



# INTERREGIONAL DISPARITIES IN INCOME

by

S. E. Chernick

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S. E. Chernick

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## I. INTRODUCTION

## Scope of the Study

Since the end of the Second World War, the problem of regional development has become much more obtrusive in many of the advanced industrial countries. Although rapid gains in economic activity and living standards have been recorded at the national level in these countries, these gains have been accompanied by significant disparities in regional growth and levels of income. A related phenomenon, but of much longer historical standing, has been the pervasive tendency for economic activity and population to concentrate in urban centres or relatively small geographic areas. This paradox of a high rate of national economic growth combined with wide differences in regional participation has led to the implementation of policies seeking to redress the imbalance. The assumption that appears to underlie these policies is that the various regions of a country should be expected to share in the growth in total output and income of the nation as a whole.

While the problem of interregional disparities in income levels is not unique to Canada, it has always been a particularly difficult issue in this country.<sup>1</sup> Why this should be so is clearly revealed by the various maps of Canada which describe its characteristics. In spite of the vastness of the country and its great diversity of widely scattered resources, population has concentrated in particular areas, separated by large and sparsely settled spaces. The narrow, disjointed pattern of population settlement, combined with difficult physical and geographical barriers, has increased the costs of the interregional movement of goods and people. Moreover, the history of our population settlement has been marked by the arrival at successive stages of people of diverse cultures and traditions; this has also contributed to significant regional differences. Finally, the federal form of political organization has sanctioned the development of strong regional authorities, each with a primary concern for supporting local and regional interests. In few countries are the forces producing regional differentiation so powerful, and the requirements for an appropriate regional development policy so complex.

At the risk of oversimplification, it might be said that there are essentially two ways of approaching the problem of regional development within a country. The first is from the viewpoint of the region itself, however this may be defined. From this perspective, the objective is to maximize the rate of growth of output and productivity for the benefit of its residents and without regard for the impact of its development on that of other regions. The second approach is from the viewpoint of the economy as a whole. Here, the problem is to secure an appropriate

<sup>&</sup>lt;sup>1</sup> It is examined in various studies among which may be mentioned such semi-official documents as: W.A. Mackintosh, *The Economic Background of Dominion-Provincial Relations*, Royal Commission on Dominion-Provincial Relations, Ottawa, 1939 (now reprinted as No. 13 in the Carleton Library series, McCleland and Stewart Ltd., Toronto, 1964); and R.D. Howland, *Some Regional Aspects of Canada's Economic Development*, Royal Commission on Canada's Economic Prospects, Ottawa, 1957.

balance in economic development among the various regions which, at the same time, is consistent with the economic objectives of the country as a whole. The second of these alternatives is employed in this analysis. In broad terms, therefore, the purpose of this study is to explore some of the complex relationships between the functioning of the economy as a whole and its various geographical parts. The flow of personal income and its components in the various regions are employed to measure these relationships and to indicate the extent to which the regions participate in the level and growth of national economic activity.<sup>1</sup>

In more specific terms, the study defines the nature and magnitude of disparity in the interregional structure of income and its components, and evaluates the changes that have taken place since the mid-twenties. This central theme is reinforced by brief explorations into a number of related issues. These include a description and preliminary assessment of interregional price differences, a discussion of income disparities at the subregional level, a comparison of the Canadian experience with other countries, and an examination of interregional variations in population and income growth.

From the outset, it is important to note that the subsequent analysis is made exclusively in terms of disparities as measured by differences in money incomes defined in terms of national accounts concepts. No attempt is made to discuss those intangible factors which, it is recognized, may represent important additional elements differentiating one region from another. The objective of the study is thus rather modest. It is limited to a definition of the magnitude and characteristics of the regional problem in Canada as revealed in the interregional structure of income. In this way, it sets the stage for three companion studies,<sup>2</sup> in which some of the principal factors affecting interregional disparities in income are examined. The ultimate objective of these regional studies is to lay bare the important issues and delineate the criteria upon which to base a national policy fostering the balanced development of all areas.

#### Economic Regions in Canada

A question of fundamental importance for the analysis is the meaning to be attached to the term "region". The concept of an economic region is not readily defined in unequivocal terms. This is borne out by the extensive and essentially inconclusive literature on the appropriate definition of an economic region, as well as by the wide variations in practice among countries that designate regions for the implementation of policies.<sup>3</sup>

<sup>&</sup>lt;sup>1</sup> The conceptual framework within which this and related regional studies fit is set out in Economic Council of Canada, Second Annual Review: Towards Sustained and Balanced Economic Growth, Ottawa, 1965, Chapter 5.

<sup>&</sup>lt;sup>2</sup> Isabe! B. Anderson, Internal Migration in Canada, 1921 - 1961, Staff Study No. 13, Economic Council of Canada, Queen's Printer, Ottawa, 1966; Frank T. Denton, An Analysis of Interregional Differences in Manpower Utilization and Earnings, Staff Study No. 15, Economic Council of Canada, Queen's Printer, Ottawa, 1966; T.K. Shoyama, Interregional Disparities in Public Services, Staff Study No. 16, Economic Council of Canada, Queen's Printer, Ottawa, 1966.

<sup>&</sup>lt;sup>3</sup> See, for example, Morris B. Ullman and Robert C. Klove, "The Geographic Area in Regional Economic Research" in *Regional Income*, Studies in Income and Wealth, Volume Twenty-one, National Bureau of Economic Research, Princeton, 1957, pp. 87-109.

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.

Once the purpose of the analysis is established, the central task in defining a region is to delineate a geographic area that displays a relatively high degree of homogeneity and internal interdependence in respect of one or more attributes that are considered important and which thereby differentiates it from other regions. In other words, the similarities within a region should outweigh the differences, and the degree of interdependence among economic units should outweigh conflicts of economic interest. Among the many attributes commonly employed in delineating regions are physical features, resources, structure of economic activity, market size and structure, past and potential economic performance, administrative jurisdiction, and even social and cultural features. Indeed some studies have employed as many as eighty-eight different attributes in the delineation of economic regions.<sup>1</sup> Moreover, because the value of one or more characteristics of the region changes over time, their boundaries may also have to be altered if they are to remain appropriate over a long span of years.

Whatever the ideal that one might seek in defining the economic regions of a country, however, there are two considerations that effectively limit the practical freedom of choice for the analytical purposes of this study. One is the political-administrative structure of the country. The other is the geographical unit or area employed in statistical compilations.

The boundaries of Canada's ten provinces and four territories are derived largely from historical and political considerations, though they are not without some broad geographic and economic differentiation. Most basic regional statistics currently available in Canada are compiled on a provincial basis. However, for certain statistical purposes, some of the contiguous provinces have been grouped together, and the result is six major regions, reflecting a different degree of homogeneity in respect of physical features and structure of economic activity. These regions are the Atlantic Region (the Maritimes plus Newfoundland), Quebec, Ontario, the Prairie Region, British Columbia and the North. At still another level, economic regions within the provinces may usefully be distinguished. Indeed for analytical and policy purposes, a number of provinces have designated subregions within their boundaries,<sup>2</sup> as have numerous federal agencies. Clearly, the subregions represent areas with a narrower base, both in terms of administration and economic activity.<sup>3</sup>

As for the geographic unit employed in statistical compilations, the census provides a vast amount of information for relatively small areas. The data, however,

3

<sup>&</sup>lt;sup>1</sup>See D.M. Ray and B.J.L. Berry, "Multivariate Socio-Economic Regionalization: A Pilot Study in Central Canada" in *Regional Statistical Studies*, University of Toronto Press, Toronto, 1965.

<sup>&</sup>lt;sup>2</sup> The most recent was that undertaken in Quebec. On January 19, 1966, that province designated ten economic regions, 25 subregions and seven regional capitals.

<sup>&</sup>lt;sup>3</sup> A system of 68 regions for Canada is developed in P. Camu, E.P. Weeks and Z.W. Sametz, *Economic Geography of Canada*, Macmillan of Canada, Toronto, 1964.

are only available for ten- or five-year intervals and in many respects fail to meet the requirements for regional analysis. Furthermore, much of the relevant data from the census and other sources are available only for provinces, and in some instances only for the major regions of Canada.

Bearing in mind the objectives of our regional analysis, in addition to the political-administrative structure of the country and the availability of statistical information, it would seem appropriate for our purposes to define the regions of Canada as given by the provincial boundaries. It is then the relationship between economic growth of the nation as a whole and the degree of provincial participation that will concern us in the subsequent discussion. But because of certain statistical deficiencies, it will be necessary to limit the discussion to the five major regions of Canada. The Yukon and Northwest Territories are excluded from the discussion;<sup>1</sup> the North embraces a vast and sparsely settled region, and its special economic and physical characteristics suggest that a separate study of the area would be desirable.

<sup>&</sup>lt;sup>1</sup> For some of the historical series published by the Dominion Bureau of Statistics, the North has been included with British Columbia. For purposes of comparability, this practice has been maintained even for more recent years when data for the North have been shown separately.

## **II. INTERREGIONAL DISTRIBUTION OF INCOME**

The first major task is to describe the interregional differences in income and measure the degree of regional participation in the level and growth of national economic activity. For this purpose, the basic source of information is the estimated flow of personal income in each of the regions.<sup>1</sup> Personal income is the best available measure of economic activity at the provincial level. It represents the final result of economic activity in the form of income received by residents of a region, whether it takes place entirely within the region or outside it. Personal income divided by the population in the region is then an approximate indicator of the level of economic welfare,<sup>2</sup> and, with some modification in both the numerator and denominator, this relationship can also be adjusted to serve as a rough index of regional productivity. Thus the smaller is the divergence in the level or rate of growth of personal income per capita in the various regions relative to that of the national average, the more uniform is the degree of regional participation in national economic activity.<sup>3</sup> At the limit, unrealistic as it may be, equal regional per capita income levels and rates of growth, would represent a state of perfect uniformity in participation among the regions.

