.E.</th>
<th>Consumer Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>36.15</td>
<td>24.2</td>
</tr>
<tr>
<td>1970</td>
<td>44.82</td>
<td>30.0</td>
</tr>
<tr>
<td>1975</td>
<td>55.07</td>
<td>36.9</td>
</tr>
<tr>
<td>1980</td>
<td>67.48</td>
<td>45.2</td>
</tr>
</tbody>
</table>
IX. FOREIGN TRADE

A. Introduction

For an open economy such as the Canadian economy where foreign trade is so important to its well-being and development, any attempt to forecast its future position in world trade must review the participation in the world economy. The depth of such a study need only be limited by the resources of the forecasters. As such, the main object of this chapter is to review some of the methods that have been used to forecast the imports and exports of a country and to attempt to identify some of the underlying trends of Canada's foreign trade and the implications that these trends may have on Canada's long term economic prospects.

B. Methodology - Imports

As with so many factor forecasts, imports cannot be forecast in the abstract. The magnitude of the imports depends on the size of exports, the direction and level of international capital flows and the level of Canadian import restrictions as well as many other factors. The composition of the imports depends on the structure of demand in Canada and the structure of Canada's commercial policy to mention only two classes of influence.
Thus, the central problem in making a complete forecast of imports is to analyze the import implications of various possible situations with regard to demand, cost, capital flows, commercial policy and such together with the consistency of the import and other facets of economic prospects.

A large volume of impressionistic evidence and casual opinion suggests that Canada's imports bear a significant relation to both personal consumption and gross domestic investment. Analyzing this view statistically is difficult because of the absence of any reliable breakdown between imports of consumer goods and producers' equipment. Also the multi collinearity problem, due to the high correlation between investment and consumption, hinders any attempt at sorting out their separate influence on the total flow if imports.

A few investigators have attempted to statistically analyze the import-export functions in relation to economic changes of structure. W. A. Lewis has argued that the growth of advanced countries' demand for raw materials is the dynamic factor governing the world demand for industrial products. Likewise, the statistical work of Polak and Neisser and Modigliani shows the imports of "primary

---

countries" as dependent on their manufacturers output. Polak, in fact, puts at the centre of his system, a reflection ratio which supposedly shows the relation between an increase in a country's exports and, he asserts, these reflection ratios are stable enough to support a prediction.

The gist of all this is that future world trade in primary products will continue to depend upon the growth potential (population, resources, technology) of the advanced industrial countries. Experience within the above methodology suggests the methods to be more successful for predicting in the short-term rather than the long term.

Other methods that may be considered for long range forecasting are the over-all or aggregative approaches which consider total imports and the main types of invisibles. The two general methods that can be used with the aggregative approach are, one, a general qualitative prediction base essentially on simple trend extension, and second, the application of simple statistical relationships.

The central idea in the qualitative assessment approach is to form a judgement regarding the long-run trend in the ratio of imports to the

---

1. H. Neisser and F. Modigliani; National Incomes and International Trade; (Urbana, 1953); Chapters 2 and 4. J. J. Polak; An International Economic System; (Chicago, 1953); Pp. 123-126.
gross national product. The factors which appear to be mainly responsible for the historic long-run changes in the import - G.N.P. relationship are reviewed, the main factors likely to influence the relative size of imports in the future are set down, together with a preliminary judgement on the direction and magnitude of their effects. Such a qualitative approach is based on the belief that the main thoughts of one's theory are sharply displayed and the net impressions of a myriad of quantitative and qualitative studies and judgements regarding the economy can be brought to bear.

The basic assumptions to this type of forecasting but apply specifically to the forecast of imports are given below:

(a) continued peacetime and full-employment levels of economic activity,
(b) a holding fixed of the level of major tariff regulations,
(c) continued long-run economic growth.

A slightly more sophisticated method of forecasting imports would basically follow the method and reasoning of the aggregative approach above but would break aggregative import figures into their various groups of imports such as food, autos, machinery, etc.

The second general approach using aggregative data is the use of statistical relationships. In some cases, imports have been treated
function of income, some index of relative or absolute prices, and perhaps some measure of trade restrictions.

