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**LA THÈSE A ÉTÉ
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REGIONAL ECONOMIC GROWTH IN CANADA: An Urban-
Rural Functional Area Analysis

by L.M. Kumar-Misir

Thesis presented to the School of
Graduate Studies of the University
of Ottawa in partial fulfillment
of the requirements for the degree
of Master of Arts in Economics

OTTAWA - CANADA - 1977

PREFACE

While economists acknowledge the lack of a general theory of economic growth, the construction and presentation of several partial theories of the growth process, its sources and measurement have emerged in the post-war period. More recently, the search has been for answers to problems of regional economic growth which have become more complex and urgent.

Gunnar Myrdal presented in 1957 a partial theory of regional economic growth constructed from an analysis of regional differentials in terms of the growth of urban centres producing either adverse or beneficial effects on surrounding areas on the one hand or leading to a greater balance between the two effects on the other. Such an approach contains much that can be applied to problems of regional growth in Canada.

This thesis examines Myrdal's theory of regional economic growth and then applies it to regional economic development and problems facing Canada.

The writer would like to express his sincere appreciation to Professor O.J. Firestone for his encouragement, guidance and criticisms throughout the preparation of this study. His influence

has instilled in the writer a certain respect for originality of idea or method of analysis, adherence to principles of scientific enquiry and adherence to principles of good writing. The writer is indebted to Professor H.W. Richardson of the University of Pennsylvania's School of Regional and Urban Economics who gave his time both to read the thesis and to provide invaluable comments.

The writer is equally indebted to Professor O. Wadsted of the University of Ottawa's Department of Economics who provided advice and direction on some important revisions to the thesis. The assistance of several officials of the Department of Manpower and Immigration, Statistics Canada and others was invaluable to the completion of the thesis.

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CHAPTER ONE

INTRODUCTION

The achievement to date of an appropriate participation by each of Canada's provinces and territories in the economic growth of the country has been less than satisfactory. The search to achieve an appropriate mix on the part of each province and each territory in the pace of national economic growth continues to be an urgent but elusive goal. "... with regard to the goal of an equitable distribution of rising incomes, (the Economic Council of Canada) noted that there was some reduction in poverty and some narrowing of regional economic disparities in the course of the 1960's. However, Canada continues to have very major poverty and regional disparity problems".(1)

Aspects of Regional Economic Disparity

One important aspect of regional economic welfare in Canada is the distribution of income among the provinces. Regional estimates of personal income per capita in selected years of the post-war period are presented in Table 1:1.

(1) Economic Council of Canada, Performance and Potential: Mid - 1950's to Mid - 1970's, (Ottawa: Information Canada, September 1970), p. 42.

TABLE 1.1

ESTIMATES OF PERSONAL INCOME PER CAPITA (IN CURRENT DOLLARS), BY PROVINCES AND CANADA, SELECTED YEARS, 1951-71

	1951	1961	1971
Ontario-----	1,416	1,954	3,967
British Columbia ^a -----	1,429	1,897	3,719
Alberta-----	1,331	1,651	3,405
Saskatchewan-----	1,285	1,172	2,778
Manitoba-----	1,209	1,557	3,203
Quebec-----	1,007	1,488	3,027
Nova Scotia-----	829	1,284	2,611
New Brunswick-----	804	1,122	2,469
Prince Edward Island-----	653	971	2,188
Newfoundland-----	579	961	2,211
Canada-----	1,199	1,651	3,405

^aIncludes the Yukon and Northwest Territories.

Source: Canada, Statistics Canada, National Income and Expenditure Accounts, 1926-71 (Ottawa: Information Canada, September 1972), Table 36.

The data point to some interesting trends reflecting the persistence of the problem of economic disparity. Two points stand out: (1) there continues to be a substantial percentage difference in income levels between the highest-income and the lowest-income provinces, and (2) the positions of the provinces examined in terms of income distribution show little change over a period of twenty years.

Another important measure of economic welfare is the extent to which the Canadian economy has achieved full-employment of its human resources. The latter is defined by the Economic Council of Canada to be achieved at an annual average rate of unemployment (2) of 3 per cent at the Canada level.

(2) Economic Council of Canada, First Annual Review: Economic Goals for Canada to 1970, (Ottawa: Information Canada, December 1964), pp. 37-42. Canada's unemployment rate ranging from 3.4% in 1966 to 7.1% in 1976 suggests that the goal of full-employment at a 3% unemployment rate may not be realistic.

TABLE 1:2

THE CIVILIAN LABOUR FORCE AND UNEMPLOYMENT, BY PROVINCES, 1971

	Civilian Labour Force ^a	Unemployed ^a	Per Cent of Civilian Labour Force Unemployed ^b
Ontario.....	3,249	170	5.2
British Columbia.....	911	64	7.0
Alberta.....	664	31	4.7
Saskatchewan.....	348	13	3.7
Manitoba.....	390	19	4.9
Quebec.....	2,394	197	8.2
Nova Scotia.....	264	20	7.6
New Brunswick.....	215	16	7.4
Prince Edward Island.....	39	..	..
Newfoundland.....	158	18	11.4

^aThousands of persons 14 years of age and over.

^bMay be inconsistent with number in labour force and number unemployed because of rounding of original data.

..Not available.

Source: Canada, Statistics Canada, The Labour Force (Ottawa: Information Canada, June 1972), Table 18, p. 35 and Table 19, p. 36.

Table 1:2 shows how the rate of unemployment of the civilian labour force during 1971 differed among the provinces. No province had achieved full-employment of its human resources. All provinces exceeded the national annual average rate of unemployment that marks full-employment in the Canadian economy.

The process of economic growth requires net increases over time in the stock of capital goods. Rates of new capital expenditures incurred by the provinces in 1961 and 1971 are shown in Table 1:3.

TABLE 1:3

NEW CAPITAL EXPENDITURES^a (MILLIONS OF DOLLARS), PRIVATE AND PUBLIC SECTORS, BY PROVINCES AND CANADA, 1961 AND 1971

	1961	1971	1961-1971 ^b
Ontario.....	2,794.5	7,429.4	10.3
British Columbia ^c	900.4	2,996.2	12.8
Alberta.....	980.5	2,087.8	7.8
Saskatchewan.....	453.4	665.3	3.9
Manitoba.....	416.6	823.1	7.0
Quebec.....	2,007.4	3,970.8	7.0
Nova Scotia.....	223.7	613.7	10.6
New Brunswick.....	171.0	475.0	10.7
Prince Edward Island.....	38.3	69.3	6.0
Newfoundland.....	184.4	655.4	13.5
Canada.....	8,172.0	19,785.9	9.2

^aCapital and Repair Expenditures on Construction and on Machinery and Equipment.

^bCompound rate of growth.

^cIncludes the Yukon and Northwest Territories.

Source: Canada, Statistics Canada, Private and Public Investment in Canada, Outlook and Regional Estimates, 1961-72. (Ottawa: Statistics Canada, 1972), Table 36, pp. 48 and 49.

While there has been a general upward movement in all provinces over the ten-year period, the growth rates of new capital expenditures in the low-income provinces have been either less fast or not much faster than those of the high-income provinces. The low-income provinces must attract new capital expenditures at faster rates than the high-income provinces if they are to reduce the economic welfare gap between themselves and the high-income provinces.

The data presented thus far suggest: (1) rising incomes per capita in all provinces, (2) the persistence of wide differences in average per capita income among the provinces, and (3) wide differences in productive employment of the human and material resources of each province.

Purpose and Organization

What particular theories of regional economic growth may be relevant and can be applied to provide some of the reasons underlying regional economic growth and disparity in Canada?

Professor Gunnar Myrdal(3) in 1957 outlined a partial theory of regional economic growth which can be applied to regional economic development and problems facing Canada. The theory is based upon the persistence of regional economic differentials ensuing from the growth of urban centres, producing either positive or negative economic effects on surrounding areas, on the one hand or leading to a greater balance between the two effects on the other.

The purpose of this thesis is two-fold: (1) to develop a regional classification system for Canada which would satisfy the Myrdal-Kaldor thesis, and (2) to apply the Myrdal-Kaldor thesis to regional economic development and problems facing Canada.

(3) Gunnar Myrdal, Economic Theory and Underdeveloped Regions, (London: Gerlad Duckworth and Co. Ltd. 1957), pp. 11-38.

The analysis of the Myrdal-Kaldor thesis deals with the economic performance of Canada's regions defined in terms of a specific regional classification in the period 1951 - 1966.

Chapter two examines the theories of regional economic growth advanced by Professors Hirschman and Myrdal. The latter's thesis of regional economic growth is examined critically and the subsequent comments made on the Myrdal thesis by Professors Kaldor and Richardson are assessed. Notwithstanding the short-comings of the Myrdal thesis, an argument is presented towards the application of the latter to more recent Canadian economic conditions. Chapter three reviews the concept and classifications of regions, presents a variety of private and public regional classifications of Canada and discusses some criteria for establishing the several classifications. An assessment is made of the different Canadian systems in existence, their usefulness and their lack of it. The type of system needed and reasons are discussed and a regional grouping of cities and surrounding areas is formed to apply the Myrdal-Kaldor thesis to Canadian growth. Chapter four covers the method of testing the Myrdal-Kaldor thesis of cumulative causation in Canada's regions. It explains how and why the Myrdal-Kaldor thesis is more suitable than the "pure" Myrdal theory and states whether the more testable hypothesis is applicable to the analysis of regional economic development in Canada. It explains what economic phenomena are to be tested and how, and what are some of the qualifications of the technique outlined for

analysis of the Myrdal-Kaldor thesis. The chapter concludes with some comment on what results may be expected from the exercise.

Chapter five examines variations in regional growth rates of population and industry in terms of cities and combined cities and surrounding areas and rest-of-provinces in Canada. It analyzes the growth and distribution of population among the regions and the growth of regional output, employment and earnings in manufacturing. The chapter includes Lorenz curves showing changes in income inequality with respect to workers in manufacturing in the regions during the periods 1951 and 1966. Dealing mainly with a description of the data, this chapter serves to introduce the test of cumulative causation in Canada. Chapter six applies Richardson's model of the Myrdal-Kaldor thesis to regional economic development in Canada during the period 1951-1966. Regression equations are fitted to manufacturing data for Canada's core cities and combined core cities and related areas by provinces, regions and Canada. The regressions are examined and cumulative causation in Canada's regions is assessed. The objective is to determine whether the Myrdal-Kaldor thesis as presented by Professor Richardson is workable in Canada and, if so, to provide information on some of the forces that contributed to unequal regional economic development in Canada during 1951-1966. A secondary objective is to see whether the analysis can delineate some of the more critical problems for sustained economic development at a continuing rate in Canada's regions. To the extent that the test of the Myrdal-Kaldor

) thesis does not work out for Canada's regions, reasons will sought for this inapplicability of what on a priori grounds appears to be a plausible theoretical analysis of regional economic growth.

Chapter seven presents the summary and conclusions of determining an economic region system in Canada to satisfy the Myrdal-Kaldor thesis and applying Richardson's model of the Myrdal-Kaldor thesis to Canada's regional economic development in the period 1951-1966.

Four appendices complete the thesis. They cover: (1) approximately sixteen tables of data on population and manufacturing for regions and Canada during the period 1951-1966, (2) an examination of the sources and quality of the data, (3) some suggestions for further research on regional economic growth in Canada and (4) a combined bibliography and references dealing with regional economic growth theories and analyses.

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CHAPTER TWO

PRESENT STATE OF REGIONAL ECONOMIC GROWTH THEORIES

The construction and presentation of a number of partial theories of the growth process, its sources and measurements have emerged in the post-war period: "... (economists) are still searching for a general theory of economic growth. They continue to improvise in policy terms on the basis of a partial theoretical framework which they have so far been able to build".(1) More recently, the search has been for answers to problems of regional economic growth which have become more complex and urgent.

This chapter presents the regional economic growth theories advanced by Professors Albert Hirschman, and Gunnar Myrdal and the comments made by Professors Nicholas Kaldor and Harry Richardson on the Myrdal thesis. Recognizing the shortcomings of the Myrdal thesis, the case is made that it provides a useful framework to examine more recent regional economic development in Canada.

A Theory of Unbalanced Growth

Among regional economic growth theories, the theory of unbalanced growth originally developed by Professors

(1) O.J. Firestone, "Theories and Problems of Economic Growth", Lecture given May 1969, (mimeograph) p. 2.

Myrdal, Hirschman and Perroux(2) presents a theoretically impressive framework for the analysis of regional economic development and problems facing a given economy.

Here is a summary of the principles of the theory of unbalanced growth and the regional implications developed by Hirschman and Myrdal.

According to Hirschman, economic growth is the result of the interplay of the following three forces: (1) social overhead capital (SOC) defined as "... those basic services without which primary, secondary and tertiary productive activities cannot function. In its wider sense, it includes all public services from law and order through education and public health to transportation, communications, power and water supply, as well as such agricultural overhead capital as irrigation and drainage systems"(3), (2) directly productive activity (DPA) defined as enterprises "in industry, agriculture and commerce that are generally in the hands of individuals or private firms"(4), and (3) linkages which may take the form of a backward or a forward linkage. A backward linkage would occur when one firm's output creates a demand for another's goods or services. A forward linkage would occur when one firm takes the output of another and

(2) Economic Theory and Underdeveloped Regions, op. cit., pp. 11-38, A. Hirschman, The Strategy of Economic Development (New Haven: Yale University Press, Inc., 1958) pp. 62-159 and 183-201, F. Perroux, "Note sur la Notion de Pole de Croissance", Economie Appliquée, 8 (Jan.-June, 1952), pp. 307-320.

(3) The strategy of Economic Development, op. cit., p. 83.

(4) Ibid., p. 85.

carries it to a further stage of production.

Professor Hirschman examined the growth pole concept and its relation to the region that surrounds it. He suggested that if a region is to increase its rate of growth, it must develop one or more growth poles. Initially, this means that one part of a region develops much more rapidly than the rest. However, the existence of the regional growth pole produces economic pressures that lead to widespread developments to correct the imbalance. The extent and the nature of the whole area's response to pressures for growth will depend on the region's economic structure in relation to the industries that make up the growth pole. Thus, an expanding industry generates an increased demand for inputs of production. At first, it may import the inputs from other distant regions or countries. Under the right circumstances, however, a local plant will be established to supply the expanding industry. Such a result is termed backward linkage. Forward linkage may also result. Hirschman mentions the more-dependent industries which cluster around the site of an expanding industry as a special case of forward or backward linkage. As they are smaller than the dominant industry, their most economic location is as close as possible to the larger industry. Their production largely depends either on the market which the larger industry provides or in making use of a by-product of the larger industry. The forward linkages may be much weaker for less-dependent firms but can nevertheless be a contributing factor to the establishment of more industries. Moreover, in the case of the

less-dependent industries, the plants that the forward linkages cause to be established may turn out to be much more important to the economy of an underdeveloped region.

Professor Myrdal explained that economic growth stems from the interplay of three forces. They are: (1) cumulative causation defined as a "circular constellation of forces tending to act and react upon one another in such a way⁵ as to keep a poor country in a state of poverty," (5) (2) back-wash effects defined as "all relevant adverse changes, caused outside that locality, of economic expansion in a locality," (6) and (3) spread effects defined as "certain centrifugal 'spread effects' of expansionary momentum from the centres of economic expansion to other regions." (7)

Myrdal demonstrated that a given economic change is not normally accompanied by countervailing changes but, instead, by supporting changes which move the system in the same direction as the first change but much further by examining the drift towards regional economic inequalities within an economy. Figure 2:1 illustrates the workings of the principle of interlocking, circular interdependence within a process of cumulative causation in the declining region.

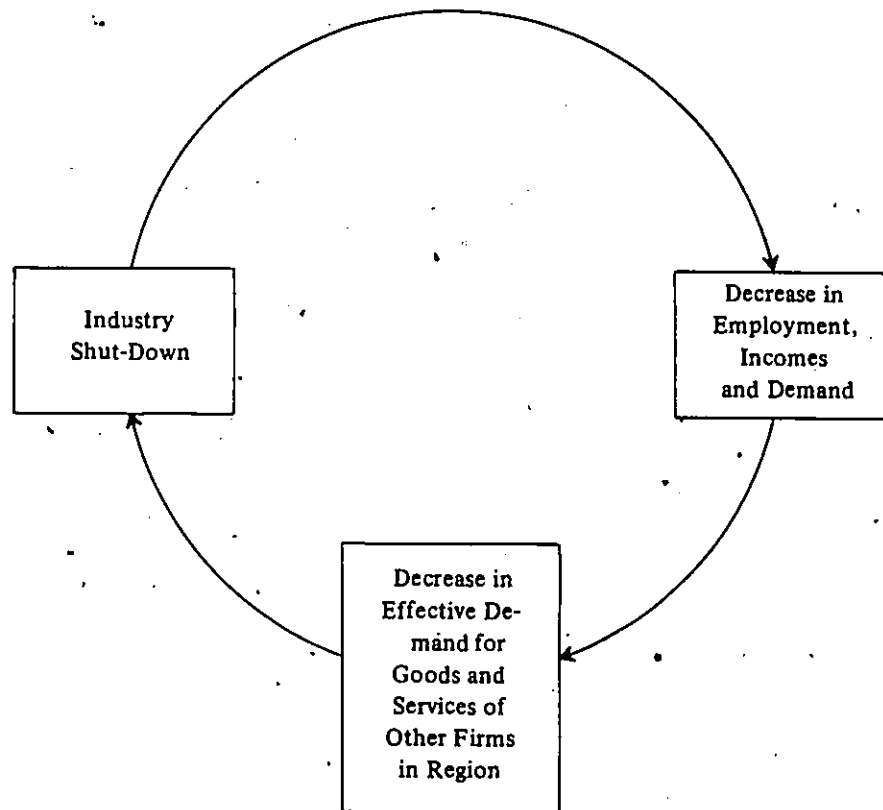
(5) Economic Theory and Underdeveloped Regions, op. cit., p. 11.

(6) Ibid., p. 30.

(7) Ibid., p. 31.

FIGURE 2.1

THE DECLINING REGION IN THE DRIFT TOWARDS REGIONAL ECONOMIC INEQUALITIES

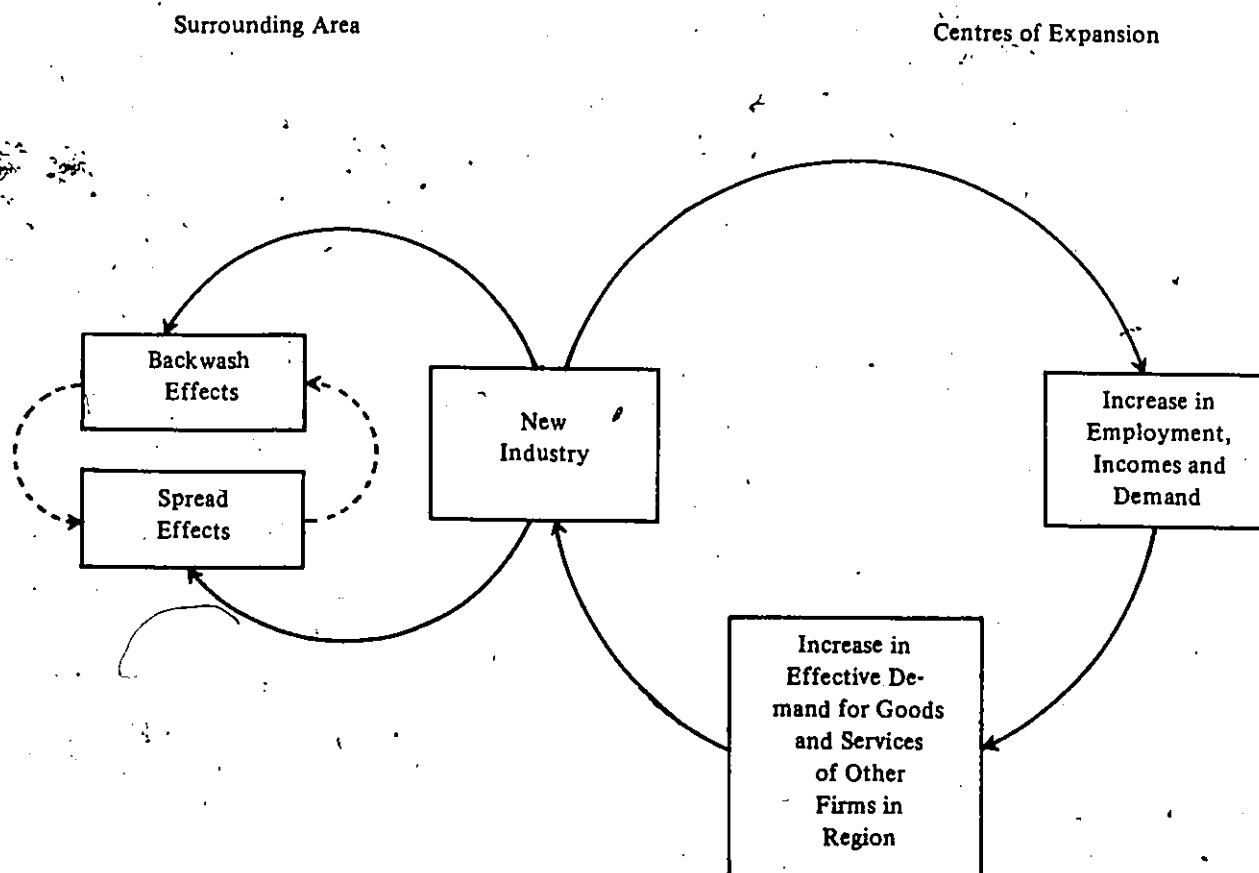


Source: Gunnar Myrdal, *Economic Theory and Under-developed Regions* (London: Gerlad Duckworth and Co. Ltd., 1957) pp. 23-26.

The declining region both dissuades new investments and migration from outside sources and as the process increases, causes the migration of the human and material resources of the region. The downward cumulative process may give rise to endogenous; countervailing forces and stop. The existence, however, of a lower limit to the process is small comfort representing, as it does, a stagnation equilibrium at a depressed level of human living conditions.

The cumulative process works equally when the initial change is positive. Additionally, important economic influences reach out from a centre of economic expansion to its surrounding area. Figure 2:2 presents the mechanics of the principle of circular and cumulative causation in the more relevant case of a regional centre of economic expansion.

FIGURE 2.2
REGIONAL CENTRES OF ECONOMIC EXPANSION IN THE DRIFT TOWARDS
REGIONAL ECONOMIC INEQUALITIES



Source: Gunnar Myrdal, *Economic Theory and Under-developed Regions* (London: Gerlad Duckworth and Co. Ltd., 1957) pp. 23-32.

Within the centre of economic expansion, economic benefits accrue and gain momentum. Within the surrounding area of a centre of economic expansion, important "backwash" and "spread" effects are transmitted thereto from the expanding centre.

"Backwash" effects or adverse changes occurring in a surrounding area of a centre of economic expansion result from the workings of:

(1) economic factors such as the movements of labour, capital and goods and services and (2) non-economic factors including transportation systems, public utilities, medical care, education standards, custom and tradition. "Spread" effects or beneficial changes caused

in a surrounding area of a centre of industrial expansion arise from:

(1) increasing outlets of agricultural products, (2) incentive to produce raw materials and (3) stimulus to establish consumer goods industries.

The "centre of economic expansion - surrounding area" growth phenomenon may be explained in terms of rounds of economic production. Rounds of economic production within such a centre occur bringing both increases in employment, incomes and demand and acceptable rates of return on capital. External economies on the one hand present incentives to enterprise and a widening of the range and quality of public services and on the other attracts workers and their families. When labour, capital and enterprise from the surrounding area move to an expanding centre, the "backwash" effects on the surrounding area emerge. They include:

- a. decrease in economic production.
- b. decline in employment, incomes and demand.
- c. decrease in tax revenues and the amount and quality of public services.

- d. rise in age-sex imbalances,
- e. rise in costs of social welfare,
- f. rise in progress-impeding mores and customs.

Simultaneously, labour, capital and enterprise remaining in the surrounding area respond to certain centrifugal "spread" effects of expansionary momentum from the centre of economic expansion. The surrounding area increasingly exploits its position as:

- a. a source of agricultural produce,
- b. a source of raw materials,
- c. a location for consumer goods industries.

The outcome in terms of economic growth of the area depends on the relative strengths of the two opposing forces. Thus, stronger "backwash" effects produce a declining region, stronger "spread" effects establish new centres of economic expansion and "in the marginal case, the two kinds of effects will balance each other and a region will be "stagnating".(8)

Kaldor and Richardson on Myrdal's Thesis

Professor Kaldor(9) re-examined and presented anew the regional economic growth theory developed earlier by Myrdal.

(8) Economic Theory and Underdeveloped Regions, op. cit., p. 32.

(9) Nicholas Kaldor, "The Case for Regional Policies", Scottish Journal of Political Economy, November 1970, pp. 337-347.

The restatement of the theory was based on a consideration of:

- a. the role of resource endowment in regional development,
- b. capital accumulation and processing activity,
- c. industrial aspects of the principle of circular and cumulative causation,
- d. regional aspects of the mode of operation of cumulative causation in processing activity.

The role of resource endowment in the determination of regional development was assessed in terms of: (1) "land-based" economic activity such as agriculture, forestry and mining and mineral exploration and (2) "processing" economic activity such as manufacturing and construction. Referring to "land based" activities, resource endowment offered no more than "the natural explanation, why some areas are more densely settled than others, and why the comparative advantage in procuring different products (and which settles the nature of their external trading relations) should differ as between one area and another." (10) Referring to "processing" activities, resource endowment was not sufficient to explain growth. Noting that the "more developed" high income areas were areas which possessed a highly developed modern industry, Kaldor said: "One cannot therefore say that industries will be located in regions which are 'well endowed' with capital resources for reasons other than industrial development itself. It was not the result of the peculiar thriftiness of the inhabitants of a region, or of a particularly high degree of initial inequality in the distribution of income which

(10) "The Case for Regional Policies" op. cit., p. 338.

'induced' a high savings-ratio, that some regions became rich while others remained poor. The capital needed for industrialization was largely provided by the very same individuals who acquired wealth as a result of the process of development, and not prior to it."(11)

The more relevant explanation why some regions continue to be highly industrialized is to be found in the circular and-cumulative causation principles of Myrdal. The latter defined as increasing returns to scale in the broadest sense of the term in manufacturing, would include beneficial effects flowing from: (1) large-scale production, (2) development of skill and know-how, (3) opportunities for easy communication of ideas and experience and (4) opportunity of ever-increasing differentiation of processes and of specialization in human activities.