The assumption underlying the discussion above is that the average or national rate of growth of income is given independently of its interregional distribution. It may well be, however, that the growth rate recorded at the national level is itself related to the nature of the interregional distribution. Indeed the exact nature of this relationship is a subject of some controversy. To some extent, the difference in viewpoint among economists hinges upon their appraisal of the degree of effectiveness in the organization and functioning of competitive market forces. Among the possible relationships is one in which an increased degree of regional participation is obtained with a slower rate of national economic growth or lower average level of income for the country as a whole. If this were the case, government policies aimed at increasing regional participation would have to

<sup>&</sup>lt;sup>1</sup> Personal income by major component and geographic distribution is obtained from the national accounts and covers the period since 1926. Its major components are: wages, salaries and supplementary labour income; military pay and allowances; net income of farm operators from farm production; net income of nonfarm unincorporated business; interest, dividends and net rental income of persons; and transfer payments. Thus, certain major income flows associated with corporate enterprise and government are excluded. At the national level, the personal income series represents a fairly good estimator of movements in Gross National Product.

<sup>&</sup>lt;sup>2</sup>In some respects, personal income related to the family unit is a superior measure of the level of economic welfare.

<sup>&</sup>lt;sup>3</sup> Regional participation, it will be noted, is defined in relative terms. This is clearly the appropriate focus for the present study which seeks to evaluate the relationship between regional and national economic growth. It is recognized, however, that the absolute deviations in regional incomes from the national average can be of interest and, in fact, are sometimes employed as "evidence" in fiscal negotiations. The difficulty is that changes over time and space in the absolute deviations of regional income (even after allowing for variations in prices) cannot easily be interpreted. See, for example, E.J.R. Booth, "Interregional Income Differences" Southern Economic Journal, Vol. 31, July 1964, pp. 44-51.

reckon with the possibility that a "cost" in the form of a reduced rate of national growth is involved in achieving the objective.

To measure the degree of regional participation and its changes over time, an index of relative dispersion is used. The index evaluates the interregional structure of personal income per capita by taking account of the position of each and every region in relation to the national average. The value of the index for any given year, therefore, indicates the extent to which personal income per capita in the various regions cluster around the national average. The higher the index, the greater is the dispersion or spread around the average and the lower is the degree of regional participation in national economic activity. The opposite would apply to a lower value of the index.

There are a number of alternative methods of calculation, all of which yield a measure of dispersion. In the following discussion, the coefficient of variation<sup>1</sup> is used as the index of relative dispersion. There are a number of distinct advantages to the index of dispersion calculated in this way. For one, its value is independent of the absolute size of the units in which the variates are measured so that comparisons over time and among countries can be made more easily. In addition, it provides more scope than other measures for formal statistical analysis where this is desirable.<sup>2</sup>

Personal income is an aggregate embracing a number of component elements. Some of the components, such as transfer payments, do not arise as a result of economic activity in the region. Similarly, the total population of a region covers those employed in productive activity, the unemployed, the young and the aged. In a subsequent section, therefore, it will be necessary to distinguish among the various components of income and population and qualify the notion of regional participation where appropriate.

#### Income Levels and Growth

The comparative level of personal income per capita among the ten provinces is presented in Table 1. The data are shown for four years beginning in 1927<sup>3</sup> and are intended to demarcate some salient periods in Canada's recent history. A number of features of the interprovincial structure of incomes may be noted. The first is the significant percentage difference in income levels between the highest and lowest provinces. While there was some variation over the years shown, the range has been of the order of 100 per cent. Second, the rank ordering of provinces by income level has changed very little over the whole period. Ontario has come to

<sup>&</sup>lt;sup>1</sup> The coefficient of variation is defined as the standard deviation of the distribution divided by the arithmetic mean. The standard deviation is the square root of the mean of the squared deviation of each of the observations from their mean. Later in the discussion a weighted coefficient of variation is used whereby the squared deviations of each of the observations from their mean is weighted by their frequencies (which for our purposes are the regional population shares).

<sup>&</sup>lt;sup>2</sup> Among the disadvantages, it may be noted that the coefficient is not meaningful when the observations have negative values.

<sup>&</sup>lt;sup>3</sup> Actually, the years shown represent averages of three years. The object of this procedure is to reduce the effect upon the income comparisons of unusual economic events occurring in a single year. Throughout this study, the three-year average is indicated by a bar above the centre year, e.g., 1927 is the average of 1926, 1927 and 1928.

TABLE 1

LEVEL AND GROWTH OF PERSONAL INCOME PER CAPITA BY PROVINCE

		Le	vel				Growth		
Province		(Current	dollars)			(Average an	nnual percent	age change)	
	1927	1939	1947	1963	1927-39	1939-47	1947-63	1927-47	1927-63
Ontario	509	491	981	2,025	-0.3	9.0	4.6	3.3	3.9
British Columbia	535	490	980	1,966	-0.7	9.1	4.4	3.1	3.7
Alberta	509	357	923	1,750	-2.9	12.6	4.1	3.0	3.5
Saskatchewan	449	272	818	1,749	-4.1	14.8	4.9	3.0	3.8
Manitoba	455	357	875	1,721	-2.0	11.9	4.3	3 .3	3.8
Quebec	378	344	209	1,521	-0.8	9.5	4.9	3.2	3.9
Nova Scotia	299	303	676	1,302	+0.1	10.6	4.2	4.2	4.2
New Brunswick	277	256	609	1,167	-0.7	11.4	4.1	4.0	4.1
Prince Edward Island	248	205	477	1,115	-1.6	11.1	5.4	3.3	4
Newfoundland	•••••			1,009	*****		(5.3)		
Average for Provinces	407	342	783	1,532	-1.4	10.9	4.5	3.3	3.9

the Yukon and Northwest Territories which account for 1.5 per cent and 2.4 per cent of income and population respectively in 1963. NOTE: Provinces are ranked in order of level of personal income per capita in 1963, and the data are for three-year averages centred Newfoundland is for the period 1950-63 and is not included in the provincial average. The data for British Columbia include on the year shown. Throughout this study they are indicated by a bar above the centre year. The income growth rate for

SOURCE: Based on data from Dominion Bureau of Statistics.

replace British Columbia as the highest-income province, while Saskatchewan and Manitoba have traded positions in the middle of the ranking. Throughout the period Quebec has remained near the mid-point of the ranking while the provinces of the Atlantic region have consistently been at the lower end of the distribution. Third, the effect of the severe depression of the 1930's is clearly revealed. With the exception of Nova Scotia, provincial incomes in 1939 had still not recovered their pre-depression levels. The relative decline was particularly severe in the Prairies and Prince Edward Island where agriculture is the dominant sector of economic activity. In summary, the interregional structure of per capita incomes is characterized by a significant and fairly persistent spread, and by a relatively stable ranking among the provinces over time (except during the 1930's).

Also shown in Table 1 are the annual rates of growth of personal income per capita for five periods. These demonstrate the dynamics, so to speak, of the structure of income levels discussed above. Clearly revealed is the differential impact of the depression and the Second World War upon the provincial growth of income per capita. Moreover, in sharp contrast to the decline in incomes experienced during the 1930's are the substantial advances recorded during the war period. Between 1939 and 1947, the rate of growth of income in the Prairies was especially high, while during the same period some of the Atlantic provinces also experienced higher-than-average growth. The effects of depression and war over the twenty-year period from 1927 to 1947 combined to yield rates of growth in personal income per capita which were generally below those experienced in the postwar period. At the same time, the interprovincial range of variation in growth rates appears to have been much the same over the two periods.

Considering the period as a whole the various provincial growth rates have been closely bunched around the average. In other words, no region has experienced an exceptionally high rate of economic advance over this period; nor has any region suffered an exceptional lag in its pace of economic growth. In broad terms, therefore, all provinces have shared in the national average growth of personal income. It will be noted, however, that the lower-income regions recorded rates of income growth equal to or somewhat above the average while, conversely, the higher-income provinces experienced rates of growth equal to or somewhat below the average. This suggests, therefore, that over the period of 1927 - 1963 there was a tendency towards convergence of the interregional structure of income per capita among the nine provinces, excluding Newfoundland.<sup>1</sup> Adding Newfoundland, as of 1949, increases the interregional spread of income levels, but the

<sup>&</sup>lt;sup>1</sup>In absolute terms, the interregional structure of per capita income diverged from a range of \$261 in 1927 to \$910 or \$1,016 in 1963, depending on whether nine or ten provinces are considered. This is to be expected when roughly equal rates of income growth among the regions are based on significantly widespread levels of income in the initial period. Although the slight differences in provincial growth rates were in the right direction to favour convergence in relative terms, they were not of sufficient magnitude to overcome initial differences in income levels and thereby reduce income disparities as measured in absolute terms. The conditions required for convergence of the interregional structure of income in absolute terms are rather severe in view of the initial absolute income difference between the extreme provinces in Canada. For example, to have maintained unchanged the absolute income difference between Ontario and Prince Edward Island over the period 1927 to 1963, income per capita in the latter province would have had to grow at an annual compound rate almost one third higher than that actually recorded for the 36-year period. For convergence, the required rate of growth in Prince Edward Island would be even higher.

higher-than-average growth rate experienced by that province since 1950 contributes to the process of convergence. Finally, it is of interest to note that the two largest and most populous provinces - Ontario and Quebec - both recorded rates of growth of per capita income equal to that of the average for all provinces.