If a satisfying theory underlies the relationships and if the relationships provide a good fit to past observations, it is tempting to extrapolate the past relationships into the future. When making such extrapolations, however, it must be recognized that the relationships in the past depend on a set of underlying circumstances, and account, therefore, must be taken of the way in which future circumstances may differ.

A short-coming of this method of forecasting is to frequently underestimate conditions and to over-estimate imports in periods of rapidly falling income.

Although the above technique may find fruitful application in forecasting imports of specific commodities, its use in forecasting aggregative figures without adjustments for changes in international and economic circumstances appears limited.

The method used in this study is the relative simple approach of examining the historic relationship between imports and gross national product and use this relationship together with a qualitative

\[\text{1 Many books deal with this topic. The two references by H. Neisser and F. Modigliani and by J. J. Polak being two examples.}\]
analysis of past and expected trends in import patterns to estimate future import figures.

C. Methodology - Exports.

Whereas a forecast for the imports of a country may be dealt with by examining demands and trends within a single country, a forecast for exports could entail an examination of the demands and trends for imports for a multitude of countries and markets. Considering the inter-relationships of trading patterns between countries and the varying growth rates and structural changes of the importing countries, the possible depth of any export analysis could almost become infinite. Certainly because of the basic assumptions and the uncertainties inherent in any forecast, the principle of diminishing return sets in very quickly and for practical purposes, limits the forecasting of exports to relatively simple techniques and the acceptance of some sacrifice of completeness and detail for simplicity.

A common practice used by many sophisticated forecasts is to identify the main markets of a country, divide the bulk of the imports into broad categories, and to analyze the trend of these imports as indicated in the previous section.

Another general method, not completely isolated from the above method, assumes that exports of a specific country to other countries
are likely to relate closely to changes in the level of income of these importing countries. To carry this type of analysis further, the analysis would basically entail the examination of the three factors briefly outlined below:

(a) the prospective rate of growth of income and demand in the countries which are the best customers for each export.

(b) the trends in the exportable supply - that is, the excess of productive capacity over probable domestic consumption of the exporting country.

(c) the potential output of producers competing with the exports of each commodity.

While the two above methods for estimating future exports will give first estimates, the forecast of exports cannot be made in isolation of the balance of payments question of the country or of the shifting patterns of world trade. These topics will be discussed in subsequent sections.

D. Balance of Payments.

The estimates of future exports and imports of goods and services cannot rest on long-term trends of income and substitution
effects alone. The import-export estimates must be such that the estimates could be part of a stable over-all pattern of international transactions, that is, the estimates must be consistent with equilibrium in the balance-of-payments.

While Canada has had to make a number of major structural adjustments to her position in the world economy during this century, her balance of payments history has not been one of serious long-run balance of payment problems which remained unsolved for any length of time. This may have been partly due to fortuitous reasons, but it could also be partly due to the powerful ways in which the Canadian economy and her balance-of-payments have been adapted to changing world opportunities.

The three most important reasons why Canada has maintained a rather stable balance-of-payments appear to be as follows:

(a) Variations in Canadian economic growth, whether caused by changes in export opportunities or other factors, have resulted in corresponding fluctuations in large groups of imports.

(b) A large number of Canada's imports have fairly high income elasticities of demand in Canada. For example, the growth of Canadian demand for a number of items with a high import content such as automobiles tend to fluctuate
more than proportionately to Canadian incomes.

(c) Over a broad range of Canadian imports, there is a fairly close substitutability between imported and domestic sources of supply. If exports go less well, a limited substitution of domestic for imported goods over a broad range of products can lead and have led to a substantial adjustment in the level of imports relative to the gross national product.

The most important adjustment mechanism of the Canadian International sector, especially over the moderately long run, operates through the long-term capital accounts and the level of Canadian domestic investment.

In periods of rapid Canadian economic growth, imports are likely to be growing faster than her exports. Such boom times are usually accompanied with a high level of investment, the machinery and equipment for which is supplied heavily by foreign suppliers. The same high profitability of investments attracts foreign capital; both direct and portfolio.