To explain: as trade expands between industrializing and rural regions, neither the principles of comparative advantage nor the classical mechanisms of price adjustments work. Increasing returns favour the "more developed" regions and inhibit development in the "less developed" and, because of scale effects, the "more developed" regions gain a virtual monopoly of industrial production. Since competition in industry is imperfect while near perfect competition prevails in agriculture, movements in the terms of trade favour the rich regions.

(11) Ibid., p. 339.

Kaldor introduced a variant of the cumulative causation hypothesis. The behaviour of a region's production and exports depend upon: (1) an exogenous factor, namely the rate of growth of world demand for the region's products; and (2) an endogenous or quasi-endogenous factor, the movement of "efficiency wages" in the region relative to other producing regions. This latter factor measured by the change in money wages relative to the change in productivity determines whether the region's share in the overall market is rising or declining. Since money wages and rates of increase are roughly similar among regions and since, because of increasing returns, higher growth rates in productivity occur in regions with the more rapid rates of growth of output, efficiency wages will fall relatively in regions with above average productivity and output growth rates. Thus, relatively fast-growing regions tend to acquire cumulative competitive advantages over the slow-growing ones. Recalling the existence of certain centrifugal "spread" effects of expansionary momentum from regional centres of economic expansion to the surrounding area, Kaldor explained that regional growth differentials would be dampened by: (1) a diffusion of growth and stimulation of the demand for "complimentary" products of slower regions, (2) the rise of diseconomies associated with high rates of industrial growth, (3) the effect of interregional labour mobility in holding in check divergencies in real earnings per capita and (4) the influence of built-in fiscal stabilisers. To quote: "... this principle of cumulative causation - which explains the

unequal regional incidence of industrial development by endogenous factors resulting from the process of historical development itself rather than by exogenous differences in 'resource endowment' - is an essential one for the understanding of the diverse trends of development as between different regions. In reality, the influences and cross-currents resulting from processes of development are far more complex. The intensification of trade resulting from technological improvements in transport or the reduction of artificial barriers (such as tariffs between regions) has important diffusion effects as well as important concentration effects. The increase in production and income in one region will, as such, stimulate the demand for "complimentary" products of other regions; and just as, in terms of micro-economics, falling costs generally lead to oligopoly rather than monopoly, so the principle of cumulative causation leads to the concentration of industrial development in a number of successful regions and not of a single region. These "successful" regions in turn may hold each other in balance through increasing specialisation between them - some area becoming more prominent in some industries and another area in some other industries".(12)

Professor Harry Richardson found Myrdal's views on the regional growth process "difficult to translate into a formal model".(13)

The interpretation, however, of the cumulative causation hypothesis offered by Kaldor has been expressed in formal terms by Richardson. Let

(12) "The Case for Regional Policies", op. cit., pp. 343-344.

(13) Harry W. Richardson, "A critique of Regional Growth Theory", Paper given at the Regional Economic Development Conference, University of Ottawa, Ottawa, March 2-4, 1972, (mimeograph) p. 13.

t_i = rate of productivity growth in manufacturing in region 1,

y_i = rate of growth of output in manufacturing in region 1.

W_i = money wage index of manufacturing in region 1,

T_i = index of productivity in manufacturing in region 1,

$\bar{W}_i/T_i$ = efficiency wages in manufacturing in region 1,

$\bar{W}$ = national money wage in manufacturing

Then,

$$t_i = f_i^1(y_i), \text{ where } f_i^1 \text{ is rising and } > 0 \quad (1)$$

$$\frac{W_i}{T_i} = f_i^2(t_i), \text{ where } f_i^2 \text{ is falling and } > 0 \quad (2)$$

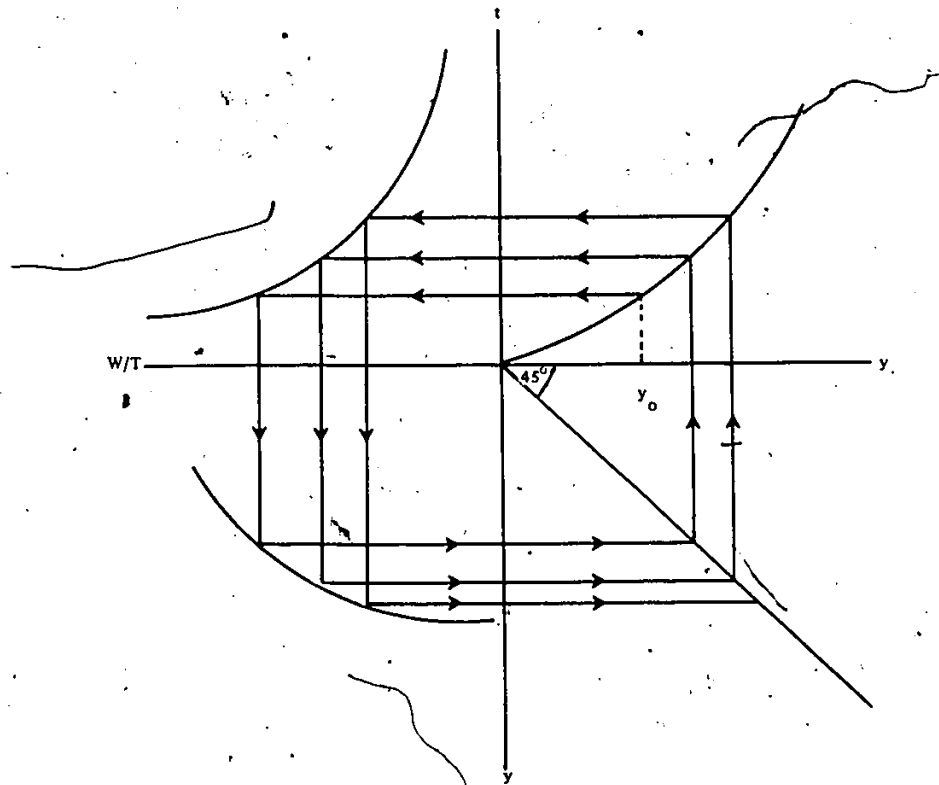
$$y_i = f_i^3\left(\frac{W_i}{T_i}\right), \text{ where } f_i^3 \text{ is falling and } > 0 \quad (3)$$

$$W_i = \bar{W} \quad (4)$$

Equations (1) - (4) respectively state that a region's rate of growth of productivity in manufacturing varies directly with its rate of growth of manufacturing output, efficiency wages in manufacturing vary inversely with that region's rate of growth of productivity in manufacturing, the rate of growth of manufacturing output varies inversely with efficiency wages in manufacturing in that region and a region's money wage in manufacturing is equal to the national money wage in manufacturing.

The circular and cumulative nature of the regional growth process is illustrated in Figure 2:3. In the manufacturing sector, rising growth rates of output induce higher rates of growth of productivity which reduce efficiency wages. In turn, falling efficiency wages lead to higher rates of growth of output and so on.

FIGURE 2.3
THE CIRCULAR AND CUMULATIVE NATURE OF REGIONAL GROWTH



Source: Harry W. Richardson, "A Critique of Regional Growth Theory", Regional Economic Development Conference, University of Ottawa, Ottawa, March 1972, p. 16.

Short-Comings of and Supporting Arguments for Myrdal's Thesis

Richardson is less favourable and Kaldor more favourable to the principle of circular and cumulative causation as a reasonably plausible explanation of why regional growth rates differ.

According to Richardson, cumulative causation fails to provide a complete explanation of how and why certain regions achieve rapid growth. Rather, the principle proceeded from the accident of higher growth regions to explain why divergent growth rates persist regionally. The Verdoorn Law - the strong positive association between the growth of productivity and efficiency on the one hand and the rate of growth in the scale of operations on the other - is overly aggregative. As such, little attention is given to the complex role of agglomeration economies, external scale economies and indivisibilities in the spatial concentration of economic activity. With respect to the manufacturing sector, money wages in rapidly growing regions may both rise faster than other regions and not be offset by higher productivity growth. The application of the concept of efficiency wages as a mechanism to explain how changes in productivity induce faster growth is less dependable. Rising prices, however, could offset the failure of efficiency wages to decline and thereby sustain the rapid growth of the region. The assumption that regions are in direct competition with each other may be false as the sectoral composition of output may differ widely among regions.

Kaldor aimed at producing a formal interpretation of the circular and cumulative causation model. Thus, his variant making reference to the manufacturing sector has yielded the testable hypotheses that (1) a region's rate of growth of productivity is an increasing function of its rate of growth of output, (2) the rate of increase in money wages is about equal in all regions and (3) the regional dispersion in productivity increases is significantly wider than the regional dispersion in money wage increases.

Application of Myrdal's Thesis to Canadian Conditions

The evaluation of regional economic development and problems facing Canada in terms of cumulative causation is encouraged by several considerations.

While Myrdal's explanation of the regional growth process is difficult to test directly, the main prediction of cumulative causation namely, divergence in regional per capita increases, can be assessed for Canada in line with the Kaldor variant.

That Myrdal's thesis proceeds from a starting point of already established "more developed" regions to explain why differences in regional growth rates persist is more relevant in an analysis of post-war regional economic development in Canada. Canada's economy at the present time is a more-developed one and there are in Canada both centres of economic expansion and slow-growing regions.

Testing of the Richardson model of the Myrdal-Kaldor

thesis of cumulative causation in Canada requires that historical data on output, employment, and wages in manufacturing are available for a specific regional system in Canada. Such data are more readily available because of the historical emphasis by the Canadian government in the compilation of manufacturing data. The latter have been officially compiled on a regular basis since 1919.

Analysis of cumulative causation in the regional economic development of Canada represents a new approach. While this thesis undertakes the test at a given level of rigour, the results are expected to contribute new information on Canada's economic development and problems.

CHAPTER THREE

THE DEMARCATION OF REGIONS

This chapter deals with the concept and classification of regions in general and of Canada in particular. It examines certain regional classifications of Canada as determined by academic, provincial and federal sources and discusses the criteria employed in establishing the classifications. The three sources of regional classifications are compared and one such classification is selected to develop the analysis of cumulative causation in Canada.

Concept of a Region

It is possible to analyse regional, urban and rural problems of a given country without giving precise definitions of the areas. One recognizes, however, that different regional boundaries may either reveal or conceal divergence from, or convergence to, national averages in growth, stability, employment, level of income and so on. Explains S.E. Chernick: "What seems to emerge from experience and the extensive discussion of this question is that a uniquely defined set of regions cannot be specified in a way which meets all possible requirements. Rather, there exists a hierarchy of regional groupings; depending upon the nature of the

analysis and the purposes it is intended to serve, one regional grouping will be found to be more appropriate than another".(1)

What are some possible definitions of a region?

The American Association of Geographers suggested this subjective definition: "... a region is not an object either self-determined or nature given. It is an intellectual concept, an entity for the purpose of thought, created by the selection of certain features that are relevant to a real interest or problem, and by the disregard of all features that are considered to be irrelevant"(2).

A United Nations study presented the following equally subjective definition of regions: "They are ordinary, common, practical, geographic areas for which social and economic improvement plans have been conceived, planned and undertaken"(3).

Walter Isard took an academic approach and he suggested the need in regional economic analysis to refer to more than simply given geographical borders of a country in order to take account of the kinds of basic forces at work in the regional growth process.

Explained Isard: "... the region is a dynamic, social organism

(1) S.E. Chernick, Inter-regional Disparities in Income, Staff Study No. 14, Economic Council of Canada, (Ottawa: Information Canada, 1966), p. 3.

(2) Organization for European Economic Co-operation, Regional Economic Planning, (Paris: Organization for European Economic Co-operation, 1961), p. 379.

(3) Resources for the Future, Design for a World-wide Study of Regional Development: a Report to the United Nations on a Proposed Research Training Programme, (Washington, D.C.: Resources for the Future, distributed by John Hopkins Press, Baltimore, MD., 1966), pp. 3-4.

possessing an intricate network of internal connections and interrelated via diverse flows to each of an hierarchical array of regional and sub-regional entities"(4).

Harvey, S. Perloff et al. presented a more concrete concept of a region when they observed that the choice of a regional system depended both on specified physical, socio-economic or other criteria and on available data. Stated the authors: "The term 'region' is generally used to describe a group of geographically contiguous areas which have certain common or complimentary characteristics or which are tied by extensive, interareal activity or flows"(5).

An equally productive definition of a region is presented below. It draws together both the concept of a region and the classification of regions. The link is achieved by establishing criteria such that one can select from the given criteria to obtain a particular regional classification. "A region may be defined as an area whose boundaries are set on the basis of certain criteria. These may be largely geographic, economic or political. The criteria overlap because there is a close interrelationship between the various elements.

Geographic factors may influence economic behaviour and the latter

(4) Walter Isard, "The Value of the Regional Approach in Economic Analysis", Regional Income, Studies in Income and Wealth, vol. 21, by the Conference on Research in Income and Wealth, (New York: N.B.E.R., distributed by the Princeton Univ. Press, Princeton, N.J.: 1957), p. 69.

(5) Harvey S. Perloff, Edgar S. Dunn, Jr., Eric E. Lampard and Richard F. Muth, Regions, Resources and Economic Growth (Baltimore, MD.: The John Hopkins Press, 1960) p. 112.

may have political repercussions and vice versa"(6).

Classification of Regions

What is the logic of a regional system?

David Grigg stated that since regionalization is a similar process to classification, the principles of classification could be applied to the construction of regional systems(7). These are: (1) classifications should be designed for a specific purpose; they rarely serve two different purposes equally well, (2) there exist differences in kind between objects; objects which differ in kind will not easily fit into the same classification system, (3) classifications are not absolute; they must be changed as more knowledge is gained about the objects under study, (4) the classification of any group of objects should be based upon properties which are properties of those objects; it follows then that differentiating characteristics should be properties of the objects classed, (5) in logical division the division should be exhaustive, (6) in logical division and classification, the species or classes should exclude each other, (7) in division, the division should proceed at every stage, and

(6) O.J. Firestone, "Regional Economic and Social Disparity", Paper given at the Regional Economic Development Conference, University of Ottawa, Ottawa, March 24, 1972, p. 12.

(7) David Grigg, "The logic of Regional Systems", Annals of the American Association of Geographers, Vol. 55 (1965), pp. 465-491.

as far as possible throughout the division, upon one principle, (8) the differentiating characteristic, or the principle of division, must be important for the purpose of the classification, (9) properties which are used to divide or classify in the higher categories must be more important for the purpose of the division than those used in the lower categories and (10) the use of more than one differentiating characteristic or principle of division produces a hierarchy of classes; the logical consistency of the hierarchy will only be maintained if rules 5-9, inclusive, are observed.

Grigg indicated that there were difficulties in the application of the principles to develop regional classifications. On the one hand, they were counsels of perfection that were not always possible to achieve; on the other hand, in the construction of regional systems, they stated what was to be avoided rather than what was to be done. The principles contribute much to the orderly examination of the process of regionalization.

What other criteria can be put forward to facilitate the classification of regions?

A listing of some such criteria comprises: (1) population distribution, (2) topography, (3) climate, (4) soils and vegetation, (5) structure of economic activity, (6) market size and structure, (7) past and potential economic performance, (8) social and cultural

features, (9) dynamics of an area, (10) administration or planning, (11) homogeneity and (12) functional integration.

Criteria 1-4 divide a country into geographical regions. Taken singly, each criterion produces a different regional system. Combined, they delineate a single system of broad geographical regions. Criteria 5-8 designate "functional" areas that serve the assessment of regional economic progress. The latter are "regions whose parts are closely linked by a meaningful intra-regional relationship"(8).

The criterion of area dynamics was proposed by Harvey Perloff: "What is called for is a modification of the usual 'homogeneity' approach; from the search for regions with some supposedly inherent and stable elements of uniformity to the examination of broad areas of the United States as they develop elements of relative uniformity and of divergence over time, and particularly as they develop interdependent patterns of economic activity. For purposes of assessing the relative economic status and the economic progress of the various parts of the country, the demarcation of regions must itself be considered an analytical variable" (9). Regional economic studies may become more revealing when one examines the economic growth of regions within continually changing locational matrices.

(8) "Regional Economic and Social Disparity", op. cit., p. 13.

(9) Harvey S. Perloff, "Problems of Assessing Regional Economic Progress". In Regional Income, op. cit., p. 39.

The criterion of administration is one of the older methods of classifying regions. Examples of regions produced by the application of this criterion are provinces or states, municipalities and counties.

The delineation of a geographic area in regional economic analysis involves one of two fundamental economic criteria. A region may be defined by the likeness of its component features - the principle of homogeneity - or by the presence of a centralizing node and an area of influence - the principle of functional integration. Homogeneous regions may be alike in a single, significant feature or in a group of features. These may be population, economy, land use, environment and so on. Where there is both similarity and dissimilarity, the importance of the similar features must be greater than that of the dissimilar features. The principle of functional integration produces regions called functional, polarized or nodal. The latter consist of all the area organized around a centralizing node and operating as a unit. Examples of nodal regions are areas of close economic and social integration located around and including the larger cities of the national economy.

Private Regional Classifications of Canada

The most important private sources of information on the delineation of regions are the studies of geographers. Among the more important contributions to the descriptions of regions of Canada is the study

by Camu, Weeks and Sametz(10). In developing a system for Canada's regional analysis, the authors observed: "Canada is the second largest country in the world, and comprises such a wide variety of geographic situations that it cannot be properly understood except as a series of regions to which reference is usually made. In the present work, we are considering a system based on general purpose regions and designed to assist in coordinating data on many factors, thereby facilitating the analysis of basic production and marketing aspects, and in turn the interpretation and forecasting of local economic conditions"(11).

To this end was produced a sixty-eight region system constructed on the basis of four properties: (1) structural factors such as physiographic bases, population and capital structure, (2) functional factors such as transportation and communications systems and the flow of other servicing functions, (3) production factors and (4) marketing patterns. This classification suggests the application of both the criterion of homogeneity and that of nodality. The economic geographic areas of this regional system are presented in Table 3:1.

(10) Pierre Camu, E.P. Weeks and Z.W. Sametz, Economic Geography of Canada, (Toronto: Macmillan of Canada, 1964).

(11) Ibid., p. 262.

TABLE 3:1

A 68-REGION SYSTEM FOR CANADA, BY REGIONS

	No. of Regions
1. Atlantic Provinces.....	13
Newfoundland.....	4
Prince Edward Island.....	1
Nova Scotia.....	4
New Brunswick.....	4
2. Quebec.....	10
3. Ontario.....	10
4. Prairie Provinces.....	22
Manitoba.....	7
Saskatchewan.....	6
Alberta.....	9
5. British Columbia.....	9
6. Northern Canada.....	4
Yukon.....	1
Mackenzie.....	1
Keewatin.....	1
Franklin.....	1
7. Canada Total.....	68

Source: Pierre Camu, E.P. Weeks and Z.W. Sametz,
Economic Geography of Canada (Toronto: Macmillan of Canada,
1964) pp. 270-283.

An examination of the operations of business enterprises in Canada revealed that: (1) there are many private regional classifications in use with each company developing its own classification for dividing up administrative and sales operations and (b) private businesses rely heavily on federal regional classifications in conducting market research, preparing feasibility studies and so on.

The Bell Telephone and sister companies have produced a unique regional classification both to facilitate the administration of this service industry and to provide subscribers with fast and efficient telephone service at reasonable rates. Thus, in the case of this industry Canada is divided into about 780 regions. Several companies notably in the oil, automobile and food and beverage industries reported that their particular regional classifications were developed with reference to: (1) sources of supply, (2) location of markets and (3) somewhere between sources of supply and location of markets in order to reduce costs. The Dun and Bradstreet Company which provides consulting and other professional services to business reported that some private regional classifications are developed in order to qualify for government grants to establish new industries.

Provincial Regional Classifications

The provincial and territorial boundaries of Canada are the product mainly of historical and political circumstances. Nevertheless, they do contain certain broad geographic and economic differences which, to make for continued provincial economic development, call for the delineation of provincial economic regions.

All provinces were contacted to provide comprehensive information on existing regional economic systems in use for provincial economic development purposes. All provinces responded except Prince Edward Island and New Brunswick.

Newfoundland

The Province of Newfoundland at the present time has no specific economic region system applicable to provincial economic development.

The Department of Industrial Development advised that, unless some specific area of the province was being considered for further development, usually the province as a whole is treated as a single economic region. A number of Planning Task Forces have been engaged in drawing up administrative guidelines on economic regions to be submitted to the provincial government. The integration of the reports of the Planning Task Forces is expected to yield a single economic region system for the province. To date, a proposed economic region system covering approximate forty-six rural development areas has been produced. The latter comprises:

- (1) Greater St. John's, (2) Bell Island, (3) Southern Shore,
- (4) Trepassey, (5) St. Mary's Bay, (6) West Conception Bay,
- (7) North Conception/South Trinity, (8) Placentia, (9) Cape Shore,
- (10) Isthmus, (11) Clarenville/North Trinity, (12) Bonavista, (13) Burin Peninsula, (14) South Burin, (15) Gloverton, (16) Eastport Peninsula, (17) Gander, (18) Bonavista North, (19) Fogo Island,
- (20) Twillingate/New World Island (21) Lewisport, (22) Grand Falls,
- (23) Buchans, (24) Green Bay, (25) Baie D'espoir, (26) North Fortune Bay, (27) Burgeo-Ramea, (28) South West Coast, (29) Codroy,
- (30) Robinsons, St George's Bay, (31) Stephenville- St. George's,
- (32) Port Au port, (33) Bay of Islands, (34) Humber Valley,

(35) South White Bay, (36) Baie Vert Peninsula, (37) Bonne Bay,
(38) Port aux Choix-Hawkes Bay (39) St. Barbe Strait, (40) St. Anthony
(41) Canada Bay, (42) Labrador Strait, (43) South Coastal Labrador,
(44) North Labrador, (45) Lake Melville and (46) Western Labrador.

Nova Scotia

The Province of Nova Scotia at present uses an economic region system of eleven regions. With respect to the formation of the latter, the Department of Development explained that one region is a metropolitan area, seven are the extended hinterlands of the urban centres of Sydney, Port Hawkesbury, New Glasgow, Amherst, Truro, Bridgewater and Yarmouth and three are essentially resource based areas. As far as was possible, county boundaries were maintained as so much of available statistical data relates to the boundaries. The economic region system covers: (1) Halifax-Dartmouth, (2) South-West Nova Scotia, (3) South Shore, (4) Annapolis Valley (5) Central Nova Scotia, (6) Cumberland, (7) Eastern Shore, (8) North Shore, (9) Strait of Canso, (10) Cape Breton County and (11) West Cape Breton.

Quebec

The Province of Quebec at this time is divided into ten economic regions which encompass the approximately twenty-five administrative regions of the province. The Department of Industry and Commerce stated that growth poles and their areas of influence were determined for this system. The ten economic regions system are: (1) Bas Saint-Laurent Gaspésie covering the administrative areas of Gaspé, Ste-Ann-des-Monts, Bonaventure and

Bas Saint-Laurent, (2) Saguenay-Lac-Saint-Jean covering Chicoutimi and Roberval, (3) Quebec covering Riviere-de-Loup, Quebec City and Chaudiere, (4) Trois-Rivieres covering Bois-Franc and Mauricie, (5) Cantons-de-l'est, (6) Montreal covering Granby, Saint-Jean, Beauharnois, Saint-Hyacinthe, Montreal Metropolitain, Richelieu, Joliette and Terrebonne, (7) Outaouais covering Hull and Labelle, (8) Nord-Ouest covering Rouyn-Noranda and Abitibi, (9) Cote-Nord covering Saguenay and Sept-Iles and (10) Nouveau-Quebec.

Ontario

The Province of Ontario at the present time uses an economic region system of five large planning regions.

The Ministry of Treasury, Economics and Intergovernmental affairs advised that in the mid-1950's, the Province had adopted a system of ten economic regions. The latter were essentially the same as those developed for the Federal government by Camu, Weeks and Sametz as part of a nation-wide system of sixty-eight regions. They proved, however, unsuitable for planning purposes. Early in 1973, the Province changed to five large planning regions with each covering a major urban centre and its entire tributary region. The economic region system comprises: (1) Southwestern Ontario covering the counties of Essex, Kent, Lambton, Elgin, Middlesex, Oxford, Perth, Huron, Bruce and Grey, (2) Central Ontario covering Norfolk, Haldimand, Niagara, Wentworth, Brant, Waterloo, Wellington, Halton, Dufferin, Peel, Simcoe, York, Metropolitan Toronto, Ontario, Muskoka, Victoria, Durham, Northumberland, Peterborough and Haliburton, (3) Eastern Ontario covering Prince Edward, Hastings, Renfrew, Lennox and

Addington, Frontenac, Lanark, Leeds, Grenville, Ottawa-Carleton, Dundas, Stormont, Russel, Glengarry and Prescott, (4) Northeastern Ontario covering Parry Sound, Nipissing, Manitoulin, Algoma, - Sudbury, Timiskaming, Cochrane and part of Kenora-Patricia and (5) North western Ontario covering Thunder Bay, Rainy River, Kenora and part of Kenora-Patricia.

Manitoba

The Province of Manitoba at present uses an economic region system of eight regions. The Secretariat of Planning revealed that provincial departments are rapidly adopting this system of economic regions for purposes of provincial development. The eight economic regions of the province are: (1) North Region, (2) Parklands Region, (3) Interlake Region, (4) Southwest Region, (5) North-Central Region, (6) Winnipeg, (7) South Central Region and (8) Southeast Region.

Saskatchewan

The Province of Saskatchewan at this time employs a variety of regional systems. Some serve the administrative functions of the province while others serve the economic objectives of the different province while others serve the economic objectives of the different provincial departments. The Industry Department has outlined a tentative economic region system of six regions. The latter would comprise: (1) Moose Jaw-Swift Current-Southwestern region, (2) Regina-Central region, (5) Prince Albert-Northern region and (6) North Battleford-Northwestern region.

Alberta

The Province of Alberta has developed an economic region system of six regions. The Department of Industry and Commerce explained that the province employs this system of economic regions at the present time for all provincial economic development plants. The six economic regions are: (1) Lethbridge-Southern, (2) Calgary-South Central, (3) Red Deer - Central, (4) Northeastern, (5) Edmonton-North Central and (6) Northwestern.