### Income Dispersion

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Changes in the distribution of personal income per capita among the various regions of Canada can be traced more clearly and directly by the index of dispersion. As suggested earlier, this measure evaluates the relative position of each and every region with respect to the average level of income. As a first approximation, the interregional income distribution is measured in terms of an unweighted index of dispersion; in a subsequent section, a weighted index is used.

The value of the unweighted index for all provinces, including Newfoundland since 1949, is the uppermost curve plotted in Chart 1 and covers the period 1926 -1964.<sup>1</sup> Its irregular shape suggests considerable fluctuations in the degree of dispersion over short periods. At the same time, the broad movements in the curve emerge fairly clearly. Beginning in 1926, interregional income dispersion rises to a peak during the "great depression" and falls thereafter to a low point in 1946. In the post-war years, the degree of dispersion rises from the 1946 low-point until 1951 and thereafter drifts downwards.



CHART I



5

REGIONS

6 PROVINCES (EXCL. ATLANTIC REGION

(INCL

NF



Source: Based on data from the Dominion Bureau of Statistics.

<sup>&</sup>lt;sup>1</sup> The various indexes of dispersion to which reference is made in this study are shown in Appendix Table A.

The broad movements in the index of dispersion until the end of the Second World War conform to the changing economic circumstances of the period. The impact of the depression in the 1930's was reflected in a particularly sharp drop in personal income per capita in those provinces in which agriculture accounted for a large proportion of total activity, namely the Prairie Provinces and Prince Edward Island. The magnitude of the decline was sufficient to induce a very large spread in the interregional income distribution. Recovery from the depression was accompanied by a reduction in dispersion, although the downward movement was far from continuous. The war period, in contrast, brought a number of levelling influences to bear upon interregional incomes. Among these may be noted the policy of decentralization of war production and military establishments, the uniformity in pay scales for the armed forces, the introduction of family allowances, and the heightened activity in Atlantic seaports which served to stimulate incomes in the provinces of that region.

The experience described above would seem to suggest a relationship admittedly impressionistic - between the level of economic activity in the economy generally and the interregional dispersion of income. Depressed economic conditions have been associated with a wider spread of interregional incomes around the average, while a high national level of economic activity has gone hand in hand with a narrowing of income disparities. While the nature of this relationship seems plausible on economic grounds, the experience in the post-war years does not support the hypothesis. During the earlier part of that period the dispersion index rose continuously, even during the boom associated with hostilities in Korea. In part, the increasing spread among regional income levels reflected the slow adjustment of the Atlantic provinces to the post-war economic environment. Since 1951, the index has either fallen or remained stable regardless of the state of the national economy. During the upswing in economic activity between 1954 and 1957 and again in the early 1960's, the dispersion in the interregional distribution of personal income per capita remained virtually unchanged. For the last year of the current expansion the index declines. It would appear, therefore, that there is no clear cyclical relationship between the degree of income spread and the national level of economic activity in the post-war period.

Pursuing this question further, a regression analysis for the post-war period and covering the five major regions of Canada was undertaken. The coefficient of variation of labour income per capita (wages, salaries and supplementary labour income) was related in the first instance to the national unemployment rate. The degree of labour income dispersion was shown to be significantly and negatively related to the national unemployment level although the unemployment variable by itself accounted for only half the variation in the interregional spread of labour income. A second calculation added a linear trend variable to the regression equation, but this contributed very little more to the explanation of movements in the dispersion of labour income. This analysis would suggest that, while the national unemployment level does not tell the whole story, periods of high economic activity in the post-war period have been accompanied by a wider spread in the interregional structure of labour income per capita.<sup>1</sup> Indirect confirmation of this relationship is to be found in the regional response model developed by Frank T. Denton, where the projected interregional income structure over a future period of twenty years converges when a seven-per-cent national unemployment rate is assumed and diverges at the three-per-cent unemployment rate.<sup>2</sup> These findings serve to reinforce the conclusion drawn in the following paragraph.

The question as to whether the degree of regional participation is *systematically* related to cyclical changes in the level of activity of the national economy is clearly an important issue in the formulation of a regional development policy. The post-war experience suggests that either the forces of rising levels of economic activity were too weak to diffuse their effect throughout the various regions of Canada or that the periods of high economic performance were too brief, or both. But at least, in view of the available evidence, incomplete as it may be, it would be questionable to assume that rapid economic advance at the national level is sufficient in itself to reduce the degree of interregional income disparity significantly.

Considering the period from 1926 to 1964 as a whole the index of dispersion has fluctuated around a negatively sloping trend line that diverges very little from the horizontal. The decline in the value of the dispersion index between the terminal years 1927 and 1963 was of the order of eleven per cent. Over the long period, therefore, the degree of dispersion of personal income per capita has been relatively constant; at most there has been a slight tendency towards convergence. This finding would appear to confirm the tentative evaluation made on the basis of the information shown in Table 1. Thus, over a period of Canadian economic history spanning almost forty years, the interregional structure of income has hardly changed; and the degree of regional participation in national economic

<sup>2</sup>Op. cit., Appendix E.

<sup>&</sup>lt;sup>1</sup>A similar finding emerges from an examination of the United States experience over the post-war years. A U.S. Department of Commerce study concludes, "Apparently, state per capita incomes become more equal in a recession year than in the year preceding the recession". "Disposable Personal Income by States in Current and Constant Prices", Survey of Current Business, Office of Business Economics, U.S. Department of Commerce, Washington, D.C., April 1965, p. 26. As will be shown in a later discussion, however, the forces favouring convergence in the distribution of state per capita incomes have been powerful enough to work more or less steadily through recessions and expansions. A thorough analysis of the historical experience in the United States is found in R.A. Easterlin, "Regional Growth of Income: Long Term Tendencies", in *Population Redistribution and Economic Growth in the United States*, 1870-1950, American Philosophical Society, Philadelphia, 1960, Vol. II.

activity that obtained in the mid-sixties is much the same as it was in the midtwenties.<sup>1</sup>

#### Variations in Regional Groupings

The income dispersion curve under discussion embraces all provinces. Newfoundland has been added beginning in 1949, the year in which that province joined the Confederation. Since personal income per capita in Newfoundland is the lowest of all the provinces, it contributes significantly to the value of the dispersion index. This is illustrated in Chart 1, where the dispersion curve for all provinces excluding Newfoundland is drawn separately. The dispersion index including Newfoundland as of 1949 is significantly above the index excluding Newfoundland. Apart from its downward displacement, the exclusion of Newfoundland does not affect the shape of the curve over the period 1949 to 1964. If, however, we reconsider the trend since 1926 in the index of dispersion based upon the nine-province grouping only, the evidence of long-run convergence is somewhat stronger.

The effect of adding or subtracting a province on the unweighted index of dispersion gives rise to the more general question of the relationship between the value of the index and variations in regional groupings. Consider the degree of dispersion in personal income per capita among the five major regions of Canada. The effect on the index, as illustrated in Chart 1, is to reduce its value throughout the period. The fluctuations are much the same as those which describe the curve for all provinces, while the slope of the trend line is unaltered. Over the period 1927 to 1963 the index declined by 12 per cent. By grouping and averaging the Prairie Provinces on the one hand and those of the Atlantic Region on the other,

<sup>&</sup>lt;sup>1</sup> This conclusion applies strictly to the period under review which is in turn defined by the availability of a consistent personal income series. In a sense, therefore, the slice of history under observation is arbitrary. From the standpoint of comparability over the cycle, however, 1927 and 1963 represent rather good points for comparison. Clearly, it would be of interest to trace the degree of stability in interregional income disparity further back in history. This is attempted in three interesting studies: R.M. McInnis "Notes on a Study of Regional Income Differentials in Canada" (mimeographed), Queen's University, Kingston, February 1965; Alan G. Green, *Regional Aspects of Canada's Economic Growth* (unpublished Ph.D. thesis, Harvard University), Cambridge, Mass., May 1965; and Jeffrey G. Williamson "Regional Inequality and the Process of National Development", Part II of *Economic Development and Cultural Change*, University of Chicago Press, Chicago, Vol. XIII, No. 4, July 1965, Table 5b, p. 33.

The first study suggests that the conclusion of long-run stability is still valid to 1920-21 but that the degree of dispersion in 1910-11 was significantly higher than any period since then. The second, employing a rather different set of statistics and techniques of measurement, indicates that the degree of interregional dispersion in gross value added per capita for 1890 was identical to that for 1956, although there were changes in dispersion in intervening periods. In the third study, Williamson estimates the degree of income dispersion for six census years beginning in 1901 by employing the share of agriculture in the regional labour force as a proxy for the level of per capita income in the region. Measuring income in this way, interregional disparity rises from 1901 to a peak level in 1931 and then declines to 1951. The 1961 value of the dispersion (calculated on the same basis by the present writer) is virtually identical to that for 1901. The estimates obtained from this procedure are merely suggestive, as Williamson himself acknowledges. Both the realism of the proxy measure applied to the Canadian circumstances and the value of the information yielded by a series based upon six census years are open to question.

the size of the deviations are necessarily reduced. This in turn is reflected in the lower value of the index of dispersion.<sup>1</sup>

Another regional grouping which is of interest is that which excludes the four provinces of the Atlantic region. These provinces, it will be recalled, fall in the lower tail of the personal income per capita distribution (see Table 1). Because we are considering unweighted averages for the economy as a whole, the four provinces might be expected to exert an influence upon the measure of dispersion that is more than proportionate to the region's size in terms of population. To gauge the extent of the region's effect on the degree of income dispersion, the index was recalculated for only six provinces, excluding the Atlantic group. The curve traced out by the new index is also shown in Chart 1.