In a period when Canada's development has slowed or is running slower than that of her trading partners, the current account
tends to become active as exports exceed imports. At such times, Canadian savings find not such a ready market at home and are often used to buy Canadian securities or shares held by foreigners.

In general, the prediction is for Canada in its international economic position to be not fundamentally different from what it is now, that is, a country which remains strongly integrated economically into the world, particularly the North American economy, and generally holding its own in the question of balance of payments.

E. Trends in World Trade.

World trade has grown rapidly in the last twenty years and for the first time in nearly 100 years, world trade has grown faster than world production for more than 10 consecutive years. The average annual rate of growth of world exports for the 1948-1963 period was 6.7 percent compared with this general trend, Canada’s exports reached a peak in 1952 of 6.2 percent of world trade and has since declined to about 4.2 percent for the 1962-63 period. This has resulted in a decline of Canada’s share of the total export market from 4.7 percent in 1954 to 4.2 percent in 1963.

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1 G. Haberler; Integration and Growth of the World Economy in Historical Perspective; A speech to 76th Annual Meeting of the American Economics Association; Boston, 1963.
Again concerning the world trend, a striking characteristic of world trade is that the industrial countries tend to export far more to the countries within their own group than they do to countries outside the group.¹ For example, exports between industrial countries increased by 9.3 percent in the 1954-63 period as compared with trade between industrialized and non-industrialized countries increasing 4.7 percent in a like period.

In Canada's case, 85 percent of her exports went to industrialized countries and increased at a rate of 4.7 percent between 1954 and 1963. This rate of increase, however, is below the average rate of increase of imports experienced by all of Canada's major trading markets such as the United States, United Kingdom and Japan.

A possible reason for this decline is the changing composition of world trade. The most rapid rate of growth in world trade has taken place in the manufactured goods segment. The table below indicates the relative sizes and rates of change of the various segments of world trade.

¹ See United Nations; A Review of Trends in World Trade; E/Cong. 46/12; February 26, 1964; Page. 20.
TABLE 32

COMPOSITION OF IMPORTS BY INDUSTRIAL COUNTRIES, 1954-1963

(Billions of U.S. Dollars)

<table>
<thead>
<tr>
<th></th>
<th>1954</th>
<th>Percent</th>
<th>1963</th>
<th>Percent</th>
<th>Increase</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Products</td>
<td>27.8</td>
<td>57.2</td>
<td>42.9</td>
<td>45.4</td>
<td>15.1</td>
<td>54.4</td>
</tr>
<tr>
<td>Industrial Materials</td>
<td>8.1</td>
<td>16.6</td>
<td>13.7</td>
<td>14.5</td>
<td>5.6</td>
<td>70.4</td>
</tr>
<tr>
<td>Manufactured Goods</td>
<td>12.1</td>
<td>25.0</td>
<td>35.8</td>
<td>37.9</td>
<td>23.7</td>
<td>196.2</td>
</tr>
</tbody>
</table>

In Canada, the 1963 figures show that manufactured goods accounting for a smaller share of exports and larger share of imports than any other industrialized country. This relatively slow rate of growth of manufactured exports reduced Canada's share of the United States imports of manufacturers from 21 percent in 1954 to 12 percent in 1963.

Of concern to Canada, being a heavy exporter of primary products, is that the consumption of natural materials has been rising less rapidly than industrial production in most industrialized countries. The main reason appears to be the more efficient use of materials in manufacture. This was accelerated during the war but the secular trend has continued down. A second reason appears to be the
changing pattern of industrial production from non-durable goods to more durable goods. This trend in itself will tend to reduce the ratio of materials consumption to an over-all index of manufacturing production.

Perhaps the most important factors that have developed to help encourage the increase in world trade and is likely to affect future position in the world economy, has been the formation of the General Agreement on Tariffs and Trade, the International Monetary Fund, and the International Bank for Reconstruction and Development. Through these organizations, the western countries have attempted to co-operate to raise standards of living, maintain high levels of employment, and expand the production and exchange of goods.