British Columbia

The Province of British Columbia employs an economic region system of nine regions. The Department of Industrial Development, Trade and Commerce advised that the system is used for statistical and analytical programmes on the one hand and provincial economic development planning on the other. The nine regions comprise: (1) Kimberley-Cranbrook, (2) Golden Revelstoke-Salmon Arm-Nelson Trail, (3) Vernon-Kelowna Penticton, (4) Kamloops Lillooet, (5) Powell River-Squamish-Vancouver-Hope, (6) Vancouver Island-Mainland (part), (7) Prince George-Quensnel-Williams Lake-Burns Lake-Smithers, (8) Northwestern and (9) Northwestern - Coast Islands.

A general provincial regional classification constructed on the criterion of administration is that of the provincial electoral districts. The latter are presented in Table 3:2. The Yukon Territory and the Northwest Territories are not included since they fall under the jurisdiction of the Federal Government. The number of provincial electoral districts is analogous to the number of members of the provincial legislative assemblies. The latter is

determined under the provisions of the British North America and Provincial Acts. While the provincial electoral districts have no one-to-one numerical relationship to federal electoral districts, both are based on representation by population.

TABLE 3:2
NUMBER OF ELECTORAL DISTRICTS OF THE PROVINCIAL
GOVERNMENTS OF CANADA, 1970-71

	Provincial Electoral Districts
1. Newfoundland.....	42
2. Prince Edward Island.....	16
3. Nova Scotia.....	46
4. New Brunswick.....	58
5. Quebec.....	108
6. Ontario.....	117
7. Manitoba.....	57
8. Saskatchewan.....	59
9. Alberta.....	74
10. British Columbia.....	55
11. All Provinces.....	632

Source: Statistics Canada, Canada Year Book,
1970-71, (Ottawa: Information Canada, 1971) pp. 109-118.

Another general provincial regional classification based again on the criterion of administration is that delineating the municipalities of the provinces. The latter are classified as unitary and regional municipalities and improvement districts. They suggest, however, some of the factors of the criteria of homogeneity and nodality.

Federal Regional Classifications

By far the largest number of regional delineations of Canada has been produced by the departments and agencies of the Federal Government. They are of all classifications: geographic, population, administrative, homogeneous, nodal and so on. Two regions constructed on the basis of economic criteria are the Census of Canada Regional System and the Standard Geographical Classification. Regions defined in terms of the criterion of administration or planning include:

(1) the Canada Manpower Centres of the Department of Manpower and Immigration, (2) the Designated Regions of the Department of Regional Economic Expansion, (3) the Postal Area System of the Post Office Department and (4) the Electoral Districts of the Federal Government.

The Census of Canada Regional System

The most comprehensive of the federal regional classifications is that employed in the decennial and quinquennial Censuses of Canada. The regional system used contains elements of both the homogeneity criterion and the nodality criterion. The Census of Canada regional classification covers: (1) Census Economic Regions, (2) Counties and Census Divisions, (3) Municipalities and Census Sub-divisions, (4) Urban and Rural Areas, (5) Census Metropolitan Area, (6) Census Agglomeration, (7) Enumeration Areas, (8) Federal Electoral Districts.

Census Economic Regions

The Census economic regions refer to combinations of counties or of census divisions delineated jointly by the provinces and Statistics Canada to make possible the production of sub-provincial data. The combinations produced are roughly comparable.

Counties and Census Divisions

Counties refer to the main political and/or administrative divisions in five provinces: Prince Edward Island, Nova Scotia, New Brunswick, Quebec and Ontario. Census Divisions have been produced as substitutes for counties in the remaining five provinces. The most detailed and comprehensive series of data are compiled for these two divisions.

Municipalities and Census Sub-divisions

Municipalities refer to areas with corporate status, governed by Provincial and Territorial Acts in seven provinces: Prince Edward Island, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan and Alberta. As a result of the extensive, unorganized areas in Newfoundland and British Columbia and the relatively large size of county and district municipalities in Nova Scotia, census sub-divisions are being used as a substitute for municipalities in these three provinces.

Urban and Rural Areas

Urban areas include: (1) incorporated municipalities with a population of 1,000 or over and having the legal status of city, town or village, (2) incorporated places of 1,000 population or over having a population density of at least 1,000 per square mile and (3) the urbanized fringe of (1) or (2) if it has a minimum population of 1,000 and a density of at least 1,000 per square mile.

Census Metropolitan Areas

A Census Metropolitan area refers to the main labour market of a continuous built-up area having 100,000 or more population. They are a product of Statistics Canada and are usually known by the name of the largest city.

Census Agglomeration

A Census Agglomeration is defined as a statistical area having an urban centre with a population over 1,000 and adjacent built-up area of at least 1,000 population and a minimum density of 1,000 persons per square mile. The largest urban centre and its adjacent urban part must constitute a continuous built-up area with no separation greater than one mile. The population of the urbanized core must be at least 2,000. Areas with an urbanized core of 100,000 or over are census metropolitan areas. The main use of such areas is to provide data for closely related urban communities separated from each other only by administrative limits.

Enumeration Areas

An enumeration area is the area canvassed by a census representative. It is defined according to the following criteria:

- (1) population, (2) number of farms and (3) limits. Such areas may include as many as 300 households, depending on its location; they always include fewer than 100 farms. As they are the building-blocks of all statistical area, they never cut across any area recognized by the Census. Moreover, their boundaries are such that the census representative will be able to locate them without difficulty. They are the smallest units for which data are available.

Federal Electoral Districts

Any place or territorial area which has the constitutional right to elect one member in the House of Commons is a Federal Electoral District.

The Standard Geographical Classification

The Standard Geographical Classification manual presents a classification system for provinces, counties or census divisions, municipalities and unorganized areas within each county or census division in Canada. Each municipality has a unique code number, the coding system being so arranged that gaps are left to allow for the inclusion of newly organized municipalities as they come into being.

The objective of a standard geographical coding system is to provide a standard set of code numbers for provinces and for geographical subdivisions having legally recognized boundaries within each province. Such a standard coding system provides a means for obtaining comparable data from different sources. A common numbering system is particularly important for data assembled by mechanical means or computers.

With respect to areas smaller than the province, the Standard Geographical Classification is based on the system used in connection with the decennial and quinquennial Censuses of Canada. The codes do not correspond, however, with the census area definitions because this classification is designed to meet the needs of regular statistical surveys while the census requires a system designed to reflect the situation on the census day or week. Local area boundaries are subject to change and the incorporation of municipalities and similar local areas is governed by provincial law and practice. Thus, a classification suitable for current use over a period of time must have sufficient flexibility to take account of changes that occur. It is unlikely that the code numbers for such a classification and those used for purposes of tabulating the census will ever fully agree.

The Canada Manpower Centres

The Canada Manpower Centres of the Department of Manpower and Immigration, constructed mainly upon the criterion of administration or planning, comprises about 350 provincial locations as follows:

TABLE 3:3

NUMBER OF CANADA MANPOWER CENTRES, BY PROVINCE, 1970-71

	CMC's
1. Newfoundland.....	10
2. Prince Edward Island.....	3
3. Nova Scotia.....	29
4. New Brunswick.....	18
5. Quebec.....	94
6. Ontario.....	101
7. Manitoba.....	16
8. Saskatchewan.....	14
9. Alberta.....	20
10. British Columbia.....	42
11. Northwest Territories and the Yukon.....	3
12. Canada Total.....	350

Source: Department of Manpower
and Immigration

As the Economic Council of Canada observed, "The Centres are, in fact, the institutional arm through which federal manpower policy operates. A brief listing of some of the current functions of these Centres shows a marked shift in focus, involving a variety of services to workers, both employed and unemployed. These services include: referral to jobs (the placement function), authorization for training and allowances under the Adult Occupation Training Act, and authorization for grants under the Manpower Mobility Program. As part of the process of deciding which of these services to offer a given worker, they provide counselling and testing services. The Centres also provide clearing services to assist in alleviating local labour market surpluses and shortages: special services for recent immigrants, recruitment services for employers, and the dissemination of labour market information. They also cooperate with other agencies in developing special applications of manpower programs for the handicapped, for mitigating the effects of large layoffs, and for promoting regional development"(12).

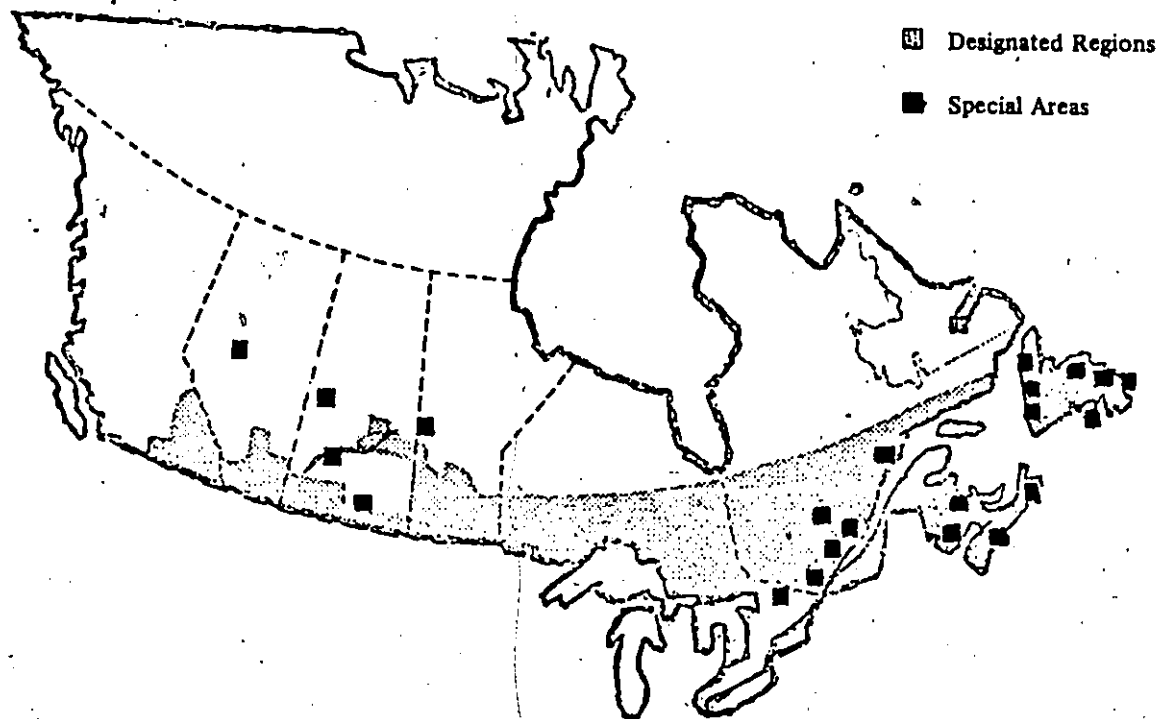
Designated Regions and Special Areas

The Department of Regional Economic expansion was created on April 1, 1969, as a result of the passage by Parliament of the Government Organization Act, 1969. The Department was designed as the instrument for a major federal effort to reduce the economic

(12) Economic Council of Canada, Design for Decision-Making, Eighth Annual Review (Ottawa: Information Canada, 1971), p. 190.

and social disparities between the various regions of Canada, and the legislation therefore made the Minister of Regional Economic Expansion responsible, in the federal jurisdiction, for "economic expansion and social adjustment in areas requiring special measures to improve opportunities for productive employment and access to those opportunities".

FIGURE 3:1
DESIGNATED REGIONS AND SPECIAL AREAS FOR
REGIONAL ECONOMIC EXPANSION



Source: Canada, Department of Regional Economic Expansion.

The Government Organization Act, 1969, terminated a number of existing agencies and programs, notably the Atlantic Development Board (ADB), the Area Development Agency (ADA) and the Fund for Rural Economic Development (FRED), but provided that the new Department would be responsible for carrying their current activities through to completion

The three regions for the Department's operations are East (the four Atlantic provinces), Centre (Quebec and Ontario) and the West (the Prairie provinces and British Columbia).

One of the main programs of the Department provides development incentives to encourage new productive employment. The program operates in many parts of Canada which have been named as designated regions or special areas(10). In March 1970, the Minister of Regional Economic Expansion announced the designation under the Government Organization Act, 1969, of twenty-two "special areas" where the department would undertake special action to encourage economic development and social adjustment. The twenty two special areas, approved by the Governor-in-Council for designation from March 1970, are of six kinds. In St. John's, Moncton, Saint John, Halifax-Dartmouth, Quebec City and Trois-Rivieres, where faster growth can have major repercussions through eastern Canada generally, the plans provide for grants and loans to the province for roads, bridges, water and sewer systems, serviced industrial and residential land,

(10) Designated regions refer to regions of Canada designated for economic development under the Regional Development Incentives Act; the latter is a unilateral federal programme. Special areas are areas identified for economic development under the Regional Economic Expansion Act which is a federal-provincial programme. Except for Montreal, special areas were phased out over the period March 1975 to December 1976.

schools, tourist facilities, industrial parks and other facilities to strengthen the economic and social effects of regional development incentives to industry. In Corner Brook, the Strait of Canso, and Sept Iles-Port Cartier, where growth potential stems largely from their location in relation to natural resources, the plans call for both key infrastructure development and financial assistance to commercial undertakings. For the remaining special areas in Newfoundland - Burin, Happy Valley, Come-by-Chance, Grand Falls-Botwood-Gander, Stephenville, and Hawkes Bay-Port au Choix, the joint plan is to provide community infrastructure, including serviced residential land and schools, to facilitate the resettlement of people from the outports.

Plans in the Lac St. Jean and Renfrew-Pembroke special areas, where new employment is particularly dependent on wood-based industries, call for the extension of financial assistance to necessary commercial undertakings.

The three northern special areas on the Prairies - The Pas, Meadow Lake and Lesser Slave Lake - were established largely to assist the employment and social adjustment of the large number of socially disadvantaged people, including particularly those of native origin, resident there. Plans call for community infrastructure, social adjustment measures and the development of new jobs particularly in the wood-based industries. The two remaining special areas - Regina and Saskatoon - are ones which have enjoyed rapid growth in the past,

but where recent problems in grain and potash marketing have caused serious problems. The plans for these areas call for incentive assistance to firms to develop new jobs.

While this system of designated regions and special areas extends from the Atlantic to the Pacific coasts, it represents a specialized regional classification designed to meet both the administrative and policy purposes of the Department of Regional Economic Expansion. This can be seen in Chart 3:1 above.

The Postal Area System

The Post Office Department has divided the country into four regions: The Atlantic Region, Quebec, Ontario and the Western Region.

As can be seen in Table 3.4 below, the operating service of the Post Office Department is organized into fourteen districts. The latter were constructed on the basis of the administration criterion.

The criterion of administration further contributed to the production by this Department of a unique Canadian Postal Code. The latter is designed to identify both a forward sortation area in a city or in the country and a local delivery unit in a forward sortation area in a city or in the country. The Postal Code introduced in April 1971 describes precisely the location of the point of delivery for each item of mail addressed to post office customers in Canada. An Area Code makes it possible to sort mail into geographic areas, or the Forward Sortation Areas in each Geographic Area. A Local Code makes it possible to sort mail for Post Offices in rural areas or for letter carrier routes, large volume points of delivery or forms of delivery service in Urban Areas.

TABLE 3:4
REGIONS AND DISTRICTS OF THE OPERATING SERVICE
OF THE POST OFFICE DEPARTMENT, 1970-71

Regions	Number of Districts
1. Atlantic Region.....	3
Newfoundland.....	1
Nova Scotia.....	1
New Brunswick and Prince Edward Island.....	1
2. Quebec.....	3
Eastern District.....	1
Western District.....	1
Montreal Metro, Area.....	1
3. Ontario.....	4
Eastern District.....	1
South-western District.....	1
Central District.....	1
Northern District.....	1
4. Western Region.....	4
Manitoba District.....	1
Saskatchewan District.....	1
Alberta District.....	1
British Columbia District.....	1
5. Canada Total.....	14

Source: Canada, Post Office Department

The need for a geographic designator in the area code that would have some logic and readily identify a portion of the country produced eighteen major geographic areas indicated by alphabetic letters. The latter have been assigned from east to west and they will represent a province or a large portion of a province.

Federal Electoral Districts

The electoral districts of the Federal Government represent another system of classification of regions of Canada and have been constructed on both the population criterion and the administration criterion. Federal electoral districts are shown by province in Table 3:5. As was the case with the provincial electoral districts examined earlier, federal electoral districts are analogous to the number of members of the House of Commons. The latter number is determined constitutionally from Section 51 of the British North America Act and bears no one-to-one numerical relationship to the provincial electoral districts. Both systems, however, are based on representation by population.

TABLE 3:5

NUMBER OF FEDERAL ELECTORAL DISTRICTS OF
CANADA, BY PROVINCE, 1970-71

	No. of Electoral Districts
1. Canada.....	264
2. Newfoundland.....	7
3. Prince Edward Island.....	4
4. Nova Scotia.....	11
5. New Brunswick.....	10
6. Quebec.....	74
7. Ontario.....	88
8. Manitoba.....	13
9. Saskatchewan.....	13
10. Alberta.....	19
11. British Columbia.....	23
12. Yukon Territory.....	1
13. Mackenzie River, N.W.T.....	1

Source: Statistics Canada, Canada Year Book,
1970-71, (Ottawa: Information Canada, 1971) p. 89.

Choice of a Regional Classification

The discussion of the different types of regions of Canada, while lengthy, has provided both information and some suggestions for further research (see Appendix C). It has, for example, contributed an awareness of the diverse regional classifications of Canada, their particular applications and usefulness. It allows the examination of these different types of regions towards the choice of a classification that is relevant to the thesis objective. It has shown that one regional classification meets closely what is required in a region for the test of cumulative causation in Canada.

Both private and public sources have worked with a certain number of criteria to delineate regions of Canada. In the main, they have applied the criteria of homogeneity and of administration to develop a variety of regional systems of the national economy. Less emphasis has been placed on the criterion of nodality.

As was stated in the previous chapters, this thesis emphasizes the analysis of the problem of different regions of Canada growing at uneven rates such that some regions are developing relatively fast while others are growing less fast or tending to be excluded from development at acceptable rates. Since the causes of differences in regional growth rates are to be assessed in terms of the circular and cumulative causation principle of Myrdal, the choice of a regional classification according to the criterion of nodality is more appropriate.

According to this criterion, nodal regions of Canada constructed as far as possible from a grouping of core cities and surrounding areas are: (1) Newfoundland: St. John's, (2) Nova Scotia: Halifax, (3) New Brunswick: Saint John, (4) Quebec: Montreal, Quebec, (5) Ontario: Hamilton, Kitchener, London, Ottawa, Toronto, Windsor, (6) Manitoba: Winnipeg, (7) Saskatchewan: Regina, Saskatoon, (8) Alberta: Calgary, Edmonton and (9) British Columbia: Vancouver, Victoria.

CHAPTER 4

METHOD OF TESTING THE MYRDAL-KALDOR THESIS

The Myrdal-Kaldor thesis of cumulative causation as a testable hypothesis of regional economic development was explained in terms of increasing returns to scale in manufacturing in the "more developed" regions of an economy. Going further, Richardson outlined a mathematical model of cumulative causation in terms of productivity growth, output growth and efficiency wages in manufacturing.

This chapter examines the method of testing the Myrdal-Kaldor thesis with respect to regional economic disparity in Canada. It presents data to support the position that the Myrdal-Kaldor thesis is more testable than the "pure" Myrdal theory of cumulative causation and states whether the more testable hypothesis is applicable to the analysis of regional economic development in Canada. It explains what economic features of Canadian manufacturing are to be tested and how, and what are some qualifications of the technique outlined for analysis of the Myrdal-Kaldor thesis of cumulative causation in Canada's regions. The chapter concludes with some comment on what results may be anticipated.

Testable Aspects of Cumulative Causation

Myrdal proposed the principle of circular and cumulative causation supported by back-wash and spread effects to explain the drift towards regional economic inequalities within an economy. No emphasis, however, was placed by Myrdal on the recommendation or design of a mathematical model to test empirically cumulative causation in regional economic development.

Subsequently, Kaldor developed Myrdal's circular and cumulative causation principle further with the lucid statement that cumulative causation manifests itself by way of increasing returns to scale in manufacturing. He explained that regional economic development depended upon the growth rate of world demand for a region's output on the one hand and the trend of efficiency wages⁽¹⁾ in manufacturing in a region relative to other regions on the other. As a consequence, regions with above average growth rates of productivity and output in manufacturing become fast growing regions that tend to acquire cumulative, competitive advantages over the slow-growing ones.

Thereafter, it remained for Richardson to express in mathematical terms the Myrdal-Kaldor thesis of cumulative causation and the implication for manufacturing. His mathematical model is:

⁽¹⁾ Efficiency wages are defined as the ratio of the changes in money wages in manufacturing to the changes in manufacturing productivity.

$$t_i = f_i^1(y_i) \text{ where } f_i^1 \text{ is rising and } >0 \quad (1)$$

which states that a region's rate of growth of productivity in manufacturing is an increasing function of its rate of growth of manufacturing output,

$$(W_i/T_i) = f_i^2(t_i) \text{ where } f_i^2 \text{ is falling and } >0 \quad (2)$$

which explains that efficiency wages in manufacturing is a decreasing function of the region's rate of growth of productivity in manufacturing,

$$y_i = f_i^3(W_i/T_i), \text{ where } f_i^3 \text{ is falling and } >0 \quad (3)$$

which argues that a region's rate of growth of manufacturing output is a declining function of efficiency wages in manufacturing in that region,

$$W_i = \bar{W} \quad (4)$$

which concludes that a region's money wages in manufacturing is equal to the national money wage in manufacturing.

What has been achieved with respect to Myrdal's cumulative causation principle is a transition from a rigorous "pure" theory of regional economic growth through its industry aspect to the delineation of a mathematical model which outlines the data to be used to test empirically regional economic development. Thus, one recognizes that regional economic development in terms of cumulative

caustion emanates from manufacturing activity, cumulative causation can be tested empirically by applying Richardson's model to the relevant manufacturing data and the relevant data are to be computed from manufacturing output, employment, productivity and wages data. What has been achieved also is the provision of information on the regional aspects of the Myrdal-Kaldor thesis. The latter, for example, discussed the beneficial economic influences of the growth of centres of economic expansion on their surrounding areas. Thus, one recognizes that the regions suited to the test are areas of close economic and social integration located around and including the larger cities of an economy. Such an over-all achievement has yielded a more understandable and testable hypothesis of regional economic growth and development.

Application of the Myrdal-Kaldor Thesis in Canada

Canada has been described as a composite of "have" and "have-not" provinces. The classification is founded mainly upon changes over time in demographic and economic characteristics including population and migration, industrial expansion, growth of output, incomes and employment opportunities in the provinces. The classification is dynamic in concept such that "have-not" provinces can develop over time into "have" provinces.

Can the differing pace of economic development in Canada yielding both "have" and "have-not" provincial economies provide

some preliminary evidence that the Myrdal-Kaldor thesis of cumulative causation is applicable to the analysis of regional economic development in Canada?

This thesis suggests that the answer is, in part, yes. Table 4.1 presents the evidence. It shows population, and output and earnings in manufacturing for provinces and Canada in terms of core cities and related areas and rest of provinces in 1951 and 1966.

There has been an influx of population and industry into Canada's core cities and related areas from elsewhere in Canada. Thus, Table 4.1 shows that in 1966 more than one-half of the population of five provinces resided within their core city and related area borders. These were Ontario, British Columbia, Quebec, Manitoba and Alberta. Their percentage shares were much lower in 1951. Another three provinces - Nova Scotia, Saskatchewan and Newfoundland - had one quarter or more of their population located in core cities and related areas in 1966. Again, their percentage shares had risen notably from 1951. Only New Brunswick and Prince Edward Island demonstrated relatively low population movements during the period.

The growth of manufacturing in core cities and related areas during this period was even stronger. More than one-half of the manufacturing output of six provinces occurred within their core city and related area boundaries in 1966. These were Manitoba, Alberta, Saskatchewan, Ontario, Quebec and British Columbia.

TABLE 4:1

POPULATION, MANUFACTURING OUTPUT AND MANUFACTURING EARNINGS - PERCENTAGE SHARES OF PROVINCIAL TOTALS, FOR CORE CITY, CORE CITY AND RELATED AREAS AND REST-OF-PROVINCES, BY PROVINCES AND CANADA, 1951 AND 1966

	POPULATION				MANUFACTURING OUTPUT				MANUFACTURING EARNINGS				
	Province Total	Core City	Core City and Related Area	Rest of Province	Province Total	Core City	Core City and Related Area	Rest of Province	Province Total	Core City	Core City and Related Area	Rest of Province	Rest of Province
Newfoundland:													
1951	100	15	19	81	100	22	22	78	100	23	23	77	77
1966	100	16	24	76	100	24	26	74	100	18	22	88	88
Prince Edward Island:													
1951	100	7	7	93	-	-	-	-	-	-	-	-	-
1966	100	9	9	91	-	-	-	-	-	-	-	-	-
Nova Scotia:													
1951	100	22	21	79	100	19	19	81	100	20	20	80	80
1966	100	24	28	72	100	17	32	68	100	17	27	73	73
New Brunswick:													
1951	100	10	15	85	100	14	14	86	100	14	14	86	86
1966	100	15	17	83	100	18	37	63	100	14	30	70	70
Quebec:													
1951	100	30	45	55	100	42	56	44	100	48	61	39	39
1966	100	27	54	46	100	31	60	40	100	33	58	42	42
Ontario:													
1951	100	34	51	49	100	44	53	47	100	48	57	43	43
1966	100	30	63	37	100	32	62	38	100	31	59	41	41
Manitoba:													
1951	100	30	46	54	100	63	87	13	100	66	89	11	11
1966	100	27	53	47	100	46	82	18	100	47	79	21	21
Saskatchewan:													
1951	100	15	15	85	100	57	57	43	100	55	55	45	45
1966	100	24	26	74	100	57	57	43	100	54	54	46	46
Alberta:													
1951	100	34	34	66	100	60	60	40	100	68	68	32	32
1966	100	49	52	48	100	56	72	28	100	59	68	32	32
British Columbia:													
1951	100	34	58	42	100	35	54	46	100	41	60	40	40
1966	100	26	59	41	100	28	55	45	100	29	54	46	46
Canada:													
1951	100	30	42	58	100	43	53	47	100	47	58	42	42
1966	100	28	53	47	100	34	64	36	100	32	58	42	42

Source: Canada, Statistics Canada, Market Research Handbook, (Ottawa: Statistics Canada, 1969), Table 7-2, pp. 296, 297 and data in tables 5 and 6.