It will be seen that the value of the index excluding the Atlantic region tends to be lower than that for all provinces throughout the period, but particularly after 1937. Indeed during the early thirties the curves are not markedly divergent, suggesting that during those years it was the experience in the Prairie Provinces that largely affected the degree of interregional income dispersion. During the post-war period the value of the index excluding the Atlantic is well below that for all provinces and tends to fluctuate around a horizontal line. The horizontal tendency during the post-war period is in sharp contrast with the wide swing in income dispersion that characterizes the index for all provinces. Clearly, therefore, economic developments in the Atlantic area were important in shaping the post-war changes in the degree of interregional income disparity.

It will be noted, finally, that in excluding the Atlantic region, the curve of dispersion shows sharp fluctuations over relatively short periods. This reflects the influence of variations in farm income in the Prairie Provinces and particularly that of Saskatchewan. Farm income in the latter province is a relatively large component of total personal income and its fluctuations account for the volatile movement of personal income per capita recorded there. If the influence of Saskatchewan upon the dispersion of income were to be removed, the sharp fluctuations would be significantly moderated and the curve would take on a smoother shape.

In the subsequent sections, interregional dispersion indexes are calculated on the basis of ten provinces, including Newfoundland since 1949. Where another regional grouping is employed, this is indicated.

#### Weighted Income Dispersion

So far in the discussion of interregional income dispersion, we have taken each province or region to count equally, without regard to its geographic extent, size of population, or structure of economic activity. Moreover, the influence of one or more regions was evaluated by varying the number of regions covered by the dispersion index. Implicitly, we have been suggesting that regardless of size, the experience

<sup>&</sup>lt;sup>1</sup>This consideration poses a fundamental conceptual difficulty for comparisons between dispersion indexes where each is based on a different number of regions. This question is pursued in some detail in Appendix Note A. For the present, it need only be noted that, for recent years, the standard significance test for the differences between two means reveals no significant difference(at the 5 per cent level) between the dispersion index for ten and that for five regions in Canada. This implies that both indexes serve equally well as dispersion measures of the "parent" interregional structure of income.

of any one province or region is as relevant and interesting as that of any other. The distribution of personal income per capita we have been considering, therefore, has been made up of *unweighted* elements or regions. Ontario's level of personal income per capita with a population of more than six million in recent years has been treated as a unit of observation equal to that of Prince Edward Island with a population of approximately 100,000 or 1/60 of the larger province. In 1962, the two largest provinces – Ontario and Quebec – accounted for almost two thirds of the total population of Canada, hence their influence on a weighted average of personal income per capita for Canada would be relatively large.<sup>1</sup> The degree of interregional dispersion will be different, therefore, if we take into account population differences among the various provinces.<sup>2</sup>

It is well to recognize, however, that this procedure reduces the importance of the spatial or geographical element underlying the interregional distribution of income. The concept of personal income per capita, in a sense, already takes account of the number of persons associated with the amount of total personal income generated in the various regions. It is a necessary form of standardization so as to enable interregional (or international) comparisons to be made. By weighting the income level in each region by its population size, the standardization process is carried further and the resulting comparisons are in effect made among regions of equal population size. In other words the weighted dispersion of income is more a comparison among individuals than among geographical areas.

The dispersion of interregional incomes on both an unweighted and a weighted basis are traced over the 1926 - 1964 period in Chart 2. The latter index is obtained by weighting the deviation of each region's income level from the average, the weight being its share of the total population.<sup>3</sup> It follows from this procedure that income changes in Prince Edward Island for example have little influence upon the dispersion index unless they are inordinately large in relation to the average. On the other hand even small relative income changes in Ontario and Quebec are reflected in the weighted dispersion index.

Throughout the period, the movements in both indexes in Chart 2 are almost perfectly synchronized, with the weighted index of dispersion continuously below the unweighted measure. The maximum divergence between the two curves is recorded in 1951 and the minimum occurs in 1945. Over most of the period the two curves are separated by roughly five percentage points. During the Second World War the two measures of dispersion converge, reflecting the relatively high income growth experienced by the Prairies and the Atlantic provinces. In the earlier part of the post-war period the lagging economic performance in the Atlantic region is

<sup>&</sup>lt;sup>1</sup>For 1963 the weighted average of personal income per capita for Canada was \$1,737 and the unweighted average \$1,532, a difference of \$205.

<sup>&</sup>lt;sup>3</sup>This consideration is perhaps more relevant for comparisons of interregional income disparity among countries. In the study by Jeffrey G. Williamson, op. cit., a major part of the work is devoted to international comparisons and these are made in terms of weighted dispersion indexes.

<sup>&</sup>lt;sup>3</sup> This means that variations in the regional distribution of population will affect the value of the weighted index of dispersion. However, the results of a variance analysis undertaken by Williamson, op. cit., pp. 38-40, suggest that the movements in the index of dispersion over time are very largely a reflection of changes in regional incomes and are relatively little affected by changing population weights.

reflected less in the weighted index of dispersion and hence displays a more moderate swing than that for the unweighted index.

CHART 2



Over the full span of the period, both indexes appear to have much the same trend – a gentle negative slope. The weighted index of dispersion falls by about eight per cent between 1927 and 1963 as compared with eleven per cent for the unweighted measure. If anything, therefore, the relative stability in the interregional structure of income over the longer run is greater when regional variations in population are taken into account.

The difference between the weighted and unweighted index of dispersion suggests that, in terms of numbers of individuals involved, the degree of interregional income disparity is of lesser magnitude than appears when the various regions are considered as units of equal weight. In other words, the degree of regional participation in national economic growth in Canada has been higher having regard to the number of persons in the various regions. Viewed in these terms, the extent of the regional problem in Canada is perhaps less than what is commonly assumed, although the nature of the problem is not altered. It follows that if a concerted effort were made to increase the degree of interregional participation by, say, raising average productivity and income in the lower-income provinces, the resources required for this purpose would not involve a large proportion of the total national income.

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## **III. VARIATIONS IN INCOME COMPONENTS**

Personal income is an aggregate measure consisting of five major income flows. The relative importance of each component in total personal income and their variations over the period under review are shown in Table 2 for Canada as a whole. Also shown is the interregional range of variations in the percentage share of each component for  $19\overline{63}$ .

Composition of P	ersonal Income	1927 and 1963	
	1927	1	.963
Income Component	Percentage Distribution	Percentage Distribution	Interprovincial Range in Per Cent
Labour Income	59.2	66.2	42 - 69
from Farm Production Net Income of Nonfarm	14.2	4.4	1 - 28
Unincorporated Business	12.5	7.3	7 - 11
Earned Income Interest, Dividends and Net	85.9	77.9	71 - 79
Rental Income of Persons Government Transfer Payments	12.3 1.8	10.5 11.6	6 - 12 10 - 21
PERSONAL INCOME	1,00.0	100.0	_

# TABLE 2

Note: Labour income stands for wages, salaries and supplementary labour income, and military pay and allowances. Government transfer payments exclude interest. Personal income as shown here excludes income earned by Canadians temporarily abroad and charitable contributions of corporations.

Source: Based on data from the Dominion Bureau of Statistics.

It is clear from Table 2 that the reward to labour (wages, salaries and supplementary labour income) is by far the largest source of personal income. In the most recent period it accounts for two thirds of personal income, while government transfers and property income (interest, dividends and net rental income of persons), the next most important components, together represent somewhat less than a quarter of the total. Of interest is the fact that net income of farm operators accounts for less than five per cent of total personal income in Canada as a whole.<sup>1</sup> This is to be compared with the much higher share of net farm income in 1927. The substantial decline in the relative importance of farm operators' income is in accord with the changing structure of economic activity

<sup>&</sup>lt;sup>1</sup>Wages and salaries paid to agricultural labourers are included in labour income.

in Canada over this period which saw a large shift of employment from agriculture to other rapidly growing sectors of the economy.

An equally striking change over the period as a whole has been the growth of government transfer payments as a component of personal income. This rapid growth reflects the increased importance of health and social welfare payments such as hospital benefits, family allowances and old age security as well as unemployment insurance benefits. Moreover, since the federal government finances a dominant share of these payments, potentially it represents a powerful force in favour of the redistribution of income among the regions. Among the other components, the share of income from nonfarm unincorporated business fell between 1927 and 1963. This change, in conjunction with the rise in labour income, reflects the continuing modification in the economic organization of business towards relatively larger roles of corporations and contractual employment.

The importance of each income component varies widely among the regions. The absolute variation is greatest for income of farm operators and labour income and least for unincorporated business income. The differences in the distribution of personal income clearly reflect the variations in the structure of economic activity that characterize the regions of Canada. As for government transfer payments, its range of variation is also high. In Prince Edward Island, for example, transfer payments constitute a fifth of the total flow of personal income.

The interregional dispersion of personal income per capita is a function of the dispersion in its various components.<sup>1</sup> These are shown in the five Panels of Chart 3 where the index of dispersion for each major income flow (indicated by the broken line) is plotted along with that for personal income, all on a per capita basis. Given the weight of labour income in total personal income, the dispersion in this component (Panel I) conforms most closely with the index for personal income per capita in respect of short-period fluctuations and long-term trend. Throughout the period, however, the curve for labour income is above that for the total, reflecting the greater degree of interregional disparity in this major income component. Thus, viewed as an independent factor, the degree of dispersion in labour income helps to raise that for aggregate personal income per capita. The dispersion of farm income per capita (Panel IV), as might be expected, is extremely erratic from year to year. With the exception of one year, its value exceeds that of total personal income by a wide margin. Moreover, the longer-run trend in the index of dispersion for farm income rises rather sharply. Considered independently, therefore, the interregional disparity in farm income per capita appears to have imparted a positive and increasing influence in favour of a higher degree of disparity in personal income. It is to be recognized, however, that relating farm income to the total population of a province is not entirely appropriate. In a subsequent section the farm income component is examined further.