The ultimate aim of the trade agreements is to reduce many of the existing tariffs. Although it is difficult to reduce to qualitative terms the reduction of such tariffs would have on the Canadian economy, it would appear that the new forces brought into play would fundamentally alter the current competitive situation, provide many existing industries with an opportunity to accelerate or redirect their operations into more profitable channels and would lead to the establishment of new lines of production in Canada.

F. Projection to 1980.

As indicated in the sections of methodology, the method of estimating future imports and exports are based on aggregative figures relating import-export figures to the gross national product figures.

An examination of Appendix II will indicate the rather stable portion of the gross national product accounted for by exports. Except for a brief period immediately following the Second World War, exports have amounted to about 23 percent of the gross national product figures.

Since about 1950 when western economies reverted to more normal economic environments, as indicated in previous sections, many changes have taken place within the western economies and in the patterns of trade between the western economies. No doubt some of these shifts have been to Canada's detriment while others have increased the demand for Canada's exports.

Fundamentally, much of Canada's growth in exports and economic power has reflected the demand for Canada's raw materials by the more industrialized countries of the world. As we have seen, however, there has been a tendency for the relative importance in the trade of raw materials to decline. This trend appears to result more from a rapid increase in the trade of manufacturers rather than
the decline in the trade of raw materials.

It has also been suggested that any general reduction in world tariffs would benefit Canada and the opportunity to expand her market for manufacturers and thereby participate in the general trend to increase trade in manufactured goods.

Concerning exports then, it is assumed that the rather stable export - G.N.P. relationship exhibited in the last twenty years will prevail during the forecast period and forms the basis for the estimates of exports given in Table 33.

Somewhat contrary to economic theory, Canada's imports as related to the gross national product and export figures, has shown greater volatility and a cycle somewhat independent of the G.N.P. and export figures. While the import figures resemble slightly the fluctuations in recent business cycles, the relationship is not as distinct or close as one might expect.

Since 1950, however, imports have consistently been greater than exports. As a percentage of the gross national product, the percentage points the imports have exceeded the exports at a range from .1 to 5.6 with an average of about 2.0 percentage points. As can be seen in Appendix II, the value of imports exceeded the value
of exports to the greatest extent during the late 1950's, a period of rapid capital expansion in Canada. During the early 1960's, the recent boom resulted in a decline in the deficit between imports and exports. This was possibly due to there being a greater discrepancy between actual and potential output in the Canadian economy as compared with other western economies.

As for the forecast period, it is expected that the wide ranges in the differential values of exports and imports will continue as the Canadian economy develops or expands in similar other western economies. Because much of Canada's imports consist of capital goods not available in Canada, the expected continued demand for the development and extraction of her natural resources, the obsolescence of existing capital goods resulting from technical change, and the expectation of greater Canadian participation in the world trade of manufactures will necessitate a continued strong demand for imports.

The attempt to judge the phase of Canadian development as compared with the phase of development of the aggregate of Canada's trading partners is extremely difficult except in the very short run. For this reason, the long term trend of the excess of imports over exports as a basis for future import estimates.

Combining the estimates for future Canadian gross national
product figures with the above assumptions, future estimates for total imports and exports are shown below and illustrated in Figure 6.

**TABLE 33.**

<table>
<thead>
<tr>
<th>Year</th>
<th>G.N.E.</th>
<th>Imports</th>
<th>Exports</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>36.15</td>
<td>9.03</td>
<td>8.30</td>
</tr>
<tr>
<td>1970</td>
<td>44.82</td>
<td>11.20</td>
<td>10.30</td>
</tr>
<tr>
<td>1975</td>
<td>55.07</td>
<td>13.80</td>
<td>12.82</td>
</tr>
<tr>
<td>1980</td>
<td>67.48</td>
<td>16.85</td>
<td>15.50</td>
</tr>
</tbody>
</table>
ESTIMATES FOR EXPORTS AND IMPORTS
1965 - 1980

BILLIONS OF 1949 DOLLARS

YEAR


3 6 9 12 15

FIGURE 6 - IMPORT AND EXPORT ESTIMATES 1965 - 1980
X. CONSOLIDATION OF EXPENDITURE

Based on the estimates of expenditure for the major divisions, the results are summarized in the Table below.