New Brunswick, Nova Scotia and Newfoundland produced one-quarter or more of manufacturing output in their core cities and related areas in 1966. Here again, the percentage shares had risen markedly from 1951. Similar results can be observed with respect to manufacturing earnings in the provincial core cities and related areas. When the rest-of-province category is analysed in terms of population, and output and earnings in manufacturing, the findings are exactly on the opposite side. They are losing population to the core cities and their surrounding areas and their share of manufacturing output and earnings are declining over time.

This evidence of population and manufacturing gains in some areas in Canada at the expense of other areas suggests the backwash effects of the Myrdal-Kaldor thesis of cumulative causation. The data illustrate the occurrence of adverse changes in the rest-of-province areas from the combined core cities and related areas of Canada as manifested in the changes over time of, for example, population, labour, capital, output, and essential public services.

Can the evidence provide also some preliminary information on the occurrence in Canada of the spread effects of the Myrdal-Kaldor thesis of cumulative causation?

There has been a movement of population and industry into the related areas of core cities in Canada. Thus, Table 4.1 shows further that a significant share of the population shifts from the rest-of

provinces to the combined core cities and related areas in the period 1951 - 1966 were residing in the related areas in Ontario, British Columbia, Quebec, Manitoba and Newfoundland output gains during the same period had occurred in the related areas in Manitoba, British Columbia, Quebec, Ontario, Saskatchewan and Alberta and that, finally, a large part of manufacturing earnings in this period were received by persons employed in the related areas in Manitoba, Ontario, British Columbia, Quebec, New Brunswick and Alberta.

The evidence of substantial gains in the distribution of population and manufacturing activity to related areas of certain of Canada's core cities suggest the occurrence of beneficial changes caused in the surrounding areas of the core cities by the industrial expansion of the latter.

The data illustrates that Canada's population over time has been moving from the rest-of-provinces to the combined core cities and related areas and that manufacturing gains in combined core cities and related areas have occurred at the expense of the rest-of-provinces. Again, the surrounding areas of certain of Canada's core cities have been increasing their shares of the gains in population and manufacturing activities. While such findings cannot be interpreted as conclusive evidence of the existence of the backwash and spread effects of the Myrdal-Kaldor thesis of cumulative causation in Canada, they suggest that the concept of cumulative

causation may be occurring in Canada's regions.

Mere suggestion, however, of the occurrence of the back-wash and spread effects of cumulative causation in Canada's regions is not enough to show the role of cumulative causation in Canada's development. What is needed is a more rigorous analysis of regional economic development in Canada in terms of the Myrdal-Kaldor thesis of cumulative causation. Formal testing of the Myrdal-Kaldor thesis of cumulative causation in terms of Richardson's model as it applies to Canada's regions will be undertaken in Chapter six.

Testing of the Myrdal-Kaldor Thesis in Canada

The test is based on: (1) Myrdal's partial theory of economic growth constructed on the principle of circular and cumulative causation, (2) the Myrdal-Kaldor thesis of cumulative causation as manifested by increasing returns to scale in manufacturing, and (3) the Richardson model of the Myrdal-Kaldor thesis expressed in terms of output growth, productivity growth and efficiency wages in manufacturing. The Myrdal-Kaldor thesis of unequal regional economic growth and Richardson's mathematical model of this thesis are assumed to be valid.

The application of the Myrdal-Kaldor thesis of cumulative causation to assess regional economic development in Canada leads to the questions what aspects of manufacturing in Canada are to be tested and whether such manufacturing data for Canada are available.

What are to be tested in Canada's case are: (1) variations in regional economic growth rates in Canada, (2) regressions of productivity growth on output growth in regional manufacturing, (3) regressions of efficiency wages on productivity growth in regional manufacturing, (4) regressions of output growth on efficiency wages in regional manufacturing and (5) relationships between regional money wage and the national money wage in manufacturing.

The examination of variations in regional economic growth rates in Canada as a prelude to testing the Myrdal-Kaldor thesis of cumulative causation in Canada is based on the growth of population and that of output, employment, earnings⁽²⁾ and productivity in manufacturing for certain of Canada's core cities and combined core cities and their related areas by provinces, regions and Canada and for rest-of-provinces for the periods 1951-1956, 1956-1961, 1961-1966 and 1951-1966.

According to Richardson's model of the Myrdal-Kaldor thesis, the recurring and expansionary features of cumulative causation can be analysed in terms of four equations of manufacturing growth among regional economies. All equations of Richardson's mathematical model of the Myrdal-Kaldor thesis of cumulative causation can be tested after computing growth rates of output and productivity, and efficiency

⁽²⁾ Earnings comprise salaries of administrative and office employees plus wages of production workers.

wages in manufacturing in Canada's core cities and combined core cities and related areas, by provinces, regions and Canada, for the period 1951-1966. All data required were generally available from publications of Statistics Canada. Where data gaps existed, available data were interpolated or extrapolated by core city and combined core city and related area. Sources and quality of the data including some definitions are described in Appendix B.

Some Qualifications of the Testing Technique

Some qualifications should be noted as applying to the method of testing and the Myrdal-Kaldor thesis of cumulative causation to regional economic development in Canada as applied in this thesis.

There is at this time no independent alternative to Richardson's mathematical model of cumulative causation. Richardson did offer a partial alternative in the case where the rate of increase in money wages was not about equal in all regions. Explained Richardson "... a weaker hypothesis, though still sufficient to make the model work, is that the regional dispersion in productivity increases is substantially wider than the regional dispersion in money wage increases"(3). A weaker hypothesis is of value in case anticipated relationships of the more rigorous model fails to hold fully in Canadian regional manufacturing.

(3) A critique of Regional Growth Theory, op. cit., p. 15.

Some more discussion of the content of the regional classification implied by Richardson's model of cumulative causation would have made more easy the exercise of choosing an appropriate regional classification to test the Myrdal-Kaldor thesis in Canada. Richardson implied some definite ideas on such a regional classification with the statement, "... although there have been tests at the national and individual industry level, there have not been any regional tests. However, the data exist for such tests in most industrial countries"(4).

The regional classification of Canada to be used for testing the Myrdal-Kaldor thesis in Canada, is based upon boundaries that change over time. Thus, for example, Ontario as a summation of core cities and related areas in 1966 included the six metropolitan areas of Hamilton, Kitchener, London, Ottawa, Toronto and Windsor. Fifteen years earlier, Ontario on this same basis included the four metropolitan areas of Hamilton, London, Ottawa and Windsor. The changing areas in the regional classification of Canada selected do not subtract from the test of data with respect to cumulative causation in Canada's regions. The case is made that the broadening of the regional delineations reflect the recurring and expansionary features of the Myrdal-Kaldor thesis of cumulative causation.

Certain regional aspects of the Myrdal-Kaldor thesis of cumulative causation are not as well defined as the industry aspect.

(4) Ibid., p. 17.

Thus, questions with respect to the area of influence of the back-wash effects on the one hand and the spread effects on the other arise. Can either effect be transmitted also from the surrounding areas of Canada's core cities to the core cities? Answers to the direction of back-wash and spread effects will be determined when data are tested in terms of the Myrdal-Kaldor thesis in Chapter six.

Finally, there is the question of the appropriate length of manufacturing data runs required to test adequately the Myrdal-Kaldor thesis in Canada's regions. Manufacturing data spanning the fifteen year period of 1951-1966 were compiled to test the Myrdal-Kaldor thesis of cumulative causation in Canada. While long data runs are preferred to short ones this time span is considered adequate. To explain: the Myrdal-Kaldor thesis concerns the case of rising regional income inequality in the more developed countries. As such, the more meaningful results should be obtained from analysing a more recent period of manufacturing growth. Again, this period is more continuous than were it to include earlier years distorted by war-time conditions.

Anticipated Findings.

The major findings anticipated from testing the Myrdal-Kaldor thesis of cumulative causation to regional economic development in Canada is that the Myrdal-Kaldor thesis may contribute to understanding of some of the forces that contributed to unequal regional

economic development in Canada during the period 1951-1966. The objective is to see whether Richardson's model of the Myrdal-Kaldor thesis is workable in Canada or, at least, whether the weaker hypothesis of a wider regional dispersion in productivity increases than the regional dispersion in money wage increases turns out to be valid for Canada during the period.

Further, this type of analysis may throw some additional light on the more critical problems for sustained economic development at a continuing rate in Canada's regions.

To the extent that the test of the Myrdal-Kaldor thesis does not work out for Canada's regions, the inquiry should bring out some of the reasons for this inapplicability of what on a priori grounds appears to be a plausible theoretical hypothesis.

With respect to using the techniques of testing the Myrdal-Kaldor thesis as outlined in Chapter 2, Table 4:1 provided some tentative evidence supporting the Myrdal-Kaldor thesis in that Canada's population over time increasingly is migrating to the core cities in the first instance and then to their surrounding areas, manufacturing activity is increasing in Canada's core cities and expanding into their surrounding areas and unequal regional economic development persists in Canada.

The method of testing the Myrdal-Kaldor thesis of cumulative causation in Canada's regions comprises an examination of variations

in regional economic growth rates in Canada undertaken to present strong evidence of regional economic inequalities in Canada which require further analysis and explanations and the application of Richardson's model of the Myrdal-Kaldor thesis to regional economic development in Canada. These tests are presented in Chapters five and six, respectively.

CHAPTER FIVE

VARIATIONS IN REGIONAL ECONOMIC GROWTH RATES IN CANADA

The pattern of an increasing share of industrial production occurring in and around a small number of large-population centres in Canada suggests that economic growth is occurring most rapidly in Canada's core cities and their related areas. Industrial production, however, is unevenly distributed regionally among core cities and their surrounding areas. "Substantial shifts in population distribution and industrial activity have occurred over the years, with the result that some areas of the country have grown rapidly in production and wealth while others have stagnated".¹

This chapter examines variations in the regional growth rates of population and certain aspects of manufacturing activity in core cities, combined core cities and related areas and rest-of-provinces in Canada. It analyzes the growth of population among the regions and regional output, employment and earnings in manufacturing. Manufacturing employment, output and earnings refer to the contribution of both production and administration workers. The chapter includes lorenz curves showing changes in income inequality with respect to manufacturing workers among the regions during the years, 1951 and 1966. Dealing mainly with a description of the data, this chapter serves to introduce the test of cumulative causation in Canada to be presented in Chapter 6.

¹ T.N. Brewis, "Regional Aspects of Economic Policy" Canadian Perspectives in Economics, J. Chant, ed., (Toronto: Collier-McMillan Canada Ltd., 1972) p. K1.

Population

The population of Canada rose from 14 million in 1951 to 21.6 million in 1966. This represented an annual average rate of increase of 2.4 per cent. British Columbia, Alberta and Ontario grew at faster rates of 3.2 per cent, 3.0 per cent and 2.8 per cent, respectively. Quebec's growth was equal to Canada's. The remaining six provinces rose at slower rates ranging from 0.6 per cent in Prince Edward Island to 2.1 per cent in Newfoundland.

TABLE 5:1. - TOTAL POPULATION, ANNUAL AVERAGE RATE OF INCREASE^a
- PER CENT, BY PROVINCES AND REGIONS, CANADA

	1951- 1956	1956- 1961	1961- 1966	1951- 1966
Newfoundland	2.8	2.0	1.5	2.1
Prince Edward Island	0.1	1.0	0.7	0.6
Nova Scotia	1.6	1.2	0.5	1.1
New Brunswick ...	1.5	1.5	0.6	1.2
Atlantic Region	1.7	1.5	0.8	1.3
Quebec	2.7	2.6	1.9	2.4
Ontario	3.3	2.9	2.2	2.8
Manitoba	1.8	1.6	0.9	1.4
Saskatchewan	1.1	1.0	0.6	0.9
Alberta	3.6	3.5	1.9	3.0
Prairie Region	2.3	2.2	1.2	1.9
British Columbia	3.7	3.1	2.8	3.2
Yukon Territory	6.0	3.7	0.4	9.6
Northwest Terri- tories	3.8	3.6	4.5	4.0
Canada	2.8	2.5	1.9	2.4

^a Compound rates.

Source: Based on data in Table 1.

When Canada and provincial populations are compiled in terms of core city and related area populations, the analysis of population growth shows some interesting contrasts.

TABLE 5:2. - POPULATION OF CORE CITIES AND RELATED AREAS, ANNUAL AVERAGE RATE OF INCREASE^a PER CENT, BY PROVINCES AND REGIONS, CANADA

	1951-1956	1956-1961	1961-1966	1951-1966	1951-1956	1956-1961	1961-1966	1951-1966	1951-1966
	Core Cities				Core Cities and Related Areas				Rest of Province
Newfoundland	1.5	5.5	1.4	2.8	2.9	3.0	5.1	3.7	1.7
Prince Edward Island	2.0	3.5	3.1	2.9	2.0	3.5	3.1	2.9	1.5
Nova Scotia	1.5	1.5	5.2	1.7	4.2	2.3	2.7	3.0	1.5
New Brunswick	- 0.7	1.0	10.3	3.6	1.9	2.2	1.8	1.9	1.1
Atlantic Region	- 0.3	2.4	5.3	2.4	3.2	2.4	3.1	2.9	1.0
Quebec	1.6	1.5	1.5	1.5	3.5	3.7	4.1	3.7	1.2
Ontario	1.4	2.4	1.7	1.8	4.3	3.6	4.9	4.2	1.2
Manitoba	1.6	0.8	- 0.9	0.6	2.9	2.9	1.3	1.8	1.5
Saskatchewan	5.5	5.0	3.5	4.7	2.5	5.0	3.6	4.7	1.1
Alberta	7.4	6.2	3.0	5.5	7.4	6.2	4.2	5.9	1.9
Prairie Region	5.1	4.5	2.2	3.9	3.2	4.8	3.1	4.3	1.4
British Columbia	1.2	0.2	1.3	1.1	3.4	3.4	3.2	3.4	3.0
Yukon Territory	0.2	14.6	- 1.1	4.1	- 0.2	14.6	- 1.1	4.1	2.6
Northwest Territories	2.6	0.9	2.9	2.1	2.6	0.9	2.9	2.1	4.3
Canada	2.0	2.4	1.9	2.1	4.0	3.7	4.1	3.9	1.0

^aCompound rates.

Source: Based on data in Table 2.

On the one hand, Canada's population as reflected by core city population recorded an annual average rate of increase of 2.1 per cent during the period 1951-1966. This was somewhat slower than the total Canada rate of growth of population. More provinces exceeded the Canada average on this core city basis. Thus, Table 5:2 shows more rapid growth rates occurred in Alberta, 5.5 per cent, Saskatchewan, 4.7 per cent, New Brunswick, 3.6 per cent, Prince Edward Island, 2.9 per cent and Newfoundland, 2.8 per cent. Ontario, Quebec and British Columbia, however, showed slower growth rates than Canada.

On the other hand, Canada's population in terms of core city and related area populations grew at an annual average rate of 3.0 per cent during the period 1951-1966. This was 1.5 percentage points higher than the total Canada rate of population growth. Alberta, Saskatchewan and Ontario showed more rapid growth rates than Canada on this core city and related area basis. The latter grew at rates of 5.9 per cent, 4.7 per cent and 4.2 per cent, respectively. The remaining seven provinces recorded less rapid growth rates than Canada ranging from 1.8 per cent in Manitoba to 3.7 per cent in Newfoundland.

A steady decline in the magnitudes of the rates of growth of population in total Canada has occurred over time. Thus, Table 5:1 also shows that during consecutive five-year periods, Canada's growth rate of population slowed from 2.8 per cent in 1951-1956 to 2.5 per cent in 1956-1961 to 1.9 per cent in 1961-1966. The provinces followed the total Canada pattern of a slowing in their rates of growth of population over time.

This pattern, however, is not entirely appropriate with respect to the rate of growth of population for Canada and the provinces in terms of core city and related areas. With reference to Table 5:2, New Brunswick, Nova Scotia and British Columbia on a core city basis quickened their rates of growth of population consecutively over the same five-year periods. British Columbia showed little or no change and the remaining five provinces slowed over time.

What do the differing rates of population growth suggest as far as the distribution of population among core cities and related areas in Canada? Four observations are indicated: (1) Canada's population in core cities fell slightly from 29.5 per cent in 1951 to 28.3 per cent in 1966. Population in core cities and related areas rose markedly from 42.3 per cent in 1951 to 52.9 per cent in 1966, (2) Ontario, Quebec and British Columbia matched Canada with their population moving into related areas of core cities. The remaining provinces continue to show increases in their core city population and some movement into their related areas, (3) all provinces showed a trend whereby their population is settling into cities and surrounding areas and (4) the more rapid growth rates of population and the larger changes in population distributions are occurring in core cities and related areas as a whole as opposed to simply core cities. Core cities are becoming increasingly centres of commerce offering numerous and attractive opportunities for employment, earnings and working conditions while their surrounding areas serve as residential centres, locations for light industry and locations for further industrial expansion.

Output, Employment and Earnings

Output

Output in manufacturing in Canada as a summation of core city production rose from \$3.0 billion in 1951 to \$5.6 billion in 1966. This represented an annual average rate of growth of 4.4 per cent. Manufacturing output as a summation of core city and related area production, rising from \$3.7

billion in 1956 to \$10.5 billion in 1966, grew at a markedly higher rate of 7.2 per cent per annum. When Canada as a total of the rest-of-provinces is compared, a rate of growth of 5.1 per cent is observed during the same period.

TABLE 5:3 - OUTPUT IN MANUFACTURING OF CORE CITIES AND RELATED AREAS, ANNUAL AVERAGE RATE OF INCREASE^a PER CENT, BY PROVINCES AND REGIONS, CANADA, 1951-1966

	1951-1956	1956-1961	1961-1966	1951-1966	1951-1956	1956-1961	1961-1966	1951-1966	1951-1966
	Core Cities				Core Cities and Related Areas				Rest of Province
Newfoundland	2.5	2.9	9.3	4.9	2.6	3.6	10.1	5.4	3.8
Nova Scotia	6.7	1.1	4.9	4.2	6.7	14.1	6.1	8.9	4.0
New Brunswick	6.4	5.8	5.5	9.0	6.4	23.0	4.8	11.1	2.0
Atlantic Region	5.7	3.1	6.1	5.0	5.7	15.8	6.0	9.1	3.1
Quebec	4.8	1.5	5.5	3.9	8.1	3.3	7.8	6.4	5.3
Ontario	1.8	2.3	9.1	4.3	5.9	6.4	10.9	7.7	4.9
Manitoba	3.2	1.6	4.8	3.2	4.8	3.0	6.9	4.9	7.4
Saskatchewan	10.3	3.6	6.3	6.7	10.3	3.6	6.3	3.7	6.6
Alberta	10.8	6.2	10.1	9.0	17.6	6.9	8.1	10.7	7.0
Prairie Region	7.2	4.6	7.7	6.2	9.9	4.8	7.4	7.3	7.0
British Columbia ..	4.6	0.1	7.9	4.2	6.1	1.6	10.4	6.0	5.6
Canada	3.4	2.1	7.7	4.4	7.0	5.0	9.5	7.2	5.1

^aCompound rates.

Source: Based on data in Table 4.

Among the provinces, growth rates of output in terms of core city production were mixed. Above average output growth was achieved in Alberta, New Brunswick, Saskatchewan and Newfoundland and below average output growth in the remaining provinces shown. Output growth in terms of core city and related area production was more rapid than that of core city production. Above average growth rates occurred in five provinces ranging from 7.7 per cent in Ontario to 11.1 per cent in New Brunswick. As was the case in Canada, growth of real output in the rest-of-provinces was noticeable in all provinces except the Atlantic.

Growth rates of real output among the provinces in the shorter time-periods shown are equally interesting. Comparing output growth in core cities and combined core cities and related areas in the three five-year periods, the growth of output in combined core city and related area terms was generally greater than that of output in core city terms.

Employment

Total manufacturing employment in Canada as an aggregate of core city employment declined from 587.4 thousand in 1951 to 544.8 thousand in 1966, an annual average rate of decrease of -0.5 per cent. In contrast, total manufacturing employment as an aggregate of core city and related area rising from 707.0 thousand in 1951 to 947.2 thousand in 1966, grew at an annual average rate of 1.9 per cent. Canada as an aggregate of rest-of-provinces showed an annual average rate of growth of 1.6 per cent during the same period. This rate was greater than that of Canada as a summation of core cities but lesser than that for Canada as an aggregate of core cities and related areas.

TABLE 5:4 - MANUFACTURING EMPLOYMENT IN CORE CITIES AND RELATED AREAS, ANNUAL AVERAGE RATE OF INCREASE PER CENT, BY PROVINCES AND REGIONS, CANADA, 1951-1966

	1951-1956	1956-1961	1961-1966	1951-1966	1951-1956	1956-1961	1961-1966	1951-1966	Rest of Province
	Core Cities				Core Cities and Related Areas				
Newfoundland	-4.3	-0.1	1.3	-1.0	-4.3	0.8	2.6	-0.3	1.8
Nova Scotia	3.0	-3.6	-0.2	-0.3	3.0	3.4	1.1	2.5	-0.1
New Brunswick	3.5	-4.2	0.3	-0.2	3.5	10.1	0.3	4.5	-0.7
Atlantic Region	1.6	-3.1	0.5	-0.3	1.6	5.3	0.9	2.6	-0.1
Quebec	-0.1	-2.4	0.3	-0.7	2.1	-0.3	2.1	1.3	1.6
Ontario	-2.0	-2.5	2.3	-0.7	1.8	11.1	4.8	2.5	1.8
Manitoba	-0.8	-2.4	0.6	-0.9	0.5	-2.0	2.8	0.4	4.6
Saskatchewan	2.9	2.0	3.1	2.6	2.9	2.0	3.1	2.6	2.1
Alberta	3.8	1.1	4.4	3.1	5.9	3.3	2.6	3.9	2.3
Prairie Region	1.1	-0.6	2.7	1.2	2.5	0.3	2.7	1.8	2.9
British Columbia	0.9	-3.3	1.2	-0.3	2.2	-1.3	4.0	1.6	2.3
Canada	-0.8	-2.3	1.6	-0.5	1.9	0.5	3.6	1.9	1.6

*Compound rates.

Source: Based on data in Table 5.

Provincially, growth of total manufacturing employment as an aggregate of core city employment in the period 1951-1966 was down in seven provinces. These were Newfoundland, Manitoba, Ontario, Quebec, British Columbia, Nova Scotia and New Brunswick. The remaining two provinces fared better with impressive employment growth rates of 2.6 per cent in Saskatchewan and 3.1 per cent in Alberta. When examined as an aggregate of core city and related area employment, growth of total manufacturing employment in all provinces except Newfoundland which showed a decline, was positive with growth rates noticeably above Canada's 1.9 per cent in the case of New Brunswick and Alberta. As can be seen in Table 5.4, positive employment growth on this basis ranged from 0.4 per cent in Manitoba to 4.5 per cent in New Brunswick. The growth of manufacturing employment in the rest-of-provinces, ranging from 0.7 per cent in New Brunswick to 4.6 per cent in Manitoba, compares more closely with the growth of employment among the provinces in core city and related area terms.

When the intervening time-periods are examined, provincial employment growth in core city terms generally was losing ground. Only Alberta and Saskatchewan showed good employment growth over the shorter time periods. Provincial employment growth in core city and related area terms generally was gaining ground. Newfoundland alone stood a loser in the growth of manufacturing employment as most of the growth of employment in manufacturing in this province had occurred in the rest-of-province area.

Output Per Person Working

Manufacturing output and employment data together describe some interesting movements in manufacturing productivity. Manufacturing output per person working in Canada in core city terms, rising from \$5.0 thousand in 1951

to \$10.4 thousand in 1966, showed an annual average rate of increase of 4.9 per cent. Output per person working in core city and related area terms, increasing from \$5.2 thousand in 1951 to \$11.0 in 1966, showed a slightly higher annual average rate of growth of 5.1 per cent. As an aggregate of rest-of-provinces, Canada's productivity during the same period had grown at 3.4 per cent, which was the slowest of the three area groupings.

TABLE 5:5. - PRODUCTIVITY OF MANUFACTURING OF CORE CITIES AND RELATED AREAS, ANNUAL AVERAGE RATE OF INCREASE^a PER CENT, BY PROVINCES AND REGIONS, CANADA, 1951-1966

	1951-1956	1956-1961	1961-1966	1951-1966	1951-1956	1956-1961	1961-1966	1951-1966	1951-1966
	Core Cities				Core Cities and Related Areas				Rest of Province
Newfoundland	7.1	3.5	7.9	6.0	7.1	2.7	7.3	5.7	2.0
Nova Scotia	3.6	5.0	5.1	4.5	3.6	10.3	4.9	6.2	4.1
New Brunswick	2.8	10.4	5.2	6.0	2.7	11.8	4.7	6.3	2.7
Atlantic Region	4.0	6.4	5.8	5.4	4.0	9.9	5.0	6.3	3.2
Quebec	4.8	3.9	5.2	4.6	5.9	3.6	5.6	5.0	3.6
Ontario	3.9	4.9	6.6	5.1	4.3	5.3	5.8	5.1	3.1
Manitoba	4.0	4.5	3.9	4.1	4.3	5.1	4.0	4.4	2.7
Saskatchewan	7.3	1.6	3.1	4.0	7.3	1.6	3.1	4.0	4.5
Alberta	6.7	5.0	5.4	5.7	10.9	3.6	5.3	6.6	4.6
Prairie Region	5.8	4.3	4.8	5.0	7.2	4.4	4.5	5.3	4.1
British Columbia ..	3.7	3.5	6.1	4.4	3.8	3.0	6.1	4.3	3.2
Canada	4.2	4.5	6.0	4.9	5.0	4.5	5.7	5.1	3.4

^aCompound rates

Source: Based on data in Table 6.