<sup>&</sup>lt;sup>1</sup>The relationship is not, however, an average of the variability in the components. Two component distributions, each with a high degree of variability can be combined to yield a third distribution with a degree of variability lower than that of either component. This is because the total dispersion is affected not only by each of the components separately but also by the interaction among them. The shape of the component distributions may therefore be dissimilar.



PER CENT









**W-GOVERNMENT TRANSFER PAYMENTS** 

15 -



of the income component (per capita) Note: Solid line in each Panel represents the index of dispersion of personal income per capita. The broken line represents the index of dispersion appearing in the title above each Panel.

Source: Based on data from the Dominion Bureau of Statistics.

The dispersions of both property income (Panel III) and unincorporated business income (Panel II) display considerable short-period fluctuations before 1945 but are more stable thereafter. The disparity in property income ranges above but near that of personal income throughout the period. On the other hand the dispersion in unincorporated business income fluctuates around that of the aggregate in the first part of the period, but since 1948 has ranged below that curve. Between 1927 and 1963, the interregional spread of property income per capita widened significantly while the spread of unincorporated business incomes among the various regions narrowed to roughly half its level in the initial group of years.

The movement in the interregional dispersion of government transfer payments (Panel V) is particularly interesting. From a relatively high level in 1927, the degree of spread is reduced irregularly but continuously until 1944. With the introduction of family allowances and war service benefits in the following year, the dispersion index falls precipitously below that for total personal income and after a period of relative stability, resumes its downward trend. In 1963, the value of the index reaches a level suggesting a high degree of equality in the interregional distribution of government transfer payments per capita. Over the period as a whole, the dispersion index for transfer payments has displayed a very steep downward trend and since 1945 has shown the least degree of interregional disparity among all income components. The independent contribution of transfer payments, therefore, has largely favoured the reduction of interregional disparity in personal income per capita and its convergence over time.<sup>1</sup>

Following this discussion, a logical next step would be to estimate more exactly the contribution of each of the components to the dispersion in aggregate personal income per capita and not merely its apparent direction as has been done above. This requires that the level of dispersion in each component be appropriately weighted and the interdependence or interaction among them be measured. The full range of calculations necessary to make such estimates has not been undertaken for the present study.<sup>2</sup> By way of illustrating the orders of magnitude involved, however, estimates for a number of selected years and for appropriately grouped components only, have been made.

Applying the procedure for implicitly weighted components as set out in Appendix Note B, it emerges that the component earned income per capita accounts on the average for about 70 per cent of the variation in total personal income per capita. In contrast, government transfer payments per capita and property income per capita each accounts for less than one per cent of the total variation. It follows by deduction that the interaction effect, on the average, accounts for almost 30 per cent of the interregional dispersion in total personal

<sup>&</sup>lt;sup>1</sup>The low interregional dispersion in transfer payments per capita implies that the share of this income component in total personal income will be larger in the low-income regions. The wide variation in regional shares of transfer payments has frequently led observers to the erroneous inference that the degree of interregional dispersion must also be high. Clearly this is the wrong way around.

<sup>&</sup>lt;sup>2</sup>Easterlin (op. cit., Appendix B and C) has suggested a simplified method for evaluating the contribution of various income components to the interregional dispersion of the total, but it is not readily applicable here.

income per capita. Clearly, it is the earned income component, which exerts an overwhelming influence upon the degree of income dispersion among the regions of Canada.

In the subsequent three sections the relationship of various income components and direct taxes to interregional income dispersion is examined more fully.

#### Taxes, Transfers and Disposable Income

Governments exert a direct influence on the level of personal income in two ways: by direct personal taxation and by means of transfer payments. Taxes reduce personal income, while transfer payments add to income. In both respects, the impact upon levels of personal income may differ from region to region and thereby affect interregional disparities in disposable income.

The higher is the average level of income in a region and the greater the degree of income inequality in favour of the higher-income groups, the greater will be the per capita volume of government tax receipts. This follows from the fact that personal income tax rate structures are progressive; and as average income levels rise, taxable income and applicable tax rates rise proportionately more. To the extent that tax rates differ among the provinces, the possibility of tax payments varying from one region to another is further enhanced.

Transfer payments, on the other hand, comprise a mixture of items. Some of these, such as unemployment insurance benefits are related to the level of economic activity, and the amounts transferred to residents of a particular province will, therefore, depend upon the state of economic conditions within the region. Other transfer items such as family allowances, old age security payments, university and hospital grants are related to the age structure of the region's population or to health and welfare standards established locally.

It would seem, therefore, that in respect of both direct taxes and transfer payments, they are likely to exert a varying impact upon incomes among the various regions. Essentially, the differential effect has its source either in the application of a fixed national policy to varying regional conditions or to varying regional policies. It will be recognized, however, that the federal government is likely to exert a greater influence on interregional income dispersion than the provincial-municipal governments.<sup>1</sup> This is true, if only because principles of equity underlie federal policies of income redistribution.

The impact of direct taxes on the one hand, and transfer payments on the other, upon the interregional dispersion of income can be evaluated indirectly by tracing the effect of eliminating one or more of the components from the index. Of course, to the extent that the components are not independent, the resulting measure of influence is inexact. The procedure is to compare the value of the dispersion indexes of personal income less transfers per capita and personal income less direct taxes (or disposable personal income) per capita with that of

<sup>&</sup>lt;sup>1</sup>See T.K. Shoyama, op. cit., Appendix A.

aggregate personal income per capita, including all components. The three series of dispersion indexes from 1926 to 1964 are shown in Chart 4 and are based on all provinces.<sup>1</sup>

#### CHART 4

INFLUENCE OF DIRECT TAXES AND TRANSFER PAYMENTS UPON INTERREGIONAL DISPERSION OF PERSONAL INCOME PER CAPITA



The effect of transfer payments on income dispersion emerges clearly from the charts. When transfers are removed from personal income, interregional disparity is widened and the value of the dispersion index rises as reflected in the uppermost curve in Chart 4. The rise in the index is especially marked in recent years since, as we have previously noted, the relative importance of transfers in total personal income has increased. During the war, however, the two curves are virtually indistinguishable. This comparison serves to confirm the conclusion drawn earlier, that transfer payments have exerted a levelling influence upon interregional income differences. It will also be noted that while the configuration of the curve is not altered when transfers are excluded, the extent of divergence from the index based on personal income per capita tends to increase with time. The effect is to reduce the absolute value of the slope of the trend line; and the long-run tendency towards interregional convergence of income levels is virtually eliminated. In 1963 the dispersion index for personal income less transfers is actually slightly above that for 1927.

For more than half of the years under consideration, the index of interregional dispersion of disposable income per capita is below that of personal income per capita. This may be seen from the third and lowest curve shown in Chart 4. Direct personal taxes, therefore, also exert a levelling influence upon interregional income differentials. Furthermore, because direct personal taxes have also tended to rise relative to incomes, the effect on the long-run dispersion of personal income, after taxes have been deducted, is to increase the

<sup>&</sup>lt;sup>1</sup>Indexes of dispersion for disposable income per capita and personal income less transfers per capita for other regional groupings will be found in Appendix Table A.

tendency towards interregional convergence in disposable income per capita. The decline in dispersion of the latter income flow over the whole period is significantly larger than that of personal income per capita.<sup>1</sup>

The effect of taxes and transfer payments on the level of personal income is opposite in direction. Their separate effect on the interregional dispersion of income, however, is in the same direction – to reduce the degree of dispersion. Thus the influence of government in respect of taxes and transfers emerges fairly clearly. It follows that an evaluation of the regional development problem would be modified were it to be posed in terms of economic activity in the private sector alone.<sup>2</sup> The degree of interregional income disparity in this case would be rather greater, since the relevant index would be that based upon personal income less government transfers. Within the limits of tax and transfer policies, therefore, the effect of adding the government sector is to ameliorate the regional development problem in the sense that the degree of interregional participation in national economic activity (public and private) is enhanced.<sup>3</sup>

# Earned Income

Various elements of personal income do not represent rewards derived from economic activity. Moreover, even if they do represent economic rewards, they do not always reflect returns to activity undertaken within the region. Yet the nature of the regional problem can better be evaluated with a measure which most accurately reflects the reward to economic activity within each of the defined regions. In other words interregional disparities can better be evaluated with a measure which would more accurately reflect interregional differences in productivity.

The concept of earned income per capita would seem to conform better to this requirement than does personal income. Earned income is shown as a subtotal in Table 2 and is obtained by deducting from personal income three of its components. These are: interest, dividends and net rental income of persons; government transfer payments (excluding interest); and charitable contributions from corporations.<sup>4</sup> Thus we have a measure that approximates fairly closely the reward for "work" within the region.

<sup>&</sup>lt;sup>1</sup> The effect of excluding Newfoundland from the calculations after 1948 is to lower the family of curves without materially affecting their configuration. Thus the rise in the indexes from the 1946 trough to the 1951 peak becomes less accentuated and the low 1946 value of the index is reached again in 1960. The trend in the three curves based on the nine provinces is also affected. As noted previously, the data excluding Newfoundland reinforce the modest long-run tendency towards convergence in interregional income differentials.

<sup>&</sup>lt;sup>2</sup> A more strict analysis would require the elimination of other important expenditure items, such as government payrolls, before the "private sector alone" can be delineated.

<sup>&</sup>lt;sup>3</sup>It is recognized that governments affect personal income in many indirect ways, and it would not be surprising to find that some of these tend to widen interregional disparities.