**TABLE 34.**

**DISTRIBUTION OF GROSS NATIONAL EXPENDITURE BY MAJOR COMPONENTS TO 1980**

<table>
<thead>
<tr>
<th>Year</th>
<th>G.N.P.</th>
<th>Capital Accumulation</th>
<th>Government Expenditure</th>
<th>Consumer Expenditure</th>
<th>Exports</th>
<th>Imports</th>
<th>Total G.N.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>36.15</td>
<td>8.38</td>
<td>5.26</td>
<td>24.20</td>
<td>8.30</td>
<td>-9.03</td>
<td>37.11</td>
</tr>
<tr>
<td>1970</td>
<td>44.82</td>
<td>10.41</td>
<td>6.40</td>
<td>30.00</td>
<td>10.30</td>
<td>-11.20</td>
<td>45.91</td>
</tr>
<tr>
<td>1975</td>
<td>55.07</td>
<td>12.78</td>
<td>7.92</td>
<td>36.90</td>
<td>12.82</td>
<td>-13.80</td>
<td>56.62</td>
</tr>
<tr>
<td>1980</td>
<td>67.48</td>
<td>15.64</td>
<td>9.81</td>
<td>45.20</td>
<td>15.50</td>
<td>-16.85</td>
<td>69.30</td>
</tr>
</tbody>
</table>

From the above table, the estimate for the gross national expenditure exceeds that of the gross national product by about 3 percent.

Upon reviewing the basic assumptions in obtaining the estimates for each of the components, it would appear little would be gained by changing any of the trend assumptions in the expenditure components except to
make the figures for the gross national product and gross national expenditure balance. Since the basic objective was to examine the spending components to identify any significant trends, it would seem the discrepancy cannot be traced to any single component, but rather the discrepancy is possibly cumulative throughout each of the components.

Except for periods of severe disturbance in the economy, all the major components of the gross national expenditure tend to be relatively stable in relation to the gross national product. It is acknowledged, however, that spending patterns within the major segments may change substantially but the aggregative figures are fairly constant relative to each other.

Although the government expenditure was the only segment that was estimated completely independent of the gross national product, the results would indicate that the expenditure of this segment will grow at approximately the same rate as growth rate of total output in the economy. As can be seen from Table 29, a large portion of government expenditure is spent in areas such as education and social welfare where public demand will probably continue strong even if the economy does not expand at the rate anticipated. It is possible then that government expenditures may rise in proportion to other segments but the historical data in Table 27 would indicate that government expenditure is not likely to decline for any extended period.
Consumer expenditure appears to be the most constant or stable segment relative to the total expenditure. While there appears to be little theory or empirical work to explain this phenomenon, it seems difficult to justify any assumed increase or decrease in this trend in the light of such historical constancy.

Even exports which theoretically are independent of any internal growth, except of course the ability to produce, have shown a growth rate very similar to the gross national product. This may be partly explained at least, by the fact that the Canadian economy is tied very closely to the American economy and with the United States being Canada's major market, the imports of the United States and hence the bulk of Canada's exports possibly have been a major role in the growth of Canada's gross national product.
XI. CONCLUSIONS

While economic theory and theories of economic growth give some valuable insight to the problem of long-range economic forecasting, the abstractions and the dependence on rather rigid assumptions of these theories tend to severely limit their use for extensive practical application.

A preliminary search of economic theory that could form the basis of long-range economic forecasting revealed that knowledge about economic growth is limited. While certain areas of economic theory as the consumption function do offer some assistance in long-range forecasting, these areas tend to be few and not generally interdependent. Without a definite theory of economic growth, the use of economic theory in long-range economic forecasting tends to be limited to segmental application. As a result, it appears that presently much long-range forecasting generally goes back to first principles and trend analysis.

Because a theory of growth would involve the analysis and the study of a multitude of variables, many of which are not clearly understood or even quantifiable, the long-range forecaster can only conjecture as to how these basic variables will change or how different
environments will affect these variables. It would appear that it is these largely unknown quantities or factors that contribute to the inaccuracies in the results of long-range economic forecasting.