Among the provinces, manufacturing output per person working also showed good growth during the fifteen-year period both in core city and core city and related area terms. However, the latter group displayed a stronger growth record. Thus, Table 5:5 shows that growth of provincial output per person working as a total of core-city activity ranged from 4.0 per cent in Saskatchewan to 6.0 per cent in Newfoundland and New Brunswick and, as a total of core city and related area activity, from 4.3 per cent in British Columbia to 6.6 per cent in Alberta. Amongst the latter group, Alberta and the Atlantic provinces exceeded the Canada average of 5.1 per cent.

In terms of rest-of-provinces, growth rates of productivity during the period ranged from a low of 2.0 per cent in Newfoundland to a high of 4.6 per cent in Alberta.

Earnings per Worker

Earnings per manufacturing employee in Canada as a total of core city earnings rose from \$2.6 thousand in 1951 to \$5.7 thousand in 1966, representing an annual average rate of growth of 4.6 per cent. Per worker earnings as an aggregate of core cities and related areas rising from \$2.7 thousand in 1951 to \$5.3 thousand in 1966 grew at the same rate of 4.6 per cent as the core city grouping. During the same period, earnings in the rest-of-provinces grew at a rate of 5.0 per cent.

All provinces showed rising per worker earnings growth rates during the same period. The latter on a core city basis ranged from 3.9 per cent in Manitoba to 4.8 per cent in New Brunswick and British Columbia. On a core city and related area basis, growth rates of earnings were mostly more rapid, ranging from 4.1 per cent in Manitoba to 5.6 per cent in Newfoundland.

TABLE 5.6. - WAGES PER WORKER IN MANUFACTURING OF CORE CITIES AND RELATED AREAS, ANNUAL AVERAGE RATE OF INCREASE, PER CENT, BY PROVINCES AND REGIONS, CANADA

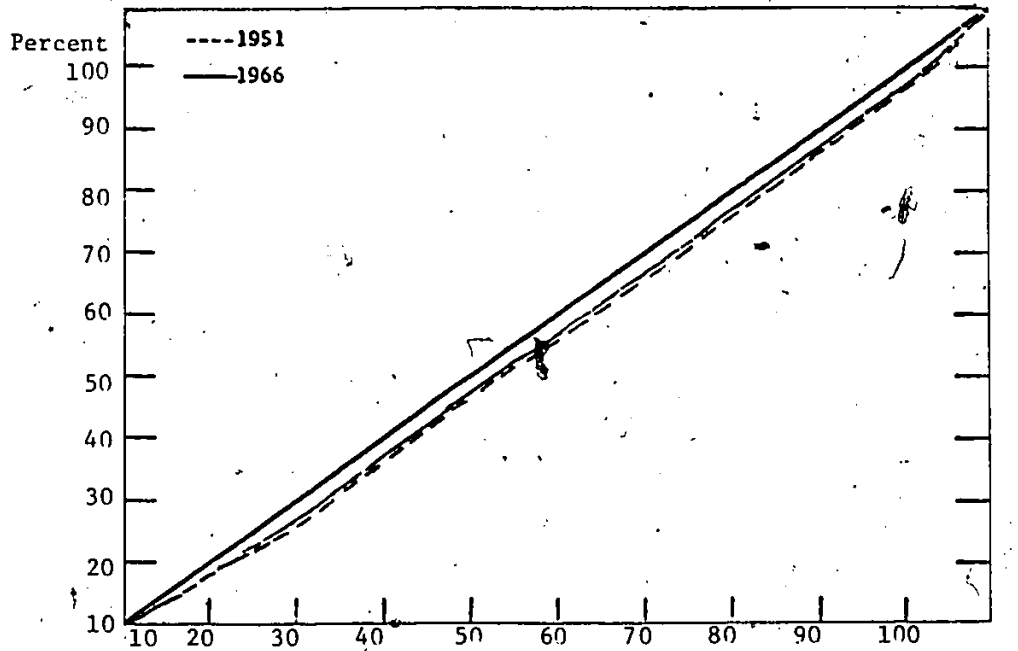
	1951-1956	1956-1961	1961-1966	1951-1966	1951-1956	1956-1961	1961-1966	1951-1966	1951-1966
	Core Cities				Core Cities and Related Areas				Rest of Province
Newfoundland	8.5	2.7	5.8	5.6	8.5	2.9	5.6	5.6	3.7
Nova Scotia	4.8	5.3	3.7	4.6	4.8	6.3	4.3	5.2	4.7
New Brunswick	3.2	6.8	4.4	4.8	3.2	6.7	6.6	5.5	4.2
Atlantic Region	5.2	5.2	4.3	4.9	5.2	5.8	5.3	5.4	4.4
Quebec	5.5	3.2	4.8	4.5	5.5	3.8	4.6	4.7	5.2
Ontario	5.1	4.1	4.8	4.7	5.2	4.2	4.5	4.6	4.8
Manitoba	5.1	3.8	3.0	3.9	5.1	3.9	3.3	4.1	5.2
Saskatchewan	5.5	4.4	4.2	4.7	5.2	4.5	4.2	4.7	5.4
Alberta	5.1	4.4	3.8	4.5	5.6	4.8	3.6	4.7	6.2
Prairie Region ..	5.3	4.2	3.8	4.4	5.5	4.5	3.5	4.5	5.8
British Columbia ..	5.5	3.9	4.8	4.8	5.1	4.1	4.8	4.7	5.6
Canada	5.1	3.8	4.8	4.6	5.3	4.0	4.6	4.6	5.0

*Compound rates

Source: Based on data in Table 7.

CHART 5:1.

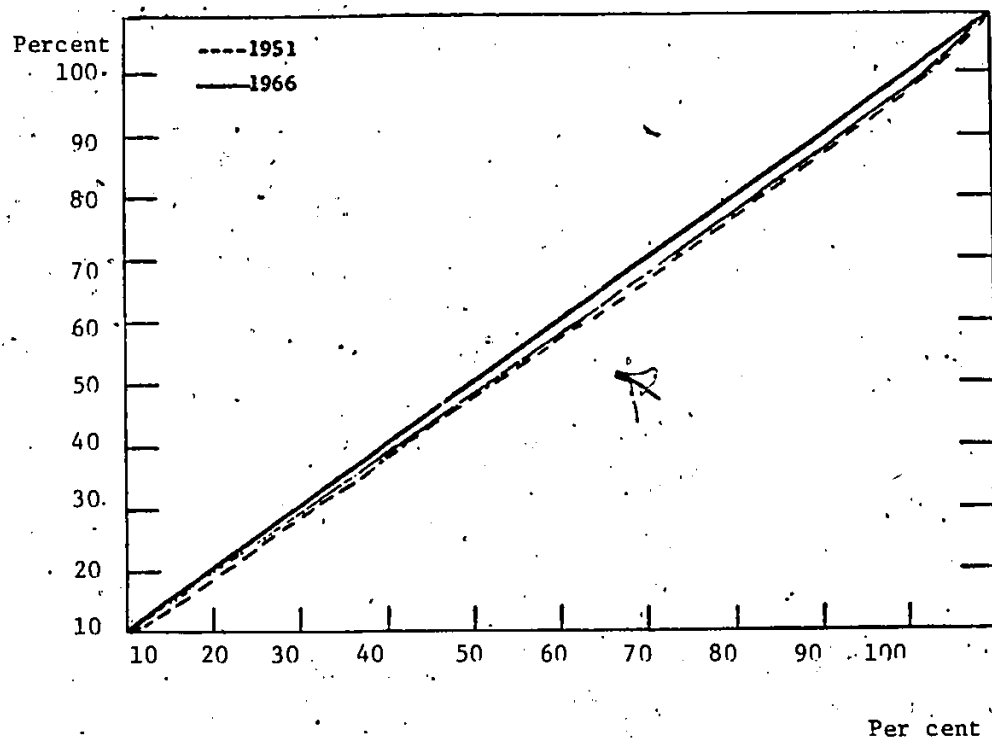
Lorenz Curves of the Distribution of Income of Core Cities,
Manufacturing Employment, by Provinces, 1951 and 1966.



Source: Based on data in Tables 5 and 7

CHART 5:2.

Lorenz Curves of the Distribution of Income of Core Cities and Related Areas,
Manufacturing Employment, By Provinces, 1951 and 1966



Source: Based on data in Tables 5 and 7

Regional Variations and Cumulative Causation

All provinces show a trend whereby their populations are moving increasingly to core cities and their related areas. This general movement, however, is composed of two separate parts with population beginning to move to the related areas of core cities in Ontario, Quebec, and British Columbia and mainly to core cities in the remaining provinces.

Manufacturing is spreading into the related areas of core cities and reaping substantial benefits. Not only is output and employment rising more rapidly in combined core cities and related areas than when confined to core cities only but increases in output per person working permit employers both to offer rising job opportunities and higher employee earnings. Charts 5:1 and 5:2 show the changes in income inequality in manufacturing for core cities and core cities and related areas in 1951 and 1966; inequality declined in this fifteen-year period in the two area bases and was just slightly more noticeable for core cities and related areas. However, the absence of a strong resource and industry base on the one hand and the sluggish development of core cities and related areas on the other are impeding adequate development of some of the provincial economies. The small number of core cities and related areas in the Atlantic Region is a prime factor in the unsatisfactory development of that region. The most satisfactory development has occurred in Ontario, Quebec and British Columbia which together contain the majority of core cities and related areas. Still, there are important centres of manufacturing activity in Canada in addition to those included in the particular regional classification adopted for the testing of the Myrdal-Kaldor thesis. This fact is recognized in Appendix three which makes suggestions for further research.

The occurrence of regional variations in growth rates of manufacturing output, employment and earnings in Canada provide the framework with respect to the application of the circular and cumulative causation principles of Gunnar Myrdal. Myrdal's argument was that: "... the play of forces in the market normally tends to increase rather than to decrease the inequalities between regions".¹ Notwithstanding the evidence of variations in regional economic growth rates, growth has occurred in Canada. The descriptive findings support the thesis objective of assessing regional economic development in Canada in terms of a specific growth model. An examination, therefore, of Canadian economic conditions in terms of Richardson's model based on the Myrdal-Kaldor thesis is warranted at this time.

¹Economic Theory and Underdeveloped Regions, op.cit., p. 26.

CHAPTER SIX

TESTING THE MYRDAL-KALDOR THESIS OF CUMULATIVE CAUSATION
IN CANADA'S REGIONAL ECONOMIC GROWTH

Gunnar Myrdal proposed the principle of cumulative causation as a partial theory of the regional economic growth process, its direction and problems. Kaldor developed further the role of cumulative causation stating that the latter in regional economic growth is manifested through manufacturing activity. Thereafter, Richardson outlined a model based on the Myrdal-Kaldor thesis of cumulative causation to be used in the empirical analysis of cumulative causation in regional economic growth. What the authors have achieved is a transition from a "pure" theory of regional economic growth through the industry aspects of the theory to the construction of a model including the description of data and the specification of an economic region system to be used to test empirically regional economic development.

This chapter applies Richardson's model based on the Myrdal-Kaldor thesis of cumulative causation to regional economic development in Canada during the period 1951-1966. Regression equations are fitted to the relevant manufacturing data for Canada's core cities and combined core cities and related areas, by provinces, regions and Canada. The regressions are examined and cumulative causation in Canada's regions is assessed. The objective is to determine whether Richardson's model based on the Myrdal-Kaldor thesis is workable in Canada and, if so, to provide information leading to a greater understanding of some of the forces that contributed to unequal economic

development in Canada during 1951-1966. Further, the analysis may underline some of the more critical problems for sustained economic development at a continuing rate in Canada's regions. To the extent that the test of the Myrdal-Kaldor thesis fails to work out for Canada's regions, the inquiry should bring out some of the reasons for this inapplicability of what on a priori grounds appears to be a plausible theoretical hypothesis of the regional economic growth process.

Outline of Test of the Myrdal-Kaldor Thesis

According to Richardson, the model based on the Myrdal-Kaldor thesis of cumulative causation is defined in terms of the rate of growth of manufacturing output (y_1), the rate of growth of manufacturing productivity (t_1), manufacturing efficiency wages (W_1/T_1), and manufacturing wage rates per person working (W_1). The equations are:

$$t_1 = f_1^1(y_1), \text{ where } f_1^1 \text{ is rising and } > 0 \quad (1)$$

$$(W_1/T_1)^* = f_1^2(t_1), \text{ where } f_1^2 \text{ is falling and } > 0 \quad (2)$$

$$y_1 = f_1^3(W_1/T_1), \text{ where } f_1^3 \text{ is falling and } > 0 \quad (3)$$

$$W_1 = \bar{W} \quad (4)$$

The equations specify what data on manufacturing activity are required to test the Myrdal-Kaldor thesis in Canada's regions. Compiled for core cities and combined core cities and related areas, by provinces, regions and Canada, they are: (1) growth rates of output calculated from value added by manufacture,

(2) growth rates of productivity calculated from output per person working (1) in manufacturing, (3) efficiency wages defined as the ratios between indexes of money wage rates per person working and indexes of productivity in manufacturing and (4) wage rates per person working in manufacturing.

The construction of an economic region system of Canada to be used to test the Myrdal-Kaldor Thesis comprises core city and combined core city and related area. The system is: (1) Newfoundland comprising St. John's, (2) Nova Scotia comprising Halifax, (3) New Brunswick comprising Saint John, (4) Atlantic Region comprising St. John's, Halifax and Saint John, (5) Quebec comprising Montreal and Québec (6) Ontario comprising Hamilton, Kitchener, London, Ottawa, Toronto and Windsor, (7) Manitoba comprising Winnipeg, (8) Saskatchewan comprising Regina and Saskatoon, (9) Alberta comprising Calgary and Edmonton, (10) Prairie Region comprising Winnipeg, Regina, Saskatoon, Calgary and Edmonton, (11) British Columbia comprising Vancouver and Victoria and (12) Canada comprising the above core cities and related areas.

Examination of Regressions

Equation (1) of Richardson's model is $t_1 = f_1^1(y_1)$ and states that the rate of growth of productivity in manufacturing (t_1) is a rising function of the rate of growth of manufacturing output (y_1). Table 6:1 shows the results of fitting the equation to the relevant data for Canada's core cities and related areas by provinces, regions and Canada during the period 1951-1966.

(1) According to Richardson, productivity (T_1) refers to the co-efficient of technical progress in a production function of the Cobb-Douglas form. Since reliable data on capital stock in manufacturing for core cities and core cities and surrounding areas were not readily available, manufacturing output per person working was used. Such a measurement of productivity, therefore, differs from the concept of productivity used by Richardson in his version of the Myrdal-Kaldor thesis.

TABLE 6:1. - REGRESSION ANALYSIS OF CUMULATIVE CAUSATION
IN THE ECONOMIC GROWTH OF CORE CITIES AND
COMBINED CORE CITIES AND RELATED AREAS
BY PROVINCES AND REGIONS,
CANADA, 1951-1966

	Constant Term	Regression Co-efficient of t_1 on y_1	t	R^2	D
Core Cities					
Newfoundland	4.27982	0.35504	2.484	0.32	1.39
Nova Scotia	4.59261	0.03790	0.187	0.00	2.34
New Brunswick	3.07512	0.60300	4.444	0.60	1.83
Atlantic Region	2.74986	0.55486	2.675	0.36	2.45
Quebec	3.28850	0.34692	3.030	0.41	2.55
Ontario	4.48985	0.15809	0.814	0.05	3.17
Manitoba	0.96900	0.91263	2.319	0.29	2.84
Saskatchewan	- 2.13817	0.91377	9.710	0.88	1.39
Alberta	1.86620	0.42338	6.719	0.78	2.41
Prairie Region	1.55093	0.62302	3.748	0.52	2.55
British Columbia	2.17421	0.53904	3.678	0.51	2.36
Canada	3.81229	0.25046	2.137	0.26	2.90
Core Cities and Related Areas					
Newfoundland	4.26564	-0.27614	1.772	0.19	1.46
Nova Scotia	0.31920	0.63174	15.158	0.94	2.73
New Brunswick	2.29769	0.35983	3.257	0.44	2.36
Atlantic Region	0.90657	0.57203	12.447	0.92	1.66
Quebec	- 0.43808	0.85518	13.110	0.93	2.82
Ontario	3.04229	0.26360	4.370	0.60	2.76
Manitoba	2.96488	0.30828	1.718	0.19	1.67
Saskatchewan	- 2.14148	0.91415	9.748	0.88	1.38
Alberta	1.34970	0.47823	8.747	0.85	2.82
Prairie Region	3.51569	0.27498	0.887	0.05	2.75
British Columbia	1.50950	0.46556	4.075	0.56	2.96
Canada	0.55045	0.63325	5.468	0.70	2.63

Source: Based on data in Tables 13 and 14.

As an aggregate of core cities, all provinces showed the required positive relationship between rates of growth of manufacturing productivity and those of manufacturing output; however, the relationship was significant mainly for Alberta, New Brunswick, British Columbia and the Prairie region. For these, the co-efficients of determination (R^2) ranged from a high of 78 per cent in Alberta to a low of 51 per cent in the Prairie region. Their "t" statistics ranged from 6.710 in Alberta to 3.748 in the Prairie region. Canada displayed a somewhat weaker pattern with respect to the relationship between manufacturing productivity growth rates and manufacturing output growth rates. Durbin-Watson statistics (D) were within the two limiting values (2) so that the hypothesis of no serial correlation is accepted. As an aggregate of core cities and related areas, provinces, regions and Canada showed a stronger positive and significant relationship between manufacturing productivity growth rates and manufacturing output growth rates. For the provinces except Newfoundland and Manitoba, positive and significant regression co-efficients of manufacturing productivity growth rates and manufacturing output growth rates were recorded with their co-efficients of determination ranging from 94 per cent in Nova Scotia to 44 per cent in New Brunswick and their "t" statistics, from 15.158 in Nova Scotia to 3.257 in New Brunswick. All regions except the Prairie region, and Canada showed this pattern with regard to manufacturing productivity growth rates and manufacturing output growth rates. As before, Durbin-Watson statistics were within the two limiting values.

Equation (2) of Richardson's model is $W_1/T_1 = f_1^2(t_1)$ and states that efficiency wages in manufacturing (W_1/T_1) is a decreasing function of the rate

(2) With 15 observations, and a regression involving one independent variable and a constant term, the two limiting values at the $\alpha = .05$ level of significance, are 1.29 (k) and 2.99 (k').

TABLE 6:2. - REGRESSION ANALYSIS OF CUMULATIVE CAUSATION
IN THE ECONOMIC GROWTH OF CORE CITIES AND
COMBINED CORE CITIES AND RELATED AREAS
BY PROVINCES AND REGIONS,
CANADA, 1951-1966

	Constant Term	Regression Co-efficient of $\frac{W_i}{T_i}$ on t_i	t	R ²	D
Core Cities					
Newfoundland	0.17878	- 0.00380	3.014	0.43	1.45
Nova Scotia	1.19364	0.08497	0.928	0.06	1.88
New Brunswick	0.26840	0.00352	4.094	0.58	1.72
Atlantic Region	0.45515	- 0.00568	5.514	0.72	1.91
Quebec	0.16729	- 0.00584	4.551	0.63	1.85
Ontario	1.05859	- 0.01307	3.402	0.47	1.42
Manitoba	0.28491	- 0.00045	0.712	0.04	1.78
Saskatchewan	0.11701	- 0.00388	2.800	0.39	1.32
Alberta	0.20105	- 0.00554	4.266	0.60	2.32
Prairie Region	0.37142	- 0.00160	1.652	0.18	1.89
British Columbia	0.38880	- 0.00527	2.712	0.38	1.34
Canada	1.03758	- 0.00816	1.622	0.17	1.24
Core Cities and Related Areas					
Newfoundland	0.25277	- 0.00510	4.173	0.59	1.52
Nova Scotia	0.20602	- 0.00335	5.686	0.73	1.34
New Brunswick	0.44043	- 0.00347	3.201	0.46	1.63
Atlantic Region	0.24620	- 0.00390	4.889	0.66	1.53
Quebec	0.99324	- 0.00437	5.422	0.69	1.50
Ontario	0.34883	- 0.00737	2.941	0.42	1.44
Manitoba	0.20972	- 0.00402	2.560	0.36	1.46
Saskatchewan	0.11704	- 0.00387	2.792	0.39	1.32
Alberta	0.10433	- 0.00419	4.203	0.60	1.28
Prairie Region	0.18990	- 0.00027	0.416	0.01	1.80
British Columbia	0.37850	- 0.00397	2.752	0.39	1.73
Canada	0.23691	- 0.00416	4.548	0.63	1.52

Source: Based on data in Tables 12 and 14

of growth of manufacturing productivity (t_1). Table 6:2 presents the results of fitting the equation to the relevant data for Canada's core cities and combined core cities and related areas by provinces, regions and Canada in the period 1951-1966.

As a summation of core cities, all provinces except Nova Scotia showed the required negative relationship between efficiency wages in manufacturing and rates of growth of manufacturing productivity. In all provinces except Nova Scotia and Manitoba, the relationship was significant with co-efficients of determination ranging from 63 per cent in Quebec to 38 percent in British Columbia. Their "t" statistics ranged from -4.551 in Quebec to -2.712 in British Columbia. All regions except the Prairie region showed a negative and significant relationship between efficiency wages in manufacturing and manufacturing productivity growth rates. Canada, however, did not show this pattern. Durbin-Watson statistics were within the two limiting values. As a summation of core cities and related areas, all provinces showed a stronger negative and significant relationship between efficiency wages in manufacturing and rates of growth of manufacturing productivity. Provincially, regression co-efficients of efficiency wages in manufacturing on manufacturing productivity growth rates were negative with co-efficients of determination ranging from 73 per cent in Nova Scotia to 36 per cent in Manitoba and the "t" statistics, from -5.686 in Nova Scotia to -2.560 in Manitoba. Only the Prairie region showed a non-significant relationship between efficiency wages in manufacturing and rates of growth of manufacturing productivity. Provincially, regression co-efficients of efficiency wages in manufacturing on manufacturing productivity growth rates were negative with co-efficients of determination ranging from 73 per cent in Nova Scotia to 36 per cent in Manitoba and the "t" statistics, from -5.686 in Nova Scotia to -2.560 in Manitoba. Only the Prairie region showed a non-significant relation-

TABLE 6:3. - REGRESSION ANALYSIS OF CUMULATIVE CAUSATION
IN THE ECONOMIC GROWTH OF CORE CITIES AND
COMBINED CORE CITIES AND RELATED AREAS
BY PROVINCES AND REGIONS,
CANADA, 1951-1966

	Constant Term	Regression Co-efficient of y_1 on $\frac{W_i}{T_i}$	t	R ²	D
Core Cities					
Newfoundland	46.16061	- 39.80078	0.968	0.07	1.36
Nova Scotia	3.87997	0.44581	0.403	0.01	1.46
New Brunswick	77.47461	- 78.96789	1.635	0.17	1.63
Atlantic Region	60.57350	- 57.01595	1.595	0.16	1.19
Quebec	60.41719	- 56.15182	1.568	0.16	1.73
Ontario	8.54158	- 4.11330	0.203	0.00	1.56
Manitoba	65.32455	- 61.33654	1.725	0.19	1.80
Saskatchewan	26.30496	- 38.19804	1.535	0.16	1.69
Alberta	42.45168	- 36.71467	0.653	0.03	1.37
Prairie Region	34.37785	- 30.26797	0.456	0.02	1.56
British Columbia	70.85078	- 61.13413	2.954	0.40	2.45
Canada	18.58585	- 14.15025	0.503	0.02	1.56
Core Cities and Related Areas					
Newfoundland	56.45958	- 48.53850	1.085	0.08	1.37
Nova Scotia	156.24133	- 162.04613	2.553	0.33	1.72
New Brunswick	166.60200	- 168.90000	2.494	0.32	1.74
Atlantic Region	144.35043	- 144.78535	2.504	0.32	1.74
Quebec	196.04149	- 195.06486	7.813	0.82	1.94
Ontario	100.98465	- 92.64762	2.779	0.37	2.52
Manitoba	30.64224	- 26.05779	0.796	0.05	1.73
Saskatchewan	26.30823	- 38.13018	1.533	0.16	1.69
Alberta	29.40413	- 21.80627	0.472	0.02	1.18
Prairie Region	4.77599	- 2.52183	0.061	0.00	1.04
British Columbia	126.63265	- 111.31895	3.172	0.44	1.80
Canada	127.54153	- 122.00223	4.506	0.61	1.58

Source: Based on data in Tables 12 and 13

ship between efficiency wages in manufacturing and rates of growth of manufacturing productivity. Durbin-Watson statistics were within the two limiting values.

Equation (3) of Richardson's model is $y_1 = f_1^3 (W_1/T_1)$ and explains that the rate of growth of manufacturing output (y_1) is a decreasing function of efficiency wages in manufacturing (W_1/T_1). Table 6:3 shows the results of fitting the equation to the relevant data for Canada's core cities and combined core cities and related areas by provinces, regions and Canada during the period 1951-1966.

As a total of core cities, one province alone showed a negative and significant relationship between rates of growth of manufacturing output and efficiency wages in manufacturing. This was British Columbia. Its co-efficient of determination was 40 per cent and "t" statistic 52.954. The Durbin-Watson statistic was within the two limiting values. As a total of core cities and related areas, all provinces except Newfoundland, Manitoba, Saskatchewan and Alberta showed a stronger negative and significant relationship between rates of growth of manufacturing output and efficiency wages in manufacturing. Their regression co-efficients were all negative with co-efficients of determination ranging from 82 per cent in Quebec to 32 per cent in New Brunswick. The "t" statistics ranged from -7.813 in Quebec to -2.494 in New Brunswick. All regions except the Prairie region showed a negative and significant relationship between manufacturing output growth rates and efficiency wages in manufacturing. Canada, too, showed a similar relationship. Durbin-Watson statistics were within the two limiting values.

Equation (4) of Richardson's model is $W_1 = \bar{W}$ and explains that, in manufacturing, a region's money wage rate per person working are equal to the national money wage rate per person working. Table 6:4 compares manufacturing

money wage rates per worker for Canada's core cities and combined core cities and related areas by provinces and regions to the national per worker money wage rate in manufacturing in 1951 and 1966.