<sup>&</sup>lt;sup>4</sup> In recent years charitable contributions from corporations represent less than 1 per cent of total personal income. It may be argued that not all the items of interest, dividends and net rents should be excluded, but only extra-regional rewards. Were the data available in detail, a more judicious selection could be made. It will be noted, however, that imputed rents and investment income of life insurance companies constitute important sub-items. Since either the substantive basis of estimation or its geographical distribution largely involve "rules of thumb", the exclusion of this item as a whole is, therefore, less serious than might appear.

The interregional dispersion of earned income per capita over the period 1926 to 1964 is shown in Chart 5, along with that for personal income per capita. With the exception of a few years, the index of dispersion of earned income is above that of personal income. The difference between the two indexes is relatively small until 1945, but increases thereafter. The post-war period between 1950 and 1954 – that is the Korean boom and subsequent downturn – shows the most marked divergence between the two curves. This may reflect the influence of increases in net farm income experienced by the Prairie provinces between 1950 and 1951, when the value of this income component more than doubled. Given the smaller total value which earned income represents, this order of increase in one component exerts a more powerful influence upon the value of the dispersion index.

#### CHART 5



The fact that the index of dispersion is higher in the case of earned income per capita should not be surprising. Earlier, we evaluated the effect of government transfer payments upon the dispersion of personal income per capita and found that, when omitted from income, the dispersion index becomes higher. Obviously, the effect of omitting corporate charitable contributions and dividends, interest and net rents, from personal income has not altered the direction of shift in the earned income curve.<sup>1</sup>

It will be noted, moreover, that the shapes of the two curves over the whole period are very similar and appear to move together in both direction and magnitude. The degree of convergence in the interregional distribution of earned

<sup>&</sup>lt;sup>1</sup> From a comparison of the relevant data in Appendix Table A, it would appear that the earned income index generally lies above that of the index for personal income less government transfers, although this is less true for recent years. Where the earned income index is greater, it implies that dividends, interest and net rents and charitable contributions have exerted a levelling influence on interprovincial income differentials. The differences in the indexes are, in any case, relatively small.

income per capita, however, is less than half that of personal income between 1927 and 1963.<sup>1</sup>

In terms of earned income per capita, therefore, our view of the regional problem in Canada over the past four decades must be altered somewhat. To the extent that earned income per capita reflects the volume of economic activity and income generated within the geographic boundary of the province,<sup>2</sup> the degree of provincial participation in national economic activity is more divergent. At the same time, however, changes in the extent of the disparity over time would seem to be reasonably approximated by either earned income per capita or personal income per capita.<sup>3</sup>

In the attempt to define a measure of per capita income that reflects regional productivity more accurately, the numerator of the relation has been defined to exclude certain components. An adjustment that is similar in principle can be made to the denominator of the income relation since only a part of the region's population is employed in productive economic activity. If, therefore, we consider the number of persons employed in each region in relation to earned income, the concept of earned income per employed person is a superior measure of regional productivity.

#### CHART 6

# INTERREGIONAL DISPERSION OF EARNED INCOME PER CAPITA AND PER EMPLOYED PERSON



The interregional dispersion in earned income per employed person is shown in Chart 6 and compared with that for earned income per capita. The indexes are

<sup>&</sup>lt;sup>1</sup>The exclusion of Newfoundland after 1948 reduces the value of both indexes more or less proportionately.

<sup>&</sup>lt;sup>2</sup> The relevant notion here is "domestic" product or income.

<sup>&</sup>lt;sup>3</sup> In the analysis of interregional differences in manpower utilization undertaken by Frank T. Denton, op. cit., the focus is upon the concept of earned income per capita and others related to it. In addition to the substantive grounds for this procedure, earned income is more amenable to a quantitative analysis of geographic differentials than is personal income. In any case, the conclusions that emerge from the analysis based on the earned income concept can, with appropriate modification, be applied more generally.

calculated for the post-war period and are based on the five major regions of Canada. This is the fullest coverage permitted by the annual data available on employed persons.

It emerges from the comparison in Chart 6 that the interregional dispersion in earned income per employed person is significantly below that based upon the total population in each of the regions. The vertical distance between the two curves is fairly constant over the period, while their shape is virtually the same. In moving from the per capita to the employed-person income relation, interregional differences in the availability and utilization of labour are revealed. Their impact upon the degree of interregional disparity in income and productivity can be gauged by the distance separating the two curves.<sup>1</sup> In 1963, for example, the dispersion index for earned income per employed person is 40 per cent below that for earned income per capita. In other words, variations among the five major regions in the age structure of the population, labour force participation and unemployment rates are significant and account for roughly two fifths of the interregional dispersion in earned income per capita.<sup>2</sup> The residual degree of dispersion is to be accounted for by all those factors, both measurable and immeasurable, which influence productivity in the various regions of Canada.

#### Farm Income and Structural Changes

Of all the components of personal income, net income of farm operators is most closely associated with a well-defined sector of economic activity. Thus the evidence (from the data shown in Table 2 above) that farm income has been a declining source of personal income is more significant than first appears. The relative decline in farm income reflects a phenomenon that has very often been described as one of the most powerful factors influencing the growth of the Canadian economy over the last half century – the shift in the distribution of labour in favour of the industrial and service sectors of the economy, and the decline of agriculture.<sup>3</sup> This change in the structure of industry has contributed to Canadian economic growth because it involves essentially a shift from lower to higher productivity employment and output. In view of the far-reaching effects attributed to changes in farm income and employment at the national level it is of interest to explore the consequences of this phenomenon upon the interregional distribution of income.

<sup>&</sup>lt;sup>1</sup>Interregional differences in manpower utilization are systematically analyzed in Frank T. Denton, op. cit.

<sup>&</sup>lt;sup>2</sup> On the basis of a special set of data supplied by the Dominion Bureau of Statistics it was possible to calculate the index of dispersion of earned income per employed person covering the ten provinces averaged over the five-year period 1960-1964. Employing the larger regional grouping, however, did not significantly alter this conclusion drawn from the experience of the five major regions. The difference of two fifths between the indexes of dispersion may be compared with that calculated by Denton, op. cit., and cited in Economic Council of Canada, Second Annual Review: Towards Sustained and Balanced Economic Growth, Ottawa, 1965, pp. 113-114, where differences in the employment base are said to account for about half the disparity in earned income between the Atlantic Region and Canada as a whole.

<sup>&</sup>lt;sup>3</sup> This is discussed in Economic Council of Canada, Second Annual Review: Towards Sustained and Balanced Economic Growth, Ottawa, 1965, pp. 64-65; and N.H. Lithwick, "Labour, Capital and Growth: The Canadian Experience" in Growth and the Canadian Economy, Carleton University, Ottawa, March 1965. From an international comparative point of view, Canada's experience is evaluated in the United Nations Economic Commission for Europe, Some Factors in Economic Growth in Europe During the 1950's, Geneva, 1964, Chapter III.

Considering the economy composed of only the two sectors, agriculture and nonagriculture, there are two factors which condition the impact of changes in the structure of activity upon the income level of a given region.<sup>1</sup> These are: (a) the rate of change in the distribution of the labour force as between agriculture and nonagricultural activities; and (b) the difference in average productivity between the two sectors. The impact upon the interregional distribution of income will then depend upon the comparative experience among the regions; the more proportional are the changes in the labour force structure and the less disparate are productivity differences from region to region, the less will be the effect upon the dispersion of income.

In conceptual terms, the issue can be clearly stated; practical difficulties, however, preclude a full and satisfactory exploration of the interregional impact of structural changes. In the absence of consistent series which would permit coverage of all the provinces over a long time-span, it was necessary to combine various sources of information. Moreover, only nine provinces are considered since the quality of the required agricultural statistics for Newfoundland is rather poor. To approximate more closely the notion of earned income generated in the agricultural sector, the national accounts concept of farm income (net income of farm operators from farm production) is modified to include an estimate of wages paid to farm labour.<sup>2</sup> At the same time, the latter item is deducted from wages and salaries in the nonagricultural sector. The resulting measures (hereafter termed agricultural income and nonagricultural income) represent the return to labour, management and "owned" capital, in production. When related to the labour force in each of the sectors, an approximate measure of labour productivity is obtained.<sup>3</sup>

The subsequent analysis, then, is based on data which are far from ideal. Nevertheless, they are considered adequate for illustrating the nature of the forces of structural change and gauging the direction and order of magnitude of their impact upon the interregional distribution of income. It will be understood, moreover, that the conclusions drawn from the analysis apply only to the concepts of income and productivity as defined here. Conceivably, the findings could be altered if income and productivity in the two activity sectors were to be defined differently.

#### (a) Changes in the structure of activity

In Table 3, the regional distribution of the labour force in agriculture and that sector's share of the total labour force in each province is shown for the

<sup>&</sup>lt;sup>1</sup> For an analysis of the structural influence of primarily nonagricultural industries upon the interregional distribution of earnings see Frank T. Denton, op. cit., Tables A-8 to A-12.

<sup>&</sup>lt;sup>2</sup> The interprovincial rankings in respect of the two measures are identical.

<sup>&</sup>lt;sup>3</sup>A number of different sectoral income estimates can be derived from existing data sources. See for example the estimates covering the period 1942-53, in W.J. Anderson, "Productivity of Labour in Canadian Agriculture", The Canadian Journal of Economics and Political Science, Vol. 21, No. 2, May 1955, pp. 228-236. The major concern for our purposes is that the income measure be reasonably consistent in coverage as between agriculture and nonagriculture and that interregional variations resulting from the application of national accounts conventions be held to a minimum. A departure from the latter requirement is involved in the exclusion of imputed net rents on owner-occupied farm dwellings from agricultural income as we have defined it. Similarly, interregional variations in measures of sectoral productivity can arise from the denominator of this ratiothe volume of labour. In the agricultural sector, particularly, there are wide regional variations in the amount of time farm operators and labourers devote to this activity. These variations are not fully reflected in the labour force estimates.