As indicated, most of the methodology used for long-range economic forecasting appears to be some form of basic trend projection. The trends may be changes in absolute figures or rates of change for the variables. The degree of sophistication of the forecast depends mainly, then, on the number of trends or variables that are examined.

The important trends which appear to be affecting the Canadian potential for output are the trends in the work force and productivity.

The relatively high Canadian birth rate, the low death rate, and the expected continued net flow of immigrants, indicates a continued rapid growth rate of the Canadian population. It is expected also, that the greater participation rates for women in the labour force and a strong influx of young people to the labour force will more than offset any tendency for the decline in the participation rates for men with the result the growth rate of the labour force will be higher than the growth rate of the population.

With the expected breakdown of the total labour force into
agriculture, government and public administration, and commercial non-agricultural segments combined with the estimates of their segmental productivity, an overall rate of growth in productivity per man is indicated to approximate one and nin-tenths percent for Canada between 1965 and 1980. There are indications that this may be low, but it does equal the productivity growth rate for the 1928 to 1956 period.

The basic structural changes within the economy to effect the output are seen to be a moderate decline in the percentage of the labour force engaged in the agricultural sector but a high rate of increase in per-man productivity giving a general increase in the agricultural output; a slight decline in per man productivity in the governmental and public administration sector but a large increase of the labour force in this sector indicating a continued strong growth in the contribution to total productivity in this sector; a substantial increase in both the absolute size of the labour force and the productivity per-man in the commercial non-agricultural sector indicating a large growth factor in this segment.

The overall rate of growth of total output is indicated to be 4.26 percent. It is indicated that this growth rate may be achieved by both a decline in the number employed in the low productivity sectors of the economy and a higher percentage of the work force
entering the high productivity areas.

It would appear that many estimates for broadly divided, long range national expenditure patterns are often based on estimates of the gross national product. The five basic divisions of gross national expenditure used in this study, capital accumulation, government expenditure, consumer expenditure, imports and exports, all showed a rather constant proportion relationship to the gross national product in the recent past and it would seem difficult to envision any drastic changes in these basic spending patterns.

Clark, M.G., Canada and World Trade, Queen's Printer, Canada, 1964.


Hood, W.C. and Scott, A., Output, Labour and Capital in the Canadian Economy, Queen's Printer, Canada, 1957.


Slater, D.W., Consumption Expenditure in Canada, Queens Printer, Canada, 1957.


APPENDICES
APPENDIX I.
APPENDIX 1

GOVERNMENT EXPENDITURE

For the purpose of attempting to forecast government spending, the methodology used will be to segregate the spending along the same functional lines as used by the Canada Year Book. Past trends in each of the sectors will be examined to determine the past rate of growth and this rate of growth extended into the forecast period but modified where it would seem advisable to do so.

The major items to be considered are as follows:

2. Education.
4. Transportation.
5. Health and Hospital Services.
6. Interest Costs.
7. Others.

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1 Most of the information and projected trends are based on information presented in the chapter "Fiscal Trends and National Saving" of the First Annual Review of the Economic Council of Canada.
1. National Defence

Since 1951 National Defence expenditure has, in current dollars, remained at a relatively constant 1.5 billion dollars. When various veterans affairs are included, this given figure amounts to about 2 billion dollars. Most of the other studies assumed this trend would continue mainly on the basis of continued world tension but without actual warfare.

It will be assumed then that total defence expenditures will continue to amount to about 2.0 billion current dollars annually.

2. Education

The main influence on the amount expected to be spent on educational facilities is the changing structure of the student population.

As indicated by the Economic Council of Canada,¹ the elementary and secondary school population has been increasing by about 135,000 students annually for the last few years. By 1970, however, because of the passing of the post war "baby boom" this is expected to drop sharply by 1970 to about 75,000 per year after which an increase more in line with population growth could be expected.

During the 1956-1963 period, expenditures in the vocational and technological field for both new buildings and operating expenses have averaged an annual increase of 23 percent. Because of the completion of many of the major projects in this area, the rate of increase is expected to drop back to about 7.9 percent per year between 1963 and 1970.