TABLE 6.4 - COMPARISON OF MONEY WAGES PER WORKER IN MANUFACTURING FOR CANADA'S CORE CITIES AND COMBINED CORE CITIES AND RELATED AREAS TO THE NATIONAL PER WORKER MONEY WAGE, (IN THOUSANDS OF DOLLARS) BY PROVINCES AND REGIONS, CANADA, 1951 AND 1966

	Core Cities		Core Cities and Related areas	
	1951	1966	1951	1966
Newfoundland	1.8	4.0	1.8	4.0
Nova Scotia	2.2	4.4	2.2	4.8
New Brunswick	2.2	4.4	2.2	4.9
Atlantic Region	2.1	4.3	2.1	4.7
Quebec	2.4	4.7	2.5	5.0
Ontario	2.8	5.6	2.8	5.6
Manitoba	2.4	4.2	2.4	4.8
Saskatchewan	2.6	5.1	2.6	5.1
Alberta	2.6	5.0	2.6	5.2
Prairie Region	2.5	4.7	2.5	4.8
British Columbia	2.8	5.6	2.9	5.7
Canada	2.6	5.2	2.7	5.3

SOURCE: Based on data in Tables 25 and 26.

Canada's per worker wage rate in manufacturing in terms of core cities was \$5.2 thousand in 1966. Per worker wage rates in manufacturing for the provinces on the same area basis ranged from \$4.0 thousand in Newfoundland to \$5.6 thousand in British Columbia. Again, Canada's per worker wage rate was in this industry in terms of combined core cities and related areas was \$5.3 thousand in 1966. Provincial per worker wage rates in manufacturing on this area basis ranged from \$4.0 thousand in Newfoundland to \$5.7 thousand in British Columbia. Compared to the

TABLE 6.5 - REGRESSION ANALYSIS OF CUMULATIVE CAUSATION IN THE ECONOMIC GROWTH OF CORE CITIES AND RELATED AREAS, BY PROVINCES AND REGIONS, CANADA, 1951-1966

	Constant Term	Regression Co-efficient of t_1 on y_1	t	R^2	D	Constant Term	Regression Co-efficient of $\frac{y_1}{t_1}$ on t_1	t	R^2	D	Constant Term	Regression Co-efficient of $\frac{y_1}{t_1}$ on t_1	t	R^2	D
Core Cities															
Newfoundland	4.27982	0.35504	2.484	0.32	1.39	0.17878	-0.00380	-3.014	0.43	1.45	46.16061	-39.80098	-0.968	0.07	1.36
Nova Scotia	4.59261	0.03790	0.187	0.00	2.34	1.19364	0.08497	0.928	0.06	1.88	3.87997	0.44581	0.403	0.01	1.46
New Brunswick	3.07512	0.60300	4.444	0.60	1.83	0.26840	-0.00352	4.094	0.58	1.72	77.47461	-78.06789	-1.635	-0.17	1.63
Atlantic Region	2.74986	0.55486	2.675	0.36	2.45	0.45515	-0.00368	-5.514	0.72	1.91	60.57850	-57.01595	1.595	0.16	1.14
Quebec	3.28850	0.34692	3.030	0.41	2.55	0.16729	-0.00584	4.551	0.63	1.85	60.41719	-56.15182	1.568	0.16	1.73
Ontario	4.94985	0.15809	0.814	0.05	3.17	1.03859	-0.01307	-3.402	0.47	1.42	8.54158	-4.11330	0.203	0.00	1.56
Manitoba	0.96900	0.91263	2.319	0.29	2.84	0.28491	-0.00045	-0.712	0.04	1.78	65.32455	-61.33654	1.725	0.19	1.80
Saskatchewan	2.13817	0.91377	9.710	0.88	1.39	0.11701	-0.00388	-2.800	0.39	1.32	26.30496	-38.19804	1.535	0.16	1.69
Alberta	1.86620	0.42338	6.719	0.78	2.41	0.20105	-0.00554	-4.266	0.60	2.32	42.45168	-36.71467	0.653	0.03	1.37
Prairie Region	1.55093	0.62302	3.748	0.52	2.55	0.37142	-0.00160	-1.652	0.18	1.89	34.37785	-30.26797	0.456	0.02	1.56
British Columbia	2.17422	0.53904	3.678	0.51	2.36	0.36880	-0.00327	-2.712	0.38	1.34	70.85078	-61.13413	2.954	0.40	2.45
Canada	3.81229	0.25046	2.137	0.26	2.90	1.03758	-0.00816	-1.622	0.17	1.24	18.58585	-14.15025	0.503	0.02	1.56
Core Cities and Related Areas															
Newfoundland	4.26564	0.27614	1.772	0.19	1.46	0.25277	-0.00510	-4.173	0.59	1.52	56.45958	-48.53850	1.085	0.08	1.37
Nova Scotia	0.31920	0.63174	15.158	0.94	2.73	0.20602	-0.00335	-5.686	0.73	1.34	156.24133	-162.04613	2.553	0.33	1.72
New Brunswick	2.29769	0.35983	3.257	0.44	2.36	0.44043	-0.00347	-3.201	0.46	1.63	166.60200	-168.90000	2.494	0.32	1.74
Atlantic Region	0.90657	0.57203	12.447	0.92	1.66	0.24620	-0.00390	-4.889	0.66	1.53	144.35043	-144.78535	2.504	0.32	1.74
Quebec	0.43808	0.85518	13.110	0.93	2.82	0.99324	-0.00437	-5.422	0.69	1.50	196.04149	-195.06486	7.813	0.82	1.94
Ontario	3.04229	0.26360	4.370	0.60	2.76	0.34883	-0.00737	-2.941	0.42	1.44	100.98465	-92.64762	2.779	0.37	2.52
Manitoba	2.96488	0.30828	1.718	0.19	1.67	0.20972	-0.00402	-2.560	0.36	1.46	30.64224	-26.05779	0.796	0.05	1.73
Saskatchewan	2.14148	0.91415	9.748	0.88	1.38	0.11704	-0.00387	-2.792	0.39	1.32	26.30823	-38.13018	1.533	0.16	1.69
Alberta	1.34970	0.47823	8.747	0.85	2.82	0.10433	-0.00419	-4.203	0.60	1.28	29.40413	-21.80627	0.472	0.02	1.18
Prairie Region	3.51569	0.27498	0.887	0.05	2.75	0.18990	-0.00027	-0.416	0.01	1.80	9.77599	-2.52183	0.061	0.00	1.04
British Columbia	1.50950	0.46556	4.075	0.56	2.46	0.37850	-0.00397	-2.752	0.39	1.73	126.63265	-111.31895	3.176	0.44	1.80
Canada	0.55045	0.63325	5.468	0.70	2.63	0.23691	-0.00416	-4.548	0.63	1.52	127.54153	-122.00223	4.502	0.61	1.58

Source: Based on data in Tables 12-14.

national per worker money wage rate in manufacturing, the per worker wage rate structure in this industry among the provinces generally, was close.

Cumulative Causation in Canada's Regions

To satisfy the conditions for the occurrence of cumulative causation in Canada's regions, Canada's regional development by way of manufacturing activity must meet Richardson's model based on the Myrdal-Kaldor thesis. The latter states that the rate of growth of manufacturing productivity varies directly with the rate of growth of manufacturing output, efficiency wages in manufacturing vary inversely with the rate of growth of manufacturing productivity and the rate of growth of manufacturing output varies inversely with efficiency wages in manufacturing. Table 6:5 shows the regression results for manufacturing productivity growth rates (t_1) on manufacturing output growth rates (y_1), efficiency wages in manufacturing (W_1/T_1) on manufacturing productivity growth rates (t_1) and manufacturing output growth rates (y_1) on efficiency wages in manufacturing (W_1/T_1) for core cities and combined core cities and related areas, by provinces, regions and Canada during the period 1951-1966.

As an aggregate of core cities, one province alone satisfied the conditions necessary for the occurrence of cumulative causation. This was British Columbia which yielded regression co-efficients of 0.53904, - 0.00527 and - 61.13413, for growth rates of manufacturing productivity on growth rates of manufacturing output, efficiency wages in manufacturing on growth rates of manufacturing productivity and growth rates of manufacturing output on efficiency wages in manufacturing, respectively. Its coefficients of determination and the "t" statistics were high in all cases. Its Durbin-Watson statistics were within the two limiting values. No region met the required conditions for cumulative causation. Canada, too, did not show a growth pattern in terms of cumulative causation. As an aggregate of combined core cities and related areas, the picture was more encouraging. All provinces except Newfoundland, Manitoba,

Saskatchewan and Alberta, all regions except the Prairie region, and Canada satisfied the necessary conditions for growth in terms of cumulative causation. Nova Scotia produced regression co-efficients of 0.63174, - 0.00335 and - 162.04613 for manufacturing productivity growth rates on manufacturing output growth rates, efficiency wages in manufacturing on manufacturing productivity growth rates and manufacturing output growth rates on efficiency wages in manufacturing, respectively. Co-efficients of determination and the "t" statistics were all high and residuals were not autocorrelated. Manufacturing in New Brunswick yielded regression co-efficients of 0.35983, - 0.00347 and - 168.90000, respectively. Quebec's manufacturing showed regression co-efficients of 0.85518, - 0.00437 and - 195.06486, respectively. Manufacturing in Ontario exhibited regression co-efficients of 0.26360, - 0.00737 and - 92.64762, respectively, and in British Columbia, 0.46556, - 0.00397 and - 111.31893, respectively. Co-efficients of determination and the "t" statistics were all high and Durbin-Watson statistics revealed no auto-correlated residuals. The Atlantic region's manufacturing yielded regression co-efficients in the same order of 0.57203, - 0.00390 and - 144.78535 with high co-efficients of determination and "t" statistics in all cases but one. Durbin-Watson statistics were within the two limiting values. Canada's manufacturing showed regression co-efficients of 0.63325, - 0.00416 and - 122.00223, respectively, high co-efficients of determination and "t" statistics in all case but one and Durbin-Watson statistics within the two limiting values.

Findings

The Myrdal-Kaldor thesis of cumulative causation on a priori grounds appeals as a plausible theoretical analysis of regional economic development. The occurrence of cumulative causation in certain provinces and regions in

Canada essentially in terms of combined core cities and surrounding areas, as shown in the previous section, confirms that Richardson's model based on the Myrdal-Kaldor thesis is workable in Canada.

British Columbia as a summation of core cities and Nova Scotia, New Brunswick, Quebec, Ontario and British Columbia as a summation of core cities and surrounding areas are continuing to develop in a circular and cumulative pattern. Thus, in these provinces, rising growth rates of manufacturing output induce higher rates of growth of manufacturing productivity which, in turn reduces manufacturing efficiency wages. As the latter fall, higher rates of growth of manufacturing output ensue and the process is repeated. Conversely, Newfoundland, Manitoba, Saskatchewan and Alberta as a summation of combined core cities and related areas are not experiencing growth in terms of the circular and cumulative pattern. Thus, in these provinces, rising growth rates of manufacturing output do not induce higher growth rates of manufacturing productivity. Manufacturing efficiency wages are not reduced which would lead to higher rates of growth of manufacturing output and the recurring cumulative growth process is not being experienced.

What are some of the reasons for the failure of the model in some provinces, namely, Newfoundland, Manitoba, Saskatchewan and Alberta and its success in the remaining provinces? Answers are to be found, in part, in the relative role of manufacturing in the economic development of the provinces. Answers reside, in part, in the field of policy.

Canada's regional economic base at the present time spreads across the primary industries, through the secondary industries to the tertiary industries. The primary industries except mining are declining. The secondary industries especially manufacturing which is unevenly distributed regionally, retain their

economic importance. The tertiary industries especially services, trade and public administration are new and important sources of growth to the regional economies. Notwithstanding this general economic structure of the regions, manufacturing during the period in two Atlantic provinces, Quebec, Ontario and British Columbia ranked high in importance as a contributor to regional economic growth. In contrast, Newfoundland and the three Prairie provinces received near negligible contributions to economic growth from manufacturing.

Again, there are major differences between Canada's regions in the case of institutional rigidities affecting changes in efficiency wages, productivity changes and output changes in manufacturing and generally. These differences are more the outcome of historical circumstances surrounding Canada's regional economic development rather than differences arising from a significant variation in the form and the economic goals of the regional governments. Indeed, the private sector continues to show a preference for investing scarce capital resources in the rapidly developing regions simply because these are the areas which bring the highest returns and have the most promising long-term growth prospects.

Differences in demand elasticities for a region's output provide more information on the differential success of the model on different regions of Canada. Regional growth can occur under conditions of high efficiency wages provided that demand for a region's output is price-inelastic. Such may have occurred in the period, for example, in the case of Newfoundland and Saskatchewan where efficiency wages were above the Canada average. While Quebec and British Columbia showed relatively higher efficiency wages, the output structure comprising mainly non-durables or semi-durables suggest that demand is fairly price-elastic.

The analysis presented in the chapter raises a question whether it would be desirable to change the emphasis with respect to regional economic development in Canada from an over-reliance on regional redistribution to more positive economic strategies to raise productivity, reduce or eliminate rigidities and promote more competition in the markets. While such a change is desirable to strengthen the competitive efficiency of the regional economies, one must take careful note of the serious employment and relocation problems arising and decide in terms of economic welfare whether this trade-off is affordable, and indeed acceptable to the majority of the population affected.

Having demonstrated the general validity of the Richardson model of the Myrdal-Kaldor thesis of cumulative causation in the case of five of nine provinces shown in Canada, the question arises whether policy action could bring about certain changes in structure and attitudes which may yield over time for the four other provinces the desirable results observed for the successful five. While such an outcome is considered to be quite feasible, the economic impact of structural change on the population affected and the kinds of changes in consumer, worker and cultural attitudes which would ensue must be included in any policy recommendations.

CHAPTER SEVEN

SUMMARY AND CONCLUSIONS

Of the several partial theories of the process of economic growth, its sources and measurement which have emerged in the post-war period, this thesis examined Myrdal's theory of regional economic growth and tested Richardson's model of the Myrdal-Kaldor thesis of cumulative causation to regional economic development and problems facing Canada in the period 1951-1966.

To test the Myrdal-Kaldor thesis of cumulative causation in Canada, it was necessary to define an appropriate regional classification. An abundance of regional classifications of Canada, private and public, was presented. The majority, however, were found to be not suited to the particular regional classification system demanded by the Myrdal-Kaldor thesis. The latter requires an economic region system reflecting centres of economic expansion and their surrounding areas of influence. Metropolitan areas were considered the appropriate regional classification. While Canada's metropolitan areas which are a combination of core cities and their related areas come closest to the required regional classification, the latter may be incomplete. There are other centres of economic activity in Canada with important manufacturing industries. The latter should be included in order to make a more complete test of cumulative causation in Canada.

From the test, the occurrence of cumulative causation in Canada confirms that Richardson's model based on the Myrdal-Kaldor thesis is workable and useful to the study of regional economic growth in Canada. However, it must be noted that this conclusion is essentially supported by the second set of

aggregates, namely, the combined core cities and related areas and that, with four major provinces excepted.

While the Myrdal-Kaldor thesis of cumulative causation was shown to be workable in Canada as qualified above, the short-comings must be remembered. They include: (1) the starting point of higher growth regions to explain the persistence of regional economic inequalities, (2) an overly aggregative principle with consequent neglect of the effect of agglomeration economies, external scale operations and indivisibilities in the geographic concentration of industry, (3) money wages in higher growth regions rising faster than other regions and not offset by higher productivity growth and (4) rising prices serving both to offset efficiency wages that are not declining and to sustain the rapid growth of the region. Notwithstanding these shortcomings, the Myrdal-Kaldor thesis presents a useful framework to examine more recent regional economic development in Canada.

Dealing with certain aspects of regional economic growth as a result of manufacturing activity, the Myrdal-Kaldor thesis ignores the contributions to regional economic growth of non-manufacturing industries. For example, the service industries in Canada have become the most important sources of employment and output in Canada and constitute a major factor in the growth process. The Myrdal-Kaldor thesis constructed in terms of manufacturing activity does not purposely neglect non-manufacturing activity. It is a partial theory of economic growth. Notwithstanding its limitations in approach to explain the economic growth process, Professors Myrdal and Kaldor (and Richardson) have made a major contribution to further the understanding of some of the most dynamic elements in that growth process.

TABLE 1. Total Population (No. of Persons), by Provinces and Regions, Canada
Selected Years, 1951-1971

	1951	1956	1961	1966	1971
Newfoundland	361,416	415,074	457,853	493,396	522,104
Prince Edward Island ..	98,429	99,285	104,629	108,535	111,641
Nova Scotia	642,584	694,717	737,007	756,039	788,960
New Brunswick	515,697	554,616	597,936	616,788	634,557
Atlantic Region ...	1,618,126	1,763,692	1,897,425	1,974,758	2,057,262
Quebec	4,055,681	4,628,378	5,259,211	5,780,845	6,027,764
Ontario	4,597,540	5,404,933	6,236,092	6,960,870	7,703,106
Manitoba	776,541	850,040	921,686	963,066	988,247
Saskatchewan	831,728	880,665	925,181	955,344	926,242
Alberta	939,501	1,123,116	1,331,944	1,463,203	1,627,874
Prairie Region	2,547,770	2,853,821	3,178,811	3,381,613	3,542,363
British Columbia	1,165,210	1,398,464	1,629,082	1,873,674	2,184,621
Yukon Territory	9,096	12,190	14,628	14,382	18,388
Northwest Territories	16,004	19,313	22,998	28,738	34,807
Canada	14,009,427	16,080,791	18,238,247	20,014,880	21,568,311

Source: Statistics Canada, Estimated Population of Canada by Province, (Ottawa: Information Canada, June 1972) Table 1, p. 2.

TABLE 2. Population of Core Cities and Related Areas (No. of Persons), by Provinces and Regions, Canada
Selected Years, 1951-1971

	1951	1956	1961	1966	1971	1951	1956	1961	1966	1971
	Core Cities					Core Cities and Related Areas				
Newfoundland	52,873	57,078	74,519	80,016	88,102	68,620	79,153	91,654	117,533	131,814
Prince Edward Island ..	6,547	7,242	8,611	10,042	9,439	6,547	7,242	8,611	10,042	9,439
Nova Scotia	139,477	129,536	139,477	179,533	186,805	133,931	164,200	183,946	209,901	222,637
New Brunswick	50,779	52,491	55,153	89,921	89,039	78,337	86,015	95,563	104,195	106,744
Atlantic Region	249,676	246,347	277,760	359,532	373,385	287,435	336,610	379,774	441,671	470,634
Quebec	1,231,684	1,333,005	1,433,783	1,544,514	1,462,763	1,824,152	2,147,592	2,573,640	3,140,854	3,357,413
Ontario	1,576,743	1,690,609	1,910,113	2,075,971	2,103,091	2,335,219	2,886,923	3,442,048	4,382,575	4,959,429
Manitoba	235,710	255,093	265,986	257,005	246,246	356,813	412,248	476,543	508,759	540,262
Saskatchewan	124,587	162,613	207,740	247,036	265,918	124,537	162,613	207,740	248,332	267,183
Alberta	318,997	455,822	616,630	712,421	841,471	318,997	455,822	616,630	755,945	899,021
Prairie Region	679,294	873,528	1,090,356	1,216,462	1,353,635	800,397	1,030,683	1,300,913	1,513,036	1,706,466
British Columbia	396,164	420,428	439,463	467,828	488,017	675,167	798,846	944,317	1,108,353	1,278,152
Yukon Territory	2,594	2,570	5,031	4,771	11,217	2,594	2,570	5,031	4,771	11,217
Northwest Territories	2,724	3,100	3,245	3,742	6,122	2,724	3,100	3,245	3,741	6,122
Canada	4,138,879	4,569,587	5,159,751	5,672,819	5,798,230	5,927,688	7,206,324	8,648,968	10,595,001	11,789,433

Source: Canada, Statistics Canada, Population by Census Metropolitan areas, 1971 Census, Table 1, p. 1; Population: Incorporated Cities, Towns and Villages, 1966 Census, Table 11-12, pp. 11-1-12.1; Population: Incorporated Cities, Towns and Villages, 1961 Census, Table 10-11, pp. 10.1-11.2; Population: Historical, 1961 Census, Table 6, p. 6.89, (Ottawa: Information Canada, 1961-73).

TABLE 3. Population of Core Cities and Related Areas as a Percentage of Total Population, by Provinces and Regions, Canada, Selected Years, 1951-1971

	1951	1956	1961	1966	1971	1951	1956	1961	1966	1971
	Core Cities					Core Cities and Related Areas				
Newfoundland	14.6	13.8	16.3	16.2	16.9	19.0	19.1	20.0	23.8	25.2
Prince Edward Island	6.6	7.3	8.2	9.2	8.4	6.6	7.3	9.2	9.2	8.4
Nova Scotia	21.7	18.6	18.9	23.7	23.7	20.8	23.6	25.0	27.8	28.2
New Brunswick	9.8	9.5	9.2	14.0	10.0	15.2	15.5	16.0	16.9	16.8
Atlantic Region	15.4	14.0	14.6	18.2	18.1	17.8	19.1	20.0	22.4	22.9
Quebec	30.4	28.8	27.3	26.7	24.3	45.0	46.4	48.9	54.3	55.7
Ontario	34.3	31.3	30.6	29.8	27.3	50.8	53.4	55.2	63.0	64.4
Manitoba	30.4	30.0	42.8	26.7	24.9	45.9	48.5	51.7	52.8	54.7
Saskatchewan	15.0	18.5	22.4	25.8	28.7	15.0	18.5	22.4	26.0	28.8
Alberta	34.0	40.6	46.3	48.7	51.7	34.0	40.6	46.3	51.7	55.2
Prairie Region	26.7	30.6	34.3	36.0	38.2	31.4	36.1	40.9	44.7	48.2
British Columbia	34.0	30.1	27.0	25.0	22.3	57.9	57.1	58.0	59.2	58.5
Yukon Territory	28.5	21.1	34.4	33.2	61.0	28.5	21.1	34.4	33.2	61.0
Northwest Territories	17.0	16.1	14.1	13.0	17.6	17.0	16.1	14.1	13.0	17.6
Canada	29.5	28.4	28.3	28.3	26.9	42.3	44.8	47.4	52.9	54.7

Source: Calculations based on data in Tables 1 and 2.

TABLE 4. Manufacturing Employment of Core Cities and Related Areas (No. of Persons), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	2,898	2,786	2,639	2,535	2,228	2,326	2,595	2,628	2,626	2,565	2,313	2,195	2,170	2,130	2,157	2,466
Nova Scotia	5,589	6,405	6,343	6,216	6,260	6,471	6,292	6,041	5,489	4,264	5,373	5,782	5,465	5,687	5,447	5,338
New Brunswick	3,534	4,532	4,714	4,418	4,528	4,201	4,015	3,722	3,461	3,372	3,394	3,245	3,309	3,364	3,624	3,442
Atlantic Region	12,021	13,723	13,696	13,169	13,016	12,998	12,902	12,391	11,576	10,201	11,080	11,222	10,944	11,181	11,228	11,246
Quebec	198,971	203,352	209,975	202,190	193,316	198,749	199,743	189,031	188,858	186,312	176,747	175,150	171,409	173,402	175,897	179,347
Ontario	286,097	285,849	295,161	271,475	255,650	258,160	260,651	237,535	241,119	210,501	227,834	228,301	233,155	239,637	248,407	255,195
Manitoba	27,704	28,162	28,230	26,887	26,392	26,629	27,039	25,867	22,462	24,689	23,620	23,371	23,446	23,499	23,779	24,371
Saskatchewan	5,678	5,830	6,163	6,225	6,271	6,537	6,642	6,716	7,014	7,226	7,204	7,079	7,152	7,383	7,697	8,383
Alberta	18,080	19,642	20,536	20,326	20,567	21,831	23,614	23,088	24,022	23,934	23,067	24,219	23,767	25,221	27,026	28,685
Prairie Region	51,462	53,634	54,929	53,438	53,230	54,997	57,295	55,671	53,498	55,849	53,891	54,669	54,365	56,103	58,502	61,439
British Columbia ..	38,931	37,774	38,724	38,834	39,522	40,700	40,494	37,202	36,716	35,909	34,433	34,696	35,687	36,465	37,609	37,530
Canada	587,482	594,332	612,485	579,106	554,734	565,604	571,085	531,850	531,767	498,774	503,985	504,038	505,560	516,788	531,643	544,757
Core Cities and Related Areas																
Newfoundland	2,898	2,786	2,639	2,535	2,228	2,326	2,595	2,810	2,716	2,707	2,435	2,336	2,330	2,311	2,359	2,763
Nova Scotia	5,589	6,405	6,343	6,216	6,260	6,471	6,292	7,677	7,441	7,387	7,655	8,045	7,594	8,149	8,056	8,083
New Brunswick	3,534	4,532	4,714	4,418	4,528	4,201	4,015	4,801	4,655	6,039	6,784	6,900	7,061	6,505	6,772	6,815
Atlantic Region	12,021	13,723	13,696	13,169	13,016	12,998	12,902	15,288	14,812	16,133	16,874	17,281	16,985	16,965	17,187	17,661
Quebec	246,138	260,412	268,071	257,317	256,606	272,713	258,668	266,307	267,644	267,895	268,870	271,378	268,935	277,035	288,071	298,060
Ontario	333,896	337,766	350,366	330,030	335,776	360,829	357,497	336,603	347,115	338,947	380,602	394,006	410,427	432,985	457,537	482,503
Manitoba	36,578	37,759	38,449	35,753	35,898	37,567	38,760	37,314	37,808	36,307	33,891	33,800	34,579	35,787	37,335	38,939
Saskatchewan	5,678	5,830	6,163	6,225	6,271	6,537	6,642	6,716	7,014	7,226	7,204	7,079	7,152	7,383	7,697	8,383
Alberta	18,080	19,642	20,536	20,326	20,567	24,127	28,037	28,063	29,190	29,181	28,271	29,319	29,394	29,644	31,763	32,118
Prairie Region	60,336	63,231	65,148	62,304	62,736	68,231	73,439	72,093	74,012	72,714	69,366	70,198	61,125	72,814	76,795	79,440
British Columbia ..	54,644	53,464	54,434	55,047	57,951	60,901	60,828	58,733	59,485	58,575	57,058	58,987	60,507	63,300	66,846	69,507
Canada	707,035	728,596	751,715	717,867	726,085	774,872	763,334	749,024	763,068	754,264	792,770	811,850	817,979	863,099	906,436	947,171

Source: 1951-1955: Statistics Canada, General Review of the Manufacturing Industries of Canada, Section 7: Manufacturing Industries in Urban Centres, Annuals, Ottawa: Dominion Bureau of Statistics, 1954-1958, Tables 16 and 17 (Cat. No. 31-201); 1956-1966: Statistics Canada, Manufacturing Industries of Canada, (Section G: Geographical Distribution), Annuals, Ottawa: Dominion Bureau of Statistics, 1958-1971, Tables 3, 11 (1956-1957), 5, 11 (1958-1961), 8, 9 (1962-1965) and 6, 8 (1966), (Cat. No. 31-209).