	(1)	(2)	(3)	(4)	(5)	(9)	(1)
	Distri	gional	Sha	re of ulture in	Hypothetical Share of	Decline in Share of Agriculture in	Regional Deviation from Average National
	of Agr. Labou	icultural ur Force	Region	al Labour	Agriculture in Regional Labour Force	Regional Labour Force	Change in Agricultural and Nonagricultural Labour Force
	(perce	intages)	(perce	entages)	(percentages)	(percent	tage points)
	1921	1961	1921	1961	1961	1921-1961	1921-1961
						(Col. 3-Col. 4)	(Col. 5-Col. 4)
Prince Edward Island	1.8	1.4	59.5	26.9	25.4	32.6	-1.5
Nova Scotia	4.8	1.9	26.5	5.2	7.8	21.3	2.6
New Brunswick	4.5	2.0	35.2	7.1	11.3	28.1	4.1
Maritimes	11.1	5.3	32.8	7.7	10.2	25.1	2.5
Quebec	20.8	20.5	27.6	7.5	8.2	20.1	0.7
Ontario	28.5	26.6	26.3	7.2	7.7	19.1	0.5
Manitoba	8.4	9.3	40.0	17.5	13.5	22.5	-4.0
Saskatchewan	16.8	18.5	65.2	36.7	30.7	28.5	-6.0
Alberta	11.1	16.1	52.8	21.3	20.8	31.5	-0.5
Prairies	36.3	43.9	53.6	24.6	21.3	29.0	-3.3
British Columbia	3.4	3.8	16.0	4.2	4.2	11.8	0.0
CANADA	100.0	100.0	32.6	10.2	10.2	22.4	10.2

Note: Col. 5 is calculated on the assumption that the 1921 regional shares of the Canadian agricultural and nonagricultural labour force remain unchanged through to 1961. This is the same as assuming that the national rate of change in each of the two sectors applies uniformly to all the regions.

Source: Based on data from 1961 Census of Canada, Bulletin 3.1-1, Dominion Bureau of Statistics, Ottawa, 1964.

TABLE 3

census years 1921 and 1961. The regional distribution of the agricultural labour force over the forty-year period has altered significantly (Cols. 1 and 2). The share of the Maritime region (particularly Nova Scotia and New Brunswick) and Ontario has declined. In contrast, that of the Prairie region has risen. The changes recorded in Quebec and British Columbia were relatively small. Measured by relative employment shares, therefore, the agricultural industry in Canada has come to be concentrated more and more in the Prairies. The altered regional distribution, however, has taken place within a far-reaching shift in the structure of the agricultural and nonagricultural labour force at the national level.

The change in the structure of economic activity for Canada as a whole is striking; the agricultural sector accounts for only one tenth of the total labour force in 1961, as compared with a third forty years earlier (Cols. 3 and 4). In other words, rapid growth in the nonagricultural labour force has been coupled with a decline in agriculture, both in terms of the share of the labour force engaged in that sector as well as in absolute numbers.<sup>1</sup>

In the various provinces, a similar process of change in industrial structure is evident. The change in each case is made up of an increased proportion of the labour force in nonagricultural pursuits, accompanied by an absolute decline in the numbers engaged in agriculture. Judging by the range of variation in agricultural shares for the two census years shown, there has been some degree of convergence among the provinces in their industrial structures when measured in terms of the labour force. From a range of 39 percentage points in 1921, the interprovincial distribution narrows to about 33 percentage points in 1961 – a difference which is probably not significant in view of the underlying statistical question of comparability over the forty-year period.

Given the provincial structures of activity in 1921, the scope for an alteration favourable to the level of income was largest in the Prairie Provinces and Prince Edward Island and least in British Columbia. Over the period, the largest relative shifts in the labour force actually did take place in those provinces which had high initial shares of labour engaged in the agricultural sector (Table 3, Col. 6). However, it also emerges that the shift in the labour force structure of each province was more or less in line with the average experience of the country as a whole. This is indicated in the hypothetical shares of agriculture in the total labour force of each region (Table 3, Col. 5). The hypothetical shares are calculated on the assumption that the regional distribution of the Canadian agricultural labour force is unchanged between 1921 and 1961 but that the national rate of growth of both the agricultural and nonagricultural labour force is experienced in each of the regions.<sup>2</sup> The resulting intraregional distribution of the labour force indicates what would have occurred had each region shared proportionately in the national growth of the nonagricultural labour force and the decline in that of agriculture.

<sup>&</sup>lt;sup>1</sup>Between 1921 and 1961 the numbers occupied in agriculture declined by 37 per cent although the decline was not continuous throughout the period.

<sup>&</sup>lt;sup>2</sup> This is an inverted form of Table 4.14, col. (2) in R.A. Easterlin, op. cit.
The actual experience in 1961 (Col. 4) and the hypothetical expectations for that year (Col. 5) are not very different, suggesting that all provinces have participated more or less proportionately in the changing structure of industry recorded for the economy as a whole. The extent of divergence among the provinces is shown in (Col. 7), which is derived from the difference between the actual and hypothetical distributions. The data suggest that the Maritime region as a whole recorded an alteration in its labour force structure somewhat more favourable to nonagricultural pursuits, while the Prairie region experienced a relatively slower-than-average adjustment in the distribution of the total labour force as between agricultural and nonagricultural activity. A contributing factor was the continued extension of agricultural settlement in the earlier part of this period. As for the other provinces, the divergence in experience from that of the national economy was relatively small.

To summarize, the pattern of interregional changes in industrial activity over the forty-year period displays some tendency towards convergence, with the most favourable relative shifts having been experienced in the lowest-income regions. Other things being equal, therefore, the effect of changes in the structure of the labour force upon the degree of interregional income disparity, is in the direction favouring reduced dispersion.

### (b) Differences in productivity

In general, agricultural activity yields a lower productivity or average income per worker than does nonagriculture industry taken as a whole. The larger is the difference, the greater is the potential income gain for a region from a shift in its industrial structure in favour of nonagricultural activity. Because agricultural incomes are so volatile, however, the extent of the productivity difference between the sectors is very much influenced by the years chosen for comparison. Data limitations, moreover, reduce the available years from which to choose.

Census data provide one source of information, but each of the single years 1931, 1941, 1951 and 1961 can be seriously questioned as "representative" years for income generated in agriculture. For illustrative purposes, Table 4 shows provincial differences in productivity based on the five-year average 1960-1964. A comparison among the five major regions, on a consistent basis, is possible for the post-war period, although removing Newfoundland from 1963 requires an estimate of total and sectoral employment in that province. To provide a basis for longer-term comparisons, regional productivity for 1927 was estimated by combining available income data with labour force estimates for 1926-27 provided by R. M. McInnis.<sup>1</sup> While these estimates are not strictly comparable with those for the post-war period (where employed persons rather than the labour force is used) at least the order of magnitude and direction of changes are indicated. Table 5 shows the regional productivity differences for 1927, 1947 and 1963.

<sup>&</sup>lt;sup>1</sup>Op. cit., Statistical Appendix. In a private communication, McInnis cautions that his figures may involve an underestimation of the 1926-27 agricultural labour force, particularly for the Prairie regions.

Despite variations from period to period, it emerges clearly from the data in Tables 4 and 5 that productivity in the nonagricultural sector is very much higher than that in agriculture. For the country as a whole it is between one and one half to two times as high.

### TABLE 4

	1	2	3
	Income per Worker in Agriculture	Income per Worker in Nonagriculture	Percentage Ratio 2/1
	\$	\$	
Prince Edward Island	1,100	3,333	303
Nova Scotia	937	3,495	373
New Brunswick	1,000	3,150	315
Quebec	1,481	3,645	246
Ontario	2,536	4,242	167
Manitoba	1,984	4,015	202
Saskatchewan	3,008	4,091	136
Alberta	2,698	4,078	151
British Columbia	3,080	4,537	147
Average for Provinces	1,882	3,811	202

### PROVINCIAL DIFFERENCES IN INCOME PER WORKER BETWEEN AGRICULTURAL AND NONAGRICULTURAL ACTIVITY, 1960-1964 AVERAGE

Note: Agricultural income is the sum of net income of farm operators (from the National Accounts DBS) and wages paid to agricultural labour (from Quarterly Bulletin of Agricultural Statistics DBS). Nonagriculture is earned income less agricultural income defined above. Worker refers to employed persons.

Source: Based on data from the Dominion Bureau of Statistics.

Among the regions, the Maritimes and Quebec show the largest gap in productivity (ranging from two and a half to three times) as between agricultural and nonagricultural activity, while the difference in the Prairie provinces and British Columbia is relatively small. Moreover, during the post-war period the relationship of income per worker as between the two sectors changed significantly in two of the regions. Sizeable alterations were recorded in Ontario where the productivity difference narrowed and in the Maritimes, where it widened. The evidence over the longer span of years, 1927 to 1963, suggests that all the regions with the exception of the Maritimes experienced a convergence in intersectoral productivity. The relative growth in agricultural productivity in the Maritimes then appears to have lagged seriously in comparison with the other regions. Whatever the changes over the longer period, however, it is clear from the data for the more recent period that the gap in productivity between agriculture and nonagricultural pursuits remains relatively large in the lowest-income regions. Thus an equiproportionate increase in the share of the nonagricultural labour force among the various regions would tend to favour a reduction in the degree of interregional income disparity.