The expenditure for current and capital requirements at the university level have recently been increasing at the rate of 10.4 percent and this is expected to climb to about 16.4 percent for the 1963-1970 period.

From the above then, it would seem reasonable to expect the rates of growth in both the elementary and secondary sections and the vocational and technological field to continue to decline after 1970, the rates of which are expected to approximate 2.5 percent and 6 percent respectively.

With so much emphasis on higher education, it would seem that expenditures are not likely to slow substantially in the university level. Canada is well behind the U.S. as far as facilities for higher education is concerned, especially for the graduate level. It will be assumed then that the rate of increase assumed by the Economic Council of Canada will decline slightly to 14 percent.
Using the above rates of increase then, education expenditures could be expected to approximate those below:

**ESTIMATED EDUCATION EXPENDITURES**
(Millions of 1968 Dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary and Secondary</td>
<td>1,760</td>
<td>1,950</td>
<td>2,140</td>
<td>2,320</td>
</tr>
<tr>
<td>Vocational and Technological</td>
<td>200</td>
<td>290</td>
<td>390</td>
<td>520</td>
</tr>
<tr>
<td>University</td>
<td>390</td>
<td>640</td>
<td>1,610</td>
<td>3,100</td>
</tr>
<tr>
<td>TOTAL</td>
<td>2,350</td>
<td>3,080</td>
<td>4,140</td>
<td>5,940</td>
</tr>
</tbody>
</table>

The overall rate of increase expected in education expenditures then approximates 6.5 percent.

3. **Social Welfare**

Social welfare expenditures tend to be flat rate expenditures base mainly on the number of recipients and policy decisions and are not significantly affected by economic conditions. The 4 percent growth rate in the past would allow approximately 2 percent for population changes and 2 percent for increased benefits in such areas as better health protection, hospital care, care of the aged, etc. This same
rate of growth was expected to continue to 1980 with the resulting table below:

**ESTIMATED GOVERNMENT EXPENDITURES**

**ON SOCIAL WELFARE**

(Millions of 1963 Dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Welfare Expenditure</td>
<td>2,140</td>
<td>2,610</td>
<td>3,180</td>
<td>3,860</td>
</tr>
</tbody>
</table>

4. **Transportation**

The main factors here are the increased affluence of the society demanding more and better highways and the continued rapid growth of the cities requiring a growing network of urban streets and special transit facilities.

The cost of such facilities far outstrip the population growth because of the increased standard of living demanding better facilities and because the cost of providing these facilities in increasing congested or built-up areas mean rising construction costs.

The rate of growth in the economy expected in the present study is 4.26 percent for the 1965 to 1980 period as compared with
the 5.5 percent expected by the Economic Council of Canada for the 1963 to 1970 period. For this reason a rate of growth in the transportation sector is expected to approximate 5.5 percent to 1980 rather than the 6.6 percent expected by the Economic Council of Canada to 1970. This assumption would lead to the table below:

![ESTIMATED GOVERNMENT EXPENDITURE FOR TRANSPORTATION](image)

(Millions of 1963 Dollars)

<table>
<thead>
<tr>
<th>Year</th>
<th>Transportation Expenditure</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965</td>
<td>1,850</td>
</tr>
<tr>
<td>1970</td>
<td>2,440</td>
</tr>
<tr>
<td>1975</td>
<td>3,200</td>
</tr>
<tr>
<td>1980</td>
<td>4,120</td>
</tr>
</tbody>
</table>

5. Health and Hospital Services

As with education expenditures, it may be expected that health and hospital costs will continue to increase rather rapidly because of the increasing growth of the population and the increasing standard of health services being offered the public. Other factors which will tend to maintain the figure growing at a high rate is expanded programmes in health research, training of personnel in this area and improvement in services offered in mental hospitals.

As in the more recent past, the growth of expenditures in this
area is expected to approximate 6 percent with the resulting figures shown in the table below.