TABLE 5. Manufacturing Wages of Core Cities and Related Areas (Thousands of Dollars), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	5,162	5,639	5,888	6,170	5,778	6,212	7,250	7,675	7,890	7,843	7,051	7,002	7,316	7,480	7,688	9,990
Nova Scotia	12,516	15,398	16,149	16,732	17,195	18,379	18,717	18,588	18,203	13,595	19,771	21,273	20,786	22,932	22,457	23,533
New Brunswick	7,764	10,379	11,423	11,571	11,599	10,847	11,400	11,270	11,381	11,375	12,129	12,001	12,757	13,209	15,969	15,249
Atlantic Region	25,442	31,416	33,460	34,473	34,572	35,438	37,367	37,533	37,474	32,813	38,951	40,276	40,859	43,621	46,114	48,802
Quebec	481,811	532,854	584,827	582,232	572,885	627,882	658,857	638,712	677,996	694,349	654,179	683,556	693,088	725,287	768,521	838,350
Ontario	806,493	871,526	944,523	894,251	877,779	936,120	987,675	954,202	1,020,752	723,781	1,011,452	1,054,708	1,119,639	1,210,248	1,323,706	1,430,219
Manitoba	65,741	70,764	76,008	74,628	75,282	80,892	83,810	85,034	88,968	87,508	86,099	87,928	90,042	91,174	95,999	103,113
Saskatchewan	14,506	16,465	18,702	19,680	20,628	21,799	24,187	25,499	28,512	29,635	29,804	30,557	31,722	34,269	36,692	42,545
Alberta	47,158	54,950	62,100	64,112	64,747	73,103	84,407	85,919	94,471	96,508	95,881	104,594	105,022	114,738	127,084	144,236
Prairie Region	127,405	142,159	156,810	158,420	160,657	175,794	192,404	196,452	211,951	213,651	211,784	223,079	226,786	240,181	259,775	289,984
British Columbia ..	108,402	115,616	124,327	130,645	137,301	148,341	156,316	152,536	155,459	159,431	151,762	159,953	172,196	181,814	199,414	209,749
Canada	1,549,553	1,693,571	1,843,947	1,800,021	1,783,194	1,923,575	2,032,619	1,979,435	2,103,632	1,824,025	2,068,128	2,161,572	2,252,568	2,401,151	2,597,530	2,817,104
Core Cities and Related Areas																
Newfoundland	5,162	5,639	5,888	6,170	5,778	6,212	7,250	7,675	7,890	7,843	7,051	7,002	7,316	7,480	7,688	9,990
Nova Scotia	12,516	15,398	16,149	16,732	17,195	18,379	18,717	18,588	18,203	13,595	19,771	21,273	20,786	22,932	22,457	23,533
New Brunswick	7,764	10,379	11,423	11,571	11,599	10,847	11,400	11,270	11,381	11,375	12,129	12,001	12,757	13,209	15,969	15,249
Atlantic Region	25,442	31,416	33,460	34,473	34,572	35,438	37,367	37,533	37,474	32,813	38,951	40,276	40,859	43,621	46,114	48,802
Quebec	614,967	704,976	779,978	770,813	793,931	891,554	964,283	960,129	1,008,813	1,048,380	1,060,805	1,117,865	1,144,591	1,223,756	1,331,759	1,474,413
Ontario	944,088	1,033,550	1,126,050	1,091,860	1,160,137	1,314,614	1,358,233	1,373,315	1,464,671	1,472,092	1,695,936	1,812,698	1,964,577	2,169,122	2,405,317	2,680,867
Manitoba	89,238	97,613	107,011	101,376	106,439	117,477	124,195	126,051	136,051	133,476	128,783	132,581	138,410	146,406	158,172	174,236
Saskatchewan	14,506	16,465	18,702	19,680	20,628	21,799	24,187	25,499	28,512	29,635	29,804	30,557	31,722	34,269	36,692	42,545
Alberta	47,158	54,900	62,100	64,112	64,747	82,976	103,929	108,959	118,959	122,707	122,962	130,222	135,645	141,303	156,037	166,577
Prairie Region	150,902	168,978	187,813	185,168	191,814	222,252	232,311	260,661	283,483	285,818	281,549	293,360	305,777	321,978	350,901	383,358
British Columbia ..	156,517	164,344	177,058	185,976	202,428	223,767	236,802	241,724	253,321	260,460	256,045	276,776	296,049	321,207	358,618	394,123
Canada	1,891,916	2,103,264	2,304,359	2,268,290	2,383,882	2,687,625	2,848,796	2,883,944	3,059,936	3,122,259	3,355,626	3,566,125	3,778,725	4,107,597	4,520,640	5,015,831

Source: 1951-1955: Statistics Canada, General Review of the Manufacturing Industries of Canada, Section 7: Manufacturing Industries in Urban Centres, Annuals, Ottawa: Dominion Bureau of Statistics 1954-1958, Tables 16 and 17 (Cat. No. 31-201); 1956-1966: Statistics Canada, Manufacturing Industries of Canada, (Section G: Geographical Distribution) Annuals, Ottawa: Dominion Bureau of Statistics, 1958-1971, Tables 3, 11 (1956-1957), 5, 11 (1958-1961), 8, 9 (1962-1965) and 6, 8 (1966), (Cat. No. 31-209).

TABLE 6. Manufacturing Output(a) of Core Cities and Related Areas (Thousands of Dollars), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	11,680	11,741	12,662	13,726	12,816	13,209	14,435	15,915	16,818	16,738	15,286	16,326	17,659	17,019	18,377	23,836
Nova Scotia	23,041	30,025	30,954	31,349	32,327	31,845	34,464	33,500	32,670	29,566	33,726	35,983	37,351	41,959	41,905	42,897
New Brunswick	16,691	23,670	27,031	26,812	24,799	22,737	25,647	24,919	23,465	32,416	30,127	33,301	33,960	31,627	39,978	39,351
Atlantic Region	51,412	65,436	70,647	71,887	69,942	67,791	74,546	74,334	72,953	78,720	79,139	85,610	88,970	90,605	100,260	106,084
Quebec	871,774	973,481	1,035,967	1,008,816	1,017,867	1,103,307	1,143,272	1,156,737	1,195,435	1,208,438	1,189,773	1,262,840	1,275,286	1,363,877	1,437,567	1,554,161
Ontario	1,587,770	1,704,399	1,823,969	1,758,420	1,669,802	1,735,234	1,880,864	1,779,900	1,888,294	1,875,715	1,945,026	2,106,438	2,277,751	2,507,105	2,728,471	2,997,773
Manitoba	121,153	132,261	140,059	134,747	134,968	142,052	144,067	150,801	166,522	164,779	153,891	164,826	168,040	172,888	183,371	195,364
Saskatchewan	34,766	41,933	47,115	52,882	58,055	57,004	63,597	73,055	72,751	69,609	68,049	66,051	73,251	75,897	82,013	92,387
Alberta	85,108	105,366	117,531	119,523	129,687	142,066	165,649	173,052	193,467	192,796	192,116	209,128	207,044	235,787	270,032	311,009
Prairie Region	241,027	279,560	304,705	307,152	322,710	341,122	373,313	396,908	432,140	427,184	414,056	440,005	448,335	484,572	535,316	598,760
British Columbia ..	208,391	207,394	216,626	239,037	238,477	260,754	259,621	256,890	267,249	264,205	262,322	285,054	317,740	327,204	360,699	383,575
Canada	2,960,374	3,230,260	3,451,914	3,386,312	3,318,798	3,508,208	3,373,616	3,664,769	3,856,671	3,854,262	3,890,316	4,179,947	4,408,082	4,773,363	5,162,413	5,640,353
Core Cities and Related Areas																
Newfoundland	11,680	11,741	12,662	13,726	12,816	13,209	14,435	16,268	17,092	17,265	15,826	16,972	18,700	17,892	19,980	25,597
Nova Scotia	23,041	30,025	30,954	31,349	32,327	31,845	34,464	68,738	56,251	60,153	61,496	63,228	65,957	74,854	77,868	82,603
New Brunswick	16,691	23,670	27,031	26,812	24,799	22,737	25,647	37,378	36,692	50,073	64,119	64,045	62,843	70,911	74,495	80,912
Atlantic Region	51,412	65,436	70,647	71,887	69,942	67,791	74,546	122,384	110,041	127,491	141,441	144,245	147,500	163,637	172,343	189,112
Quebec	1,173,035	1,747,919	1,468,929	1,457,994	1,572,219	1,735,320	1,951,826	1,891,168	1,861,441	1,930,435	2,042,075	2,199,411	2,264,857	2,459,235	2,700,672	2,970,419
Ontario	1,879,882	2,036,692	2,194,241	2,098,781	2,280,938	2,507,367	2,638,995	2,580,490	2,772,073	2,778,478	3,416,352	3,779,494	4,087,757	4,600,336	5,116,458	5,732,245
Manitoba	167,505	184,663	197,709	193,895	202,290	212,545	221,025	234,873	260,282	249,473	245,559	262,912	277,987	293,774	313,420	343,082
Saskatchewan	34,766	41,933	47,115	52,882	58,055	57,004	63,597	73,055	72,751	69,609	68,049	66,051	73,251	75,897	82,008	92,387
Alberta	85,108	105,096	117,531	119,523	129,687	191,151	241,974	261,960	261,662	262,778	267,453	295,428	304,245	330,455	372,741	394,000
Prairie Region	287,379	331,692	362,355	366,300	390,032	460,700	526,596	569,888	594,695	581,860	581,061	624,391	655,483	700,126	768,169	830,369
British Columbia ..	319,455	311,063	340,614	360,113	392,196	428,459	433,183	454,697	466,630	467,425	465,911	524,408	576,555	615,227	684,042	766,013
Canada	3,711,163	4,92,802	4,36,786	3,55,075	705,327	1,99,637	525,056	618,577	804,880	885,689	6,646,840	7,271,954	7,732,152	8,538,581	9,441,684	10,488,158

Source: 1951-1955: Statistics Canada, General Review of the Manufacturing Industries of Canada, Section 7: Manufacturing Industries in Urban Centres, Annuals, Ottawa: Dominion Bureau of Statistics, 1954-1958, Tables 16 and 17 (Cat. No. 31-201); 1956-1966: Statistics Canada, Manufacturing Industries of Canada, (Section G: Geographical Distribution), Annuals, Ottawa: Dominion Bureau of Statistics, 1958-1971, Tables 3, 11 (1956-1957), 5, 11 (1958-1961), 8, 9 (1962-1965) and 6, 8 (1966), (Cat. No. 31-209).

TABLE 7. Manufacturing Wages Per Worker of Core Cities and Related Areas (Thousands of Dollars), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	1.78	2.02	2.23	2.43	2.59	2.67	2.79	2.92	3.00	3.06	3.05	3.19	3.37	3.51	3.56	4.05
Nova Scotia	2.24	2.40	2.55	2.69	2.75	2.84	2.97	3.08	3.32	3.19	3.68	3.68	3.80	4.03	4.12	4.41
New Brunswick	2.20	2.29	2.42	2.62	2.56	2.58	2.84	3.03	3.29	3.37	3.57	3.70	3.86	3.93	4.41	4.43
Atlantic Region	2.12	2.29	2.44	2.62	2.66	2.73	2.90	3.03	3.24	3.22	3.52	3.59	3.73	3.90	4.11	4.34
Quebec	2.42	2.62	2.79	2.88	2.96	3.16	3.30	3.38	3.59	3.73	3.70	3.90	4.04	4.18	4.37	4.67
Ontario	2.82	3.05	3.20	3.29	3.43	3.63	3.79	4.02	4.23	4.44	4.44	4.61	4.83	5.05	5.33	5.60
Manitoba	2.37	2.51	2.69	2.78	2.85	3.04	3.10	3.29	3.96	3.54	3.65	3.76	3.84	3.88	4.04	4.23
Saskatchewan	2.55	2.82	3.03	3.16	3.29	3.33	3.64	3.80	4.07	4.10	4.14	4.32	4.44	4.64	4.77	5.08
Alberta	2.61	2.80	3.02	3.15	3.15	3.35	3.57	3.72	3.93	4.03	4.16	4.32	4.42	4.55	4.70	5.03
Prairie Region	2.48	2.65	2.85	2.96	3.02	3.20	3.36	3.53	3.96	3.83	3.93	4.08	4.17	4.28	4.44	4.72
British Columbia ..	2.78	3.06	3.21	3.36	3.47	3.64	3.86	4.10	4.23	4.44	4.41	4.61	4.83	5.05	5.30	5.59
Canada	2.64	2.85	3.01	3.11	3.21	3.40	3.56	3.72	3.96	3.66	4.10	4.29	4.46	4.65	4.89	5.17
Core Cities and Related Areas																
Newfoundland	1.78	2.02	2.23	2.43	2.59	2.67	2.79	2.84	3.01	3.08	3.08	3.21	3.42	3.54	3.60	4.05
Nova Scotia	2.24	2.40	2.55	2.69	2.75	2.84	2.97	3.29	3.50	3.62	3.86	3.88	4.02	4.24	4.37	4.75
New Brunswick	2.20	2.29	2.42	2.62	2.56	2.58	2.84	3.10	3.32	3.38	3.57	3.87	4.14	4.41	4.48	4.91
Atlantic Region	2.12	2.29	2.44	2.62	2.66	2.73	2.90	3.15	3.35	3.44	3.63	3.79	3.99	4.21	4.33	4.70
Quebec	2.50	2.71	2.91	3.00	3.09	3.27	3.73	3.61	3.77	3.91	3.95	4.12	4.26	4.42	4.62	4.95
Ontario	2.83	3.06	3.21	3.31	3.46	3.64	3.80	4.08	4.22	4.34	4.46	4.60	4.79	5.01	5.26	5.56
Manitoba	2.44	2.59	2.78	2.84	2.97	3.13	3.20	3.38	3.60	3.68	3.80	3.92	4.00	4.09	4.24	4.47
Saskatchewan	2.55	2.82	3.03	3.16	3.29	3.33	3.64	3.80	4.07	4.10	4.14	4.32	4.44	4.64	4.77	5.08
Alberta	2.61	2.80	3.02	3.15	3.15	3.44	3.71	3.88	4.07	4.21	4.35	4.44	4.61	4.77	4.91	5.18
Prairie Region	2.50	2.67	2.88	2.97	3.06	3.26	3.44	3.62	3.83	3.93	4.06	4.18	5.00	4.42	4.57	4.83
British Columbia ..	2.86	3.07	3.25	3.38	3.49	3.67	3.89	4.12	4.26	4.45	4.49	4.69	4.89	5.07	5.36	5.67
Canada	2.68	2.89	3.07	3.16	3.28	3.47	3.73	3.85	4.01	4.14	4.23	4.39	4.62	4.76	4.99	5.30

Source: Calculations based on data in Tables 4 and 5.

TABLE 8. Manufacturing Productivity of Core Cities and Related Areas (Thousands of Dollars), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	4.03	4.21	4.80	5.41	5.75	5.68	5.56	6.06	6.40	6.53	6.61	7.44	8.14	7.99	8.52	9.67
Nova Scotia	4.12	4.69	4.88	5.04	5.16	4.92	5.48	5.55	5.95	6.93	6.28	6.22	6.83	7.38	7.69	8.04
New Brunswick	4.72	5.22	5.73	6.07	5.48	5.41	6.39	6.70	6.78	9.61	8.88	10.26	10.26	9.40	11.03	11.43
Atlantic Region	4.28	4.77	5.16	5.46	5.37	5.22	5.78	6.00	6.30	7.72	7.14	7.63	8.13	8.10	8.93	9.43
Quebec	4.38	4.79	4.93	4.99	5.27	5.55	5.72	6.12	6.33	6.49	6.73	7.21	7.44	7.87	8.17	8.67
Ontario	5.55	5.96	6.18	6.48	6.53	6.72	7.22	7.49	7.83	8.91	8.54	9.23	9.77	10.46	10.98	11.75
Manitoba	4.37	4.70	4.96	5.01	5.11	5.33	5.33	5.83	7.41	6.67	6.62	7.05	7.17	7.36	7.71	8.02
Saskatchewan	6.12	7.19	7.64	8.50	9.26	8.72	9.57	10.88	10.37	9.63	9.45	9.33	10.24	10.28	10.66	11.02
Alberta	4.71	5.36	5.72	5.88	6.31	6.51	7.01	7.50	8.05	8.06	8.33	8.63	8.71	9.35	9.99	10.84
Prairie Region	4.68	5.21	5.55	5.75	6.06	6.20	6.52	7.13	8.09	7.65	7.68	8.05	8.25	8.64	9.15	9.75
British Columbia ..	5.35	5.49	5.59	6.16	6.03	6.41	6.41	6.91	7.28	7.36	7.62	8.22	8.90	8.97	9.59	10.22
Canada	5.04	5.44	5.64	5.85	5.98	6.20	6.53	6.89	7.25	7.73	7.72	8.29	8.72	9.24	9.71	10.35
Core Cities and Related Areas																
Newfoundland	4.03	4.21	4.80	5.41	5.75	5.68	5.56	5.79	6.29	6.38	6.50	7.27	8.03	7.74	8.47	9.26
Nova Scotia	4.12	4.69	4.88	5.04	5.16	4.92	5.48	5.95	7.56	8.14	8.03	7.86	8.69	9.19	9.67	10.22
New Brunswick	4.72	5.22	5.73	6.07	5.48	5.41	6.39	7.79	7.88	8.29	9.45	9.28	8.90	10.90	11.00	11.87
Atlantic Region	4.28	4.77	5.16	5.46	5.37	5.22	5.78	8.01	7.43	7.90	8.38	8.35	8.68	9.65	10.03	10.71
Quebec	4.77	6.71	5.48	5.67	6.13	6.36	7.16	7.10	6.95	7.21	7.60	8.10	8.42	8.88	9.38	9.97
Ontario	5.63	6.03	6.26	6.36	6.79	6.95	7.38	7.67	7.99	8.17	8.98	9.59	9.96	10.62	11.18	11.88
Manitoba	4.58	4.89	5.14	5.42	5.64	5.66	5.70	6.29	6.88	6.87	7.25	7.78	8.04	8.21	8.39	8.81
Saskatchewan	6.12	7.19	7.64	8.50	9.26	8.72	9.57	10.88	10.37	9.63	9.45	9.33	10.24	10.28	10.65	11.02
Alberta	4.71	5.35	5.72	5.88	6.31	7.92	8.63	9.33	8.96	8.01	9.46	10.08	10.35	11.15	11.74	12.27
Prairie Region	4.76	5.25	5.56	5.88	6.22	6.75	7.17	7.90	8.04	8.00	8.38	8.89	10.72	9.62	10.00	10.45
British Columbia ..	5.85	5.82	6.26	6.54	6.77	7.04	7.12	7.74	7.89	7.98	8.17	8.74	9.53	9.72	10.23	11.02
Canada	5.25	6.17	5.90	6.07	6.48	6.71	7.24	7.50	7.61	7.80	8.38	8.96	9.45	9.89	10.42	11.07

Source: Calculations based on data in Tables 4 and 6.

TABLE 9. Manufacturing Wages Indexes of Core Cities and Related Areas (1951 = 100), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	100.0	113.48	125.28	136.51	145.50	150.00	156.74	164.04	168.53	171.91	171.34	179.21	189.32	197.19	200.00	227.52
Nova Scotia	100.0	107.14	113.83	120.08	122.76	126.78	132.58	137.50	148.21	142.41	164.28	164.28	169.64	179.91	183.92	196.87
New Brunswick	100.0	104.09	110.00	119.09	116.36	117.27	129.09	137.72	149.54	153.18	162.27	168.18	175.45	178.63	200.45	201.36
Atlantic Region	100.0	108.01	115.09	123.58	125.47	128.77	136.79	142.92	152.83	151.88	166.03	169.33	175.94	183.96	193.86	204.71
Quebec	100.0	108.26	115.28	119.00	122.31	130.57	136.36	139.66	148.34	154.13	152.89	161.15	166.94	172.72	180.57	192.97
Ontario	100.0	108.15	113.47	116.66	121.63	128.72	134.39	142.55	150.00	151.98	157.44	163.82	170.21	179.07	189.00	198.58
Manitoba	100.0	105.90	113.50	117.29	120.25	128.27	130.80	138.81	147.08	149.36	154.00	158.64	162.02	163.71	170.46	178.48
Saskatchewan	100.0	110.58	118.52	123.92	129.01	130.58	142.74	149.01	153.60	160.78	162.35	169.41	174.11	181.96	187.05	199.21
Alberta	100.0	107.27	115.70	120.68	120.68	128.35	136.78	142.52	150.27	154.40	159.38	165.51	169.34	174.32	180.07	192.72
Prairie Region	100.0	106.85	114.91	119.35	121.77	129.03	135.48	142.33	159.67	154.43	158.46	164.51	168.14	172.58	179.03	190.32
British Columbia ..	100.0	110.07	115.46	120.86	124.82	130.93	138.84	147.48	152.15	159.71	158.63	165.82	173.74	179.49	190.64	185.97
Canada	100.0	107.95	114.01	117.80	121.59	128.78	134.84	140.90	150.00	138.63	155.30	162.50	168.93	176.13	185.22	195.83
Core Cities and Related Areas																
Newfoundland	100.0	113.48	125.28	136.51	145.50	150.00	156.74	159.55	169.10	173.03	173.03	180.33	192.13	198.17	202.24	227.52
Nova Scotia	100.0	107.14	113.83	120.08	122.76	126.78	132.58	146.87	156.25	161.60	172.32	173.21	179.46	189.28	195.08	212.05
New Brunswick	100.0	104.09	110.00	119.09	116.36	117.27	129.09	140.90	150.90	153.63	162.27	175.90	188.18	200.45	203.63	223.18
Atlantic Region	100.0	108.01	115.09	123.58	125.47	128.77	136.79	148.58	158.01	162.26	171.22	178.77	188.20	198.58	204.24	221.69
Quebec	100.0	108.40	116.40	120.00	123.60	130.80	149.20	144.40	150.80	156.40	158.00	164.80	170.40	176.80	184.80	198.00
Ontario	100.0	108.12	113.42	116.96	122.26	128.62	134.27	144.16	149.11	159.35	157.59	162.54	169.25	177.03	185.86	196.46
Manitoba	100.0	106.14	113.93	116.39	121.72	128.22	131.14	138.52	147.54	150.81	155.73	160.65	163.93	167.62	173.77	183.19
Saskatchewan	100.0	110.58	118.82	123.92	129.01	130.58	142.74	149.01	159.60	160.78	162.35	169.41	174.11	181.96	187.05	199.21
Alberta	100.0	107.27	115.70	120.68	120.68	128.35	136.78	142.52	150.27	154.40	159.38	165.51	169.34	174.32	180.07	192.72
Prairie Region	100.0	106.80	115.20	118.80	122.40	130.40	137.60	144.80	153.20	157.20	162.40	167.20	200.00	176.80	182.80	193.20
British Columbia ..	100.0	107.34	113.63	118.18	122.02	128.32	136.01	144.05	148.95	155.59	156.99	163.98	170.97	177.27	187.41	198.25
Canada	100.0	107.83	114.55	117.91	122.38	129.47	139.17	143.65	149.62	154.47	157.83	163.80	172.38	177.61	186.19	197.76

Source: Calculations based on data in Table 7.

TABLE 10. Manufacturing Productivity Indexes of Core Cities and Related Areas (1951 = 100), by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	100.0	104.46	119.10	134.24	142.67	140.94	137.96	150.37	158.80	162.03	164.01	184.61	201.98	198.26	211.41	239.95
Nova Scotia	100.0	113.83	118.44	122.33	125.24	119.41	133.00	134.70	144.41	168.20	152.42	150.97	165.77	179.12	186.65	195.74
New Brunswick	100.0	110.59	121.39	128.60	116.10	114.61	135.38	141.94	143.64	203.60	188.13	217.37	217.37	199.15	233.68	242.16
Atlantic Region	100.0	111.44	120.56	127.57	125.46	121.96	135.04	140.18	147.19	180.37	166.82	178.27	189.95	189.25	208.64	220.32
Quebec	100.0	109.36	112.55	113.62	120.31	126.71	130.59	139.32	144.52	148.17	153.65	164.61	169.86	179.68	186.52	197.94
Ontario	100.0	107.38	111.35	116.75	117.65	121.08	130.09	134.95	141.08	160.54	153.87	166.30	176.03	188.46	197.83	211.71
Manitoba	100.0	107.55	113.50	114.64	116.93	121.96	121.96	133.40	169.56	152.63	151.48	161.32	164.07	168.42	176.43	183.52
Saskatchewan	100.0	117.48	124.83	138.88	151.30	142.48	156.37	177.77	169.44	157.35	154.41	152.45	167.32	167.97	174.18	180.06
Alberta	100.0	117.80	121.44	124.84	133.97	138.21	148.83	159.23	170.91	171.12	176.85	183.22	184.92	198.51	212.10	230.14
Prairie Region	100.0	111.32	118.58	122.86	129.48	132.47	139.31	152.35	172.86	163.46	164.10	172.00	176.28	184.61	195.51	208.33
British Columbia	100.0	102.61	104.48	115.14	112.71	119.81	119.81	129.15	136.07	137.57	142.42	159.64	166.35	167.66	179.25	191.02
Canada	100.0	107.93	111.90	116.07	118.65	123.01	129.56	146.70	143.84	153.37	153.17	164.48	173.01	183.33	192.65	205.35
Core Cities and Related Areas																
Newfoundland	100.0	104.46	119.10	134.24	142.67	140.94	137.96	143.67	156.07	158.31	161.29	180.39	199.25	192.05	210.17	229.77
Nova Scotia	100.0	113.83	118.44	122.33	125.24	119.41	133.00	217.23	183.49	197.57	194.90	190.77	210.92	223.05	234.70	248.05
New Brunswick	100.0	110.59	121.39	128.60	116.10	114.61	135.38	165.04	166.94	175.63	200.21	196.61	188.55	230.93	233.05	251.48
Atlantic Region	100.0	111.44	120.56	127.57	125.46	121.96	135.04	187.14	173.59	184.53	195.79	195.09	202.80	225.46	234.34	250.23
Quebec	100.0	140.67	114.88	118.86	128.51	133.33	150.10	148.84	145.70	151.15	159.32	169.81	176.51	186.16	196.64	209.01
Ontario	100.0	107.10	111.19	112.96	120.60	123.44	131.08	136.23	141.91	145.11	159.50	170.33	176.90	188.63	198.57	211.01
Manitoba	100.0	106.76	112.22	118.34	123.14	123.58	124.45	137.33	150.21	150.00	158.29	169.86	175.54	179.25	183.18	192.35
Saskatchewan	100.0	117.48	124.83	138.88	151.30	142.48	156.37	177.77	169.44	157.35	154.41	152.45	167.32	167.97	174.01	180.06
Alberta	100.0	113.58	121.44	124.84	133.97	168.15	183.22	198.08	190.23	191.29	200.84	214.01	219.74	236.73	249.25	260.50
Prairie Region	100.0	110.29	116.80	123.52	130.67	141.80	150.63	165.96	168.90	168.06	176.05	186.76	225.21	202.19	210.08	219.53
British Columbia	100.0	99.48	107.00	111.79	115.72	120.34	121.70	132.30	134.01	136.41	139.65	149.40	162.90	166.15	174.87	188.37
Canada	100.0	117.52	112.38	115.61	123.42	127.80	137.90	142.85	144.95	148.57	159.61	170.66	180.00	188.38	198.47	210.85

Source: Calculations based on data in Table 8.