**ESTIMATED GOVERNMENT EXPENDITURES FOR HEALTH AND HOSPITAL SERVICES**

(Millions of 1963 Dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Health and Hospital Expenditures</td>
<td>1,450</td>
<td>1,940</td>
<td>2,600</td>
<td>3,020</td>
</tr>
</tbody>
</table>

6. Interest Costs

Since the interest costs are dependent on the government indebtedness and this is dependent on the budget surpluses and deficits at all levels of government, the expected interest costs are based on the following assumptions:

1. The government budgets will come close to an over-all balance.

2. The debt and consequently the net interest costs will be allowed to grow approximately in step with the growth in national output.

This means assuming the debt charges will increase at approximately 1.9 percent per year and will result in the table below.
**ESTIMATES OF GOVERNMENTAL INTEREST COSTS**
(Millions of 1963 Dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest Costs</td>
<td>1,150</td>
<td>1,270</td>
<td>1,400</td>
<td>1,530</td>
</tr>
</tbody>
</table>

7. **Others**

This section includes such services as police and fire protection, recreation and community services, sanitation, tourist and industrial development promotion and government aid for scientific research.

It is expected that these will continue their strong upward trend and will approximate the 4.5 percent rate of increase as shown in the past.

**ESTIMATED OTHER GENERAL GOVERNMENTAL EXPENDITURE**
(Millions of 1963 Dollars)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Other Governmental Expenditure</td>
<td>3,460</td>
<td>4,330</td>
<td>5,430</td>
<td>6,800</td>
</tr>
</tbody>
</table>
APPENDIX II.
## GROSS NATIONAL PRODUCT, IMPORTS AND EXPORTS FROM 1945 TO 1963

(Billions of 1949 Dollars)

<table>
<thead>
<tr>
<th>YEAR</th>
<th>G.N.P.</th>
<th>EXPORTS</th>
<th>IMPORTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Value</td>
<td>Percent of G.N.P.</td>
</tr>
<tr>
<td>1945</td>
<td>15.55</td>
<td>5.06</td>
<td>32.6</td>
</tr>
<tr>
<td>46</td>
<td>15.25</td>
<td>4.12</td>
<td>27.0</td>
</tr>
<tr>
<td>47</td>
<td>15.45</td>
<td>4.14</td>
<td>26.8</td>
</tr>
<tr>
<td>48</td>
<td>15.75</td>
<td>4.19</td>
<td>26.6</td>
</tr>
<tr>
<td>49</td>
<td>16.34</td>
<td>4.02</td>
<td>24.6</td>
</tr>
<tr>
<td>50</td>
<td>17.47</td>
<td>4.00</td>
<td>22.9</td>
</tr>
<tr>
<td>51</td>
<td>18.55</td>
<td>4.38</td>
<td>23.6</td>
</tr>
<tr>
<td>52</td>
<td>20.03</td>
<td>4.85</td>
<td>23.9</td>
</tr>
<tr>
<td>53</td>
<td>20.79</td>
<td>4.81</td>
<td>23.2</td>
</tr>
<tr>
<td>54</td>
<td>20.19</td>
<td>4.62</td>
<td>22.9</td>
</tr>
<tr>
<td>55</td>
<td>21.92</td>
<td>4.97</td>
<td>22.7</td>
</tr>
<tr>
<td>56</td>
<td>23.81</td>
<td>5.34</td>
<td>22.4</td>
</tr>
<tr>
<td>57</td>
<td>24.12</td>
<td>5.39</td>
<td>22.4</td>
</tr>
<tr>
<td>58</td>
<td>24.40</td>
<td>5.37</td>
<td>22.8</td>
</tr>
<tr>
<td>59</td>
<td>25.24</td>
<td>5.57</td>
<td>23.0</td>
</tr>
<tr>
<td>60</td>
<td>25.85</td>
<td>5.81</td>
<td>22.5</td>
</tr>
<tr>
<td>61</td>
<td>26.47</td>
<td>6.24</td>
<td>23.6</td>
</tr>
<tr>
<td>62</td>
<td>28.08</td>
<td>6.52</td>
<td>23.2</td>
</tr>
<tr>
<td>63</td>
<td>29.38</td>
<td>7.10</td>
<td>24.2</td>
</tr>
</tbody>
</table>

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