TABLE 11. Manufacturing Efficiency Wages of Core Cities and Related Areas, by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	1.00	1.09	1.05	1.02	1.02	1.06	1.14	1.09	1.06	1.06	1.04	0.97	0.94	0.99	0.95	0.95
Nova Scotia	1.00	0.94	0.96	0.98	0.98	1.06	0.97	1.02	1.03	0.85	1.08	1.09	1.02	1.00	0.99	1.01
New Brunswick	1.00	0.94	0.91	0.93	1.00	1.02	0.95	0.97	1.04	0.75	0.86	0.77	0.81	0.90	0.86	0.83
Atlantic Region	1.00	0.97	0.95	0.97	1.00	1.06	1.01	1.02	1.06	0.84	1.00	0.95	0.93	0.97	0.93	0.93
Quebec	1.00	0.99	1.02	1.04	1.02	1.03	1.04	1.00	1.03	1.04	1.00	0.98	0.98	0.96	0.97	0.97
Ontario	1.00	1.01	1.02	1.00	1.03	1.06	1.03	1.06	1.06	0.76	1.02	0.99	0.97	0.95	0.96	0.94
Manitoba	1.00	0.98	1.00	1.02	1.03	1.05	1.07	1.04	0.99	0.98	1.02	0.98	0.99	0.97	0.97	0.97
Saskatchewan	1.00	0.94	0.95	0.89	0.85	0.92	0.91	0.84	0.94	1.02	1.05	1.11	1.04	1.08	1.07	1.11
Alberta	1.00	0.94	0.95	0.97	0.90	0.93	0.92	0.90	0.88	0.90	0.90	0.90	0.92	0.88	0.85	0.84
Prairie Region	1.00	0.96	0.97	0.97	0.94	0.97	0.97	0.93	0.92	0.94	0.97	0.96	0.95	0.93	0.92	0.91
British Columbia ..	1.00	1.07	1.11	1.05	1.11	1.09	1.16	1.14	1.12	1.16	1.11	1.08	1.04	1.07	1.06	0.97
Canada	1.00	1.00	1.02	1.01	1.02	1.05	1.04	1.03	1.04	0.90	1.01	0.99	0.98	0.96	—	0.95
Core Cities and Related Areas																
Newfoundland	1.00	1.09	1.05	1.02	1.02	1.06	1.14	1.11	1.08	1.09	1.07	1.00	0.96	1.04	0.96	0.99
Nova Scotia	1.00	0.94	0.96	0.98	0.98	1.06	1.00	0.68	0.85	0.82	0.88	0.91	0.85	0.85	0.83	0.85
New Brunswick	1.00	0.94	0.91	0.93	1.00	1.02	0.95	0.85	0.90	0.87	0.81	0.89	1.00	0.87	0.87	0.89
Atlantic Region	1.00	0.97	0.95	0.97	1.00	1.06	1.01	0.79	0.91	0.88	0.87	0.92	0.93	0.88	0.87	0.89
Quebec	1.00	0.77	1.01	1.01	0.96	0.98	0.99	0.97	1.04	1.03	0.99	0.97	0.97	0.95	0.94	0.95
Ontario	1.00	1.01	1.02	1.04	1.01	1.04	1.02	1.06	1.05	1.06	0.99	0.95	0.96	0.94	0.99	0.93
Manitoba	1.00	0.99	1.02	0.99	0.99	1.04	1.05	1.01	0.98	1.01	0.98	0.95	0.93	0.94	0.95	0.95
Saskatchewan	1.00	0.94	0.95	0.89	0.85	0.92	0.91	0.84	0.94	1.02	1.05	1.11	1.04	1.08	1.07	1.11
Alberta	1.00	0.94	0.95	0.97	0.90	0.78	0.78	0.75	0.82	0.84	0.83	0.79	0.80	0.77	0.75	0.76
Prairie Region	1.00	0.97	0.99	0.96	0.94	0.92	0.91	0.87	0.91	0.94	0.92	0.90	0.89	0.87	0.87	0.88
British Columbia ..	1.00	1.08	1.06	1.06	1.05	1.07	1.12	1.09	1.11	1.14	1.12	1.10	1.05	1.07	1.07	1.05
Canada	1.00	0.92	1.02	1.02	0.99	1.01	1.01	1.01	1.03	1.04	0.99	0.96	0.96	0.94	0.94	0.94

Source: Calculations based on data in Tables 9 and 10.

TABLE 12. Manufacturing Output Growth Rates(a) of Core Cities and Related Areas - Per Cent., by Provinces and Regions, Canada, 1951-1966

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	..	0.52	7.84	8.40	- 6.63	3.07	9.28	10.25	5.67	- 0.48	- 8.67	6.80	8.16	- 3.62	7.98	29.71
Nova Scotia	..	30.31	3.09	1.28	3.12	- 1.49	8.22	- 2.80	- 2.48	- 9.50	14.07	6.69	3.80	12.34	- 0.19	2.37
New Brunswick	..	41.81	14.20	- 0.81	- 7.51	- 8.31	12.80	- 2.84	- 5.83	38.15	- 7.06	10.54	1.98	- 6.87	26.40	- 1.57
Atlantic Region	..	27.28	7.96	1.76	- 2.71	- 3.08	9.96	- 0.28	- 1.86	7.91	0.53	8.18	3.92	1.84	10.66	5.81
Quebec	..	11.67	6.42	- 2.52	0.80	8.39	3.62	1.18	3.35	1.09	- 1.54	6.14	0.99	6.95	5.40	8.11
Ontario	..	7.35	7.02	- 3.59	- 5.04	3.92	8.39	- 5.37	6.09	- 0.67	3.70	8.30	8.13	10.07	8.83	9.87
Manitoba	..	9.17	5.90	3.79	0.16	5.25	1.42	4.67	10.42	5.00	- 6.61	7.11	1.95	2.89	6.06	6.54
Saskatchewan	..	20.61	12.36	12.24	9.78	- 1.81	11.57	14.87	- 0.42	- 4.32	- 2.24	- 2.94	10.90	3.61	8.06	12.65
Alberta	..	23.80	11.55	1.69	8.50	9.55	16.60	4.47	11.80	- 0.35	- 0.35	8.86	1.00	13.38	14.52	15.17
Prairie Region	..	15.99	8.99	0.80	5.07	5.71	9.44	6.32	9.03	- 1.28	- 3.07	6.27	1.89	8.08	0.49	11.83
British Columbia	..	- 0.48	4.45	10.35	- 0.23	9.34	- 0.43	- 1.05	4.03	- 1.14	- 0.71	8.67	11.47	2.98	10.24	6.34
Canada	..	9.12	6.86	- 1.90	- 1.99	5.71	6.37	- 1.79	5.24	- 0.06	0.94	7.44	5.46	8.29	8.15	9.26
Core Cities and Related Areas																
Newfoundland	..	0.52	7.84	8.40	- 6.63	3.07	9.28	12.70	5.07	1.01	- 8.33	7.24	10.18	- 4.32	11.67	28.11
Nova Scotia	..	30.31	3.09	1.28	3.12	- 1.49	8.22	99.45	- 18.17	6.94	2.23	2.82	4.32	13.49	4.03	6.08
New Brunswick	..	41.81	14.20	- 0.81	- 7.51	- 8.31	12.80	45.74	- 1.84	36.47	28.05	- 0.12	- 1.88	12.84	5.05	8.61
Atlantic Region	..	27.28	7.96	1.76	- 2.71	- 3.08	9.96	64.17	- 10.09	15.86	10.94	1.98	2.26	10.95	5.31	10.19
Quebec	..	49.01	15.96	- 0.74	7.83	10.37	6.71	2.12	- 1.57	3.71	5.78	7.70	2.98	8.58	9.82	9.99
Ontario	..	8.34	7.74	- 4.35	8.68	9.93	5.25	- 2.22	7.42	0.23	22.96	10.63	8.16	12.54	11.22	12.04
Manitoba	..	10.24	7.06	- 1.93	4.33	5.07	3.99	6.27	10.82	- 4.15	- 1.57	7.07	5.73	5.68	6.69	9.46
Saskatchewan	..	20.61	12.36	12.24	9.78	- 1.81	11.57	14.87	- 0.42	- 4.32	- 2.24	- 2.94	10.90	3.61	8.05	12.66
Alberta	..	23.80	11.55	1.69	8.50	47.39	26.59	8.26	- 0.11	0.04	1.78	10.46	2.98	8.61	12.80	5.70
Prairie Region	..	15.42	9.24	1.09	6.48	18.12	14.30	8.22	4.35	- 2.16	- 0.14	7.46	4.98	6.81	9.72	8.10
British Columbia	..	- 2.63	9.50	5.72	8.91	9.25	1.10	4.95	2.64	0.17	- 0.32	12.56	9.94	6.71	11.19	11.98
Canada	..	21.06	- 1.25	- 1.84	8.04	10.51	6.26	1.69	3.32	1.39	12.93	9.40	6.33	10.43	10.58	11.08

.. Not available.

(a) Annual percentage change.

Source: Calculations based on data in Table 6.

TABLE 13. Manufacturing Productivity Growth Rates(a) of Core Cities and Related Areas - Per Cent, by Provinces and Regions, Canada, 1951-1966

TABLE 13. Manufacturing Productivity Growth Rates (a) of Core Cities																
	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966
Core Cities																
Newfoundland	4.47	14.01	12.71	6.28	-1.22	-2.11	8.99	5.61	2.03	1.23	12.56	9.41	-1.84	6.63	13.50	
Nova Scotia	13.83	4.05	3.28	2.39	-4.65	11.38	1.28	7.21	16.47	-9.38	-0.96	9.81	8.05	4.20	4.55	
New Brunswick	10.59	9.77	5.93	-9.72	6.50	18.11	4.85	1.19	41.74	-7.60	15.54	0.00	-8.38	17.34	3.63	
Atlantic Region	11.45	8.18	5.81	-1.65	-2.79	10.73	3.81	5.00	22.54	-7.51	6.86	6.55	-0.37	10.25	5.60	
Quebec	9.36	2.92	1.22	5.61	5.31	3.06	6.99	3.43	2.53	3.70	7.13	3.19	5.78	3.81	6.12	
Ontario	7.39	3.69	4.85	0.77	2.91	7.44	3.74	4.54	13.79	-4.15	8.08	5.85	7.06	4.97	7.01	
Manitoba	7.55	5.53	1.01	2.00	4.31	0.00	9.38	27.10	-9.99	-0.75	6.50	1.70	2.65	4.76	4.02	
Saskatchewan	17.48	6.26	11.26	8.94	-5.83	9.75	13.69	-4.69	-7.14	-1.87	-1.27	9.75	0.39	3.70	3.38	
Alberta	13.80	6.72	2.80	7.31	3.17	7.68	6.99	7.33	0.12	3.35	3.60	0.93	7.35	6.84	8.51	
Prairie Region	11.32	6.53	3.60	5.39	2.31	5.16	9.36	13.46	-5.44	0.39	4.82	2.48	4.73	5.90	6.56	
British Columbia ..	2.62	1.82	10.20	-2.11	6.30	0.00	7.80	5.35	1.10	3.53	7.87	8.27	0.79	6.91	6.57	
Canada	7.94	3.68	3.72	2.22	3.68	5.32	5.51	5.22	6.62	-0.13	7.38	5.19	5.96	5.09	6.59	
Core Cities and Related Areas																
Newfoundland	4.47	14.01	12.71	6.28	-1.22	-2.11	4.14	8.64	1.43	1.88	11.85	10.45	-3.61	9.43	9.33	
Nova Scotia	13.83	4.05	3.28	2.38	-4.65	11.38	63.32	-15.53	7.67	-1.35	-2.12	10.56	5.75	5.22	5.69	
New Brunswick	10.59	9.77	5.93	-9.72	6.50	18.11	21.91	1.16	5.20	13.99	-1.80	-4.09	22.47	0.92	7.91	
Atlantic Region	11.45	8.18	5.81	-1.65	-2.79	10.73	38.58	7.24	6.33	6.08	-0.36	3.95	11.18	3.94	6.78	
Quebec	40.67	18.33	3.47	8.11	3.75	12.58	-0.84	2.11	3.74	5.41	6.58	3.95	5.46	5.63	6.29	
Ontario	7.10	3.81	1.60	6.76	2.36	6.19	3.93	4.17	2.25	9.91	6.79	3.86	6.63	5.27	6.26	
Manitoba	6.77	5.11	5.45	4.06	0.35	0.71	10.35	9.38	-0.15	5.53	7.31	3.34	2.11	2.19	5.01	
Saskatchewan	17.48	6.26	11.26	8.94	-5.83	9.75	13.69	-4.69	-7.14	-1.87	-1.27	9.75	0.39	3.60	3.47	
Saskatchewan	13.59	6.92	2.80	7.31	25.52	8.96	8.11	-3.97	0.56	4.99	6.55	2.68	7.73	5.29	4.51	
Alberta	10.29	5.90	5.76	5.78	8.52	6.22	10.18	1.77	0.50	4.75	6.06	20.58	-10.26	3.95	4.50	
Prairie Region	-0.51	7.56	4.47	3.52	3.99	1.14	8.71	1.29	1.79	2.38	6.88	9.04	1.99	5.25	7.72	
British Columbia ..	17.52	-4.38	2.88	6.75	3.55	7.90	3.59	1.47	2.50	7.44	6.92	5.47	4.06	5.36	6.24	
Canada																

.. No available.

(a) Annual percentage change.

Source: Calculations based on data in Table 8.

TABLE 14. Population of Rest-of-Provinces (No. of Persons), by Provinces and Regions, Canada, Selected Years, 1951-1966

	1951	1956	1961	1966
Newfoundland	292,796	335,921	366,199	375,863
Prince Edward Island	91,882	92,043	96,018	98,493
Nova Scotia	508,653	530,517	553,061	546,138
New Brunswick	437,360	468,601	502,373	512,593
Atlantic Region	1,330,691	1,427,082	1,517,651	1,533,087
Quebec	2,231,529	2,480,786	2,685,571	2,639,991
Ontario	2,262,321	2,518,010	2,794,044	2,578,295
Manitoba	419,728	437,792	445,143	454,307
Saskatchewan	707,141	718,052	717,441	707,012
Alberta	620,504	667,294	715,314	707,258
Prairie Region	1,747,373	1,823,138	1,877,898	1,868,577
British Columbia	490,043	599,618	684,765	765,321
Yukon Territory	6,502	9,620	9,597	9,611
Northwest Territories	13,280	16,213	19,753	24,997
Canada	8,081,739	8,874,467	9,589,279	9,419,879

Source: Calculations based on data in Tables 1 and 2.

TABLE 15. Manufacturing Employment, Wages and Output(a) of Rest-of-Provinces, by Provinces and Regions Canada, Selected Years, 1951-1966

	Employment (Number)				Wages (\$'000)				Output (\$'000)			
	1951	1956	1961	1966	1951	1956	1961	1966	1951	1956	1961	1966
Newfoundland	6,724	8,176	7,461	8,721	17,519	24,251	28,465	39,500	42,010	49,399	54,184	73,510
Nova Scotia	24,923	24,466	19,146	24,450	51,460	65,570	59,385	101,218	96,446	127,975	97,722	172,882
New Brunswick	20,971	18,359	15,659	18,934	45,783	50,216	49,640	76,919	103,904	102,577	45,860	139,100
Atlantic Region	52,618	51,001	42,266	52,105	114,762	140,037	137,490	217,637	242,360	279,951	197,766	385,492
Quebec	171,044	173,424	154,859	218,094	390,635	504,861	565,767	1,069,126	910,889	1,152,829	1,165,781	1,978,522
Ontario	260,537	280,361	210,813	337,884	725,299	996,020	901,472	1,890,817	1,689,518	2,361,203	2,013,501	3,477,323
Manitoba	4,881	5,254	7,321	9,584	10,933	16,029	28,519	45,815	25,344	57,473	69,676	73,802
Saskatchewan	5,345	4,999	4,945	7,306	11,784	14,884	19,144	35,402	26,323	56,624	52,923	69,076
Alberta	11,025	12,665	9,650	15,493	21,978	37,219	34,386	76,411	56,442	94,680	79,279	155,970
Prairie Region	21,251	22,918	21,916	32,383	44,695	68,132	82,049	157,628	108,209	208,777	201,878	298,848
British Columbia ..	39,003	47,694	40,460	55,084	106,109	170,102	184,153	336,890	272,993	395,790	397,532	615,162
Canada	544,453	575,398	470,314	695,530	1,381,500	1,879,152	1,870,931	3,672,098	3,223,969	4,398,550	3,976,458	6,735,347

(a) Value added.
Source: Statistics Canada, General Review of the Manufacturing Industries of Canada, 1951. Ottawa: Dominion Bureau of Statistics, 1954, Table 2, pp. 11-12 and data in Tables 4-6; Manufacturing Industries of Canada, Section G, Geographical Distribution, 1966, Ottawa: Dominion Bureau of Statistics, 1971, Table 2, pp. 6-8 and data in Tables 4-6.

TABLE 16. Manufacturing Wages per Worker and Productivity of Rest-of-Provinces
(Thousands of Dollars), by Provinces and Regions, Canada, Selected Years, 1951-1966

	Wages per worker				Productivity			
	1951	1956	1961	1966	1951	1956	1961	1966
Newfoundland	2.61	2.97	9.82	4.53	6.25	6.04	7.26	8.43
Nova Scotia	2.06	2.68	3.10	4.14	3.87	5.23	5.10	7.07
New Brunswick	2.18	2.74	3.17	4.06	4.95	5.59	2.93	7.35
Atlantic Region	2.18	2.75	3.25	4.18	4.61	5.49	4.68	7.40
Quebec	2.28	2.91	3.65	4.90	5.33	6.65	7.53	9.07
Ontario	2.78	3.55	4.28	5.60	6.48	8.42	9.55	10.29
Manitoba	2.24	3.05	3.90	4.78	5.19	10.94	9.52	7.70
Saskatchewan	2.20	2.98	3.87	4.85	4.92	11.33	10.70	9.45
Alberta	1.99	2.94	3.56	4.93	5.13	7.48	8.22	10.07
Prairie Region	2.10	2.97	3.74	4.87	5.09	9.11	9.21	9.23
British Columbia	2.72	3.57	4.55	6.12	7.00	8.30	9.83	11.17
Canada	2.54	3.27	3.98	5.28	5.92	7.64	8.45	9.71

Source: Calculations based on data in Table 15.

APPENDIX B

SOURCES, DEFINITIONS AND QUALITY OF DATA

Statistics Canada was consulted with respect to the provision of data covering population and output, employment and earnings in manufacturing in Canada's largest cities and their related areas in the census years of 1951-1966, inclusive. All data were generally available.)

The basic data relating to core cities, core cities and related areas, rest-of-provinces and provinces in Canada covered: (1) population and (2) value added, total employees and total salaries and wages in manufacturing.

Census of Manufactures

The Census of Manufactures is an annual survey covering Canada's manufacturing industries. The survey instituted in 1971 comprises about 20,000 manufacturing establishments at the present time.

The reporting unit for the Census of Manufactures is designated as the establishment and a return is requested from every establishment classified to a manufacturing industry.

A manufacturing establishment is typically a factory, mill or plant principally engaged in manufacturing activities. The majority of such establishments are firms but many firms have more than one establishment. Such firms are requested to submit a separate Census of Manufactures report for each manufacturing establishment which can meet the reporting requirements contained in the following definition of the establishment: "The smallest unit which is a separate operating entity capable of reporting the following principal statistics: (1) materials and supplies used, (2) goods purchased for resale as such, (3) fuel and power consumed, (4) number of employees and salaries and

wages, (5) man-hours worked and paid, (6) inventories, and (7) shipments or sales."

There are four different questionnaires used in the Census of Manufactures. They are: (1) short form, (2) long form, (3) head office questionnaire and (4) commodity questionnaire. The short and long forms are used to obtain principal statistics and commodities shipped from establishments classified to manufacturing industries and differ only in the amount of detail requested. The short form is a single-sheet questionnaire sent to small manufacturers generally reporting shipments of less than \$100,000. The head office questionnaire is generally used for company head offices and/or auxiliary offices separately located from the manufacturing establishment. The Commodity questionnaire is used to survey certain establishments which are coded on the basis of their principal activity to industries other than manufacturing but which undertake some manufacturing as a subsidiary activity. This single-sheet questionnaire is designed to collect information on the quantity and value of goods of own manufacture shipped by such establishments in order to achieve full coverage of specified domestically manufactured commodities.

The results of the Census of Manufactures are presented in some 135 publications. In addition to these annual publications, there are annual summary reports for Canada and the provinces and special reports giving principal statistics by detailed geographic areas, by type of ownership and size of establishment.

Definitions

Population is defined as the total number of persons whose usual place of residence was somewhere in Canada and Canadian Government employees stationed

abroad and their families and crews of merchant vessels.

The definition of population excludes government representatives of other countries and their families attached to legations, embassies or other diplomatic bodies of that country, members of the Armed Forces of other countries stationed in Canada and members of their families who are not citizens of Canada, students attending school in Canada whose usual residence is outside Canada and residents of any country visiting in Canada temporarily.

Aggregate output in a sector refers to the aggregate income generated in that sector which is measured as value added. Value added by manufacture is calculated by subtracting the cost of fuel and electricity and the cost of materials from the gross value of manufacturing production.

Total employees in manufacturing comprise production and related workers engaged in manufacturing and non-manufacturing activity, administrative and office employees, sales and distribution workers and employees at head offices and auxiliary offices located elsewhere. Production and related workers in manufacturing activity refer to employees engaged in production and assembling activities, as well as persons employed in storing, inspecting, handling, packing, warehousing. They also include employees engaged in maintenance, repair, janitorial and watchman services and working foremen engaged in similar work to that of the employees they supervise. Production and related workers in non-manufacturing activities include employees on manufacturing establishments' payrolls engaged in activities such as construction undertaken for the use of these establishments, some outside piece-workers employed in certain industries, logging employees who are reported as part of a sawmilling establishment and any other production workers who are not engaged in manufacturing-type

operations. Administrative and office employees include all executive and supervisory officials such as presidents, vice-presidents, comptrollers, secretaries, treasurers, and so on together with managers, professional, technical and research employees, superintendents and factory supervisors above the line supervisor or working foreman level and clerical staffs. Also included are employees in activities such as advertising, credit collections, purchasing, personnel, legal, medical and employees located at head offices or auxiliary offices separately located from the establishment; the latter are generally included in the figures for the province in which they are located. Sales and distribution workers include office personnel whose salaries are charged to selling expense, travelling salesmen, driver salesmen, truckdrivers and their helpers. Some sales employees who are reported as part of a manufacturing establishment but are not working at the establishment's location may also be included. These are generally broken down by province in cases where more than 15 employees are involved in any one province. The figures exclude persons working on a commission basis who are not considered regular employees of the establishment.

Salaries and wages in manufacturing refer to gross earnings of employees before deductions for income taxes and employees' contributions to social services such as sickness, accident and unemployment insurance and pensions.

They include all salaries, wages, bonuses, profits shared with employees, the value of room and board where provided, commissions paid to regular employees, other allowances that may be considered as part of a worker's earnings and over-time payments.

Quality of Data

Data covering population and manufacturing activity of core cities, core cities and surrounding areas and Canada were compiled from publications

of Statistics Canada. Population data were compiled from their Estimated Population of Canada by Province, Population by Census Metropolitan Areas, Population: Incorporated Cities, Towns and Villages and Population: Historical. Data on employment, output and earnings in manufacturing were compiled from the annual publications for the Manufacturing Industries of Canada. Since the data were compiled by Statistics Canada, they are of high quality.

APPENDIX C

PROPOSALS FOR FURTHER RESEARCH

- The analysis of more recent regional economic development in Canada in terms of the Myrdal-Kaldor thesis of cumulative causation suggests some areas where further research could be particularly illuminating. Possible inquiries include:

1. Development of a comprehensive regional classification system for Canada embodying all urban centres of industrial expansion and their surrounding areas of influence.
2. Development of a comprehensive data base in terms of the new regional classification of Canada.
3. Expansion of the test of Richardson's model based on the Myrdal-Kaldor thesis to include all urban centres of manufacturing activity in Canada.
4. Expansion of the time-frame to input, as far as possible, longer data runs for manufacturing.
5. Evaluation of the weaker hypothesis of a wider regional dispersion in productivity increases than the regional dispersion in money wage increases to more recent regional economic development in Canada.
6. With respect to the differential success of the model on different regions of Canada, Professor Richardson, questioning whether Canada's industrial composition might not conceal some of the effects, recommends the inclusion in a programme of further research a project to separate out the "differential" effects from the "proportional" effects and to determine whether the model can explain that part of regional growth that cannot be explained in terms of industrial composition.

Items 1-2 requiring the active participation of governments are long-term projects. Items 3-6 requiring primarily research and analysis can be undertaken as academic research projects.

APPENDIX D

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