TABLE 5

REGIONAL DIFFERENCES IN INCOME PER WORKER BETWEEN AGRICULTURAL AND NONAGRICULTURAL ACTIVITY

	(1)	(2)	(3)	(4)	(c) 1947	(0)		(8)	(6)
	Income per Worker in Agriculture	Income per Worker in Non- agriculture	Percentage Ratio 2/1	Income per Worker in Agriculture	Income per Worker in Non- agriculture	Percentage Ratio 5/4	Income per Worker in Agriculture	Income per Worker in Non- agriculture	Percentage Ratio 8/7
Maritimes	<b>\$</b> 348	\$ 881	253	\$	\$ 1,727	247	\$ 1,093	\$ 3,358	307
Quebec	393	1,121	285	747	1,858	249	1,492	3,804	255
Ontario	579	1,274	220	1,101	2,188	199	2,645	4,377	165
Prairies	975	1,299	133	1,522	2,087	137	3,191	4,150	130
British Columbia	625	1,213	194	1,646	2,106	128	3,786	4,581	121
Average for Region	584	1,158	198	1,143	1,993	174	2,441	4,054	166

Bulletin of Agricultural Statistics. DBS). Nonagriculture is earned income less agricultural income defined above. For 1927, worker refers to the labour force; for 1947 and 1963 it refers to employed persons.

Source: Based on data from the Dominion Bureau of Statistics; labour force data for 1926-27 from R.M. McInnis, op. cit.

# (c) Effects of labour force shift and productivity differences

From these considerations (based on data that are sometimes rather patchy) it would seem that the two factors – changes in the structure of the labour force, and sectoral productivity differences – both exert an influence in the direction of interregional convergence of earned income per worker. The magnitude of these combined influences may be gauged from the data shown in Table 6. There, a method is employed<sup>1</sup> which isolates the contribution of structural changes upon the growth of earned income per worker, over the periods 1927 to 1963 and 1947 to 1963.

From an examination of the data in Table 6, it emerges that the combined effect of labour force shift and productivity differences between activity sectors has not been particularly strong either at the national<sup>2</sup> or regional levels, nor for either of the two periods being compared. Among the regions, structural changes in the Maritimes and Quebec exerted the strongest influence upon the growth of productivity in both periods. In contrast, the structural factor contributed relatively little to the growth of earned income per worker in British Columbia. As between the two periods under review, the effect was more pronounced over the post-war years. This would suggest that over the longer period, which embraces the years of depression and war, the effect of the structural shift in economic activity was far outweighed by changes in the level of productivity recorded in each of the sectors considered separately. In other words, sectoral productivity growth was by far the more important independent factor in the over-all growth of productivity throughout the period; its relative importance, however; was somewhat reduced during the post-war period in favour of the structural influence.

Earlier, in evaluating the role of the separate factors in structural change, both the shift in labour force and sectoral productivity differences were found to exert a stronger favourable income effect in the lower-income provinces. While the contribution of structural change (combining both factors) has generally been small in magnitude, nevertheless the divergence in experience among the regions is consistent with this conclusion. The independent impact of structural change upon the interregional distribution of earned income per worker may be gauged by comparing the dispersion of earned income in the base period with that expected in the terminal period after allowing for the percentage contribution of structural

<sup>&</sup>lt;sup>1</sup>See United Nations Economic Commission for Europe, op. cit., Chapter III, p. 35. Briefly, the method splits the total change in productivity into three parts: one measures the increase in sectoral productivity assuming each sector's share in the total labour force unchanged; the second part measures the change in sectoral shares of the labour force assuming sectoral productivity levels unchanged; and the third is a measure of the interaction between the first two parts. In the present discussion, the interaction effect is ignored and the estimated contribution of structural change is treated as though it exerts an independent influence. To this extent, therefore, it is only the approximate effect of structural change that is being estimated here.

<sup>&</sup>lt;sup>2</sup> In comparison with other industrially advanced countries, the magnitude of the structural change effect experienced by Canada at the national level was relatively large. *Ibid.*, Chapter III.

TABLE 6

# CONTRIBUTION OF STRUCTURAL CHANGE BETWEEN AGRICULTURAL AND NONAGRICULTURAL ACTIVITY TO REGIONAL GROWTH OF INCOME PER WORKER, 1947 - 1963 and 1927 - 1963

		1947 - 1963			1927 - 1963	
	Growth of Earned Income per Worker	Structural Component	Percentage Contribution	Growth of Earned Income per Worker	Structural Component	Percentage Contribution
	(per cent pe	r annum)	Component	(per cent per	annum)	Component
Maritimes	4.7	0.7	14.9	4.2	0.5	11.9
Quebec	5.0	0.5	10.0	3.8	0.3	7.9
Ontario	4.8	0.3	6.2	3.8	0.2	5.2
Prairies	4.9	0.4	8.2	3.5	0.2	5.7
British Columbia	5.0	0.1	2.0	4.0	0.1	2.5
CANADA	4.9	0.4	8.2	3.8	0.3	7.9
Note: For 1947 and 1963 the t	erm worker refers to	employed persons	for 1927 it refe	s to the labour force	The increase in e	arned income ner

worker between 1927 and 1963, therefore, is slightly exaggerated.

Source: Based on data from the Dominion Bureau of Statistics. Labour force estimates for 1927 are from R.M. McInnis, op. cit.

changes in each region. The comparative indexes of dispersion (on a weighted<sup>1</sup> and unweighted basis) for the five major regions are as follows:

	Indexes of (per	Dispersion cent)
	Unweighted	Weighted
Actual Eamed Income per Worker 1927	16.3	13.4
Expected Earned Income per Worker in 1963 (including effect of structural change only)	15.0	12.0
Actual Earned Income per Worker 1963	12.5	9.6
Actual Earned Income per Worker 1947	11.6	10.3
Expected Earned Income per Worker in 1963 (including effect of structural change only)	9.0	8.3
Actual Earned Income per Worker 1963	12.5	9.6

Clearly the structural factor considered first on an unweighted basis of calculation has been a more important influence in the post-war period. When the impact of structural changes on interregional income dispersion is considered in isolation, the index falls by 2.6 percentage points. Over the longer period, the decline in the index is only 1.3 percentage points.<sup>2</sup> While the value of the weighted indexes is lower in each of the average years shown, the relative magnitude and direction of changes are similar to those revealed by the unweighted dispersions. The weighted structural impact upon interregional income dispersion amounts to a reduction of 1.4 percentage points between 1927 and 1963 and a reduction of 2 percentage points since 1947. The only difference in direction of movement between the two measures occurs between 1947 and 1963 where one index rises by .9 percentage points and the other falls by .7 percentage points.

It is obvious, however, that the structural factor is not the only one exerting an influence upon the interregional distribution of income. Over the longer period from 1927 to 1963 both measures of the degree of dispersion fell by a larger amount than expected from the impact of structural change alone. And during the post-war period the indexes showed little or no alteration notwithstanding the direction and magnitude of change indicated by the structural effect. The other apparently more powerful influence at work here is the rate of growth of productivity in the two sectors of economic activity.

The comparative experience among the five regions in respect of sectoral productivity growth is set out in Table 7. The unweighted interregional dispersion of productivity or income per worker for the total economy and its component sectors is shown for the three terminal years.

<sup>&</sup>lt;sup>1</sup> The weights are the population share of each region averaged over the relevant period.

<sup>&</sup>lt;sup>2</sup> The 1927 index since it is based on earned income per person in the labour force is slightly higher than it would be if measured in terms of earned income per employed person.

### TABLE 7

	(Per d	cent)	
	Earned Income per Worker	Income per Worker in Agriculture	Income per Worker in Non agriculture
1927	16.3	37.9	12.8
1947	11.6	35.5	8.9
1963	12.5	41.5	10.7

### INTERREGIONAL DISPERSION OF TOTAL AND SECTORAL INCOME PER WORKER

Source: Based on data from the Dominion Bureau of Statistics. Labour force data employed in the 1927 indexes are from R.M. McInnis, op. cit.

The interregional dispersion in income per worker in agriculture is relatively high.<sup>1</sup> In other words the rewards per worker in agriculture are widely disparate among the five regions of Canada. Moreover, while there was some tendency towards convergence until 1947, over the period 1927 to 1963 the degree of disparity has increased somewhat.<sup>2</sup> In the post-war period the rising index of dispersion suggests that the growth of productivity among the regions was particularly uneven.

The interregional dispersion of income per worker in nonagricultural activity is very much less than in agriculture. In contrast to the experience in agriculture, however, income disparity among the regions in nonagriculture has tended to narrow over the longer period. Thus, while both component indexes have displayed a similar direction of movement, the nonagricultural sector disparity emerges as the more important influence upon the level and change of the interregional dispersion of earned income per worker since 1927.

The magnitude of the influence that each sector exerts upon the dispersion of total eamed income per capita, can be evaluated along the lines set out in Appendix Note B. Employing the formulation for the case with explicit weights<sup>3</sup> and considering only the 1960-64 period as a whole, the nonagricultural sector emerges as the dominant independent influence. It accounts for roughly 70 per cent of the dispersion in earned income during this period. On the other hand, less than 1 per cent of the total variation is attributable to the independent influence of the agricultural sector.

<sup>&</sup>lt;sup>1</sup>But not as high, it will be recalled, as the dispersion of farm income per capita examined earlier.

<sup>&</sup>lt;sup>2</sup> Easterlin, op. cit., finds that the interregional dispersion of income per worker in agriculture in the United States has been constant, although the period he examines is very much longer.

<sup>&</sup>lt;sup>3</sup> Calculations were made on the basis of two weighting systems – sectoral shares of total employment and sectoral income shares. Both weighting systems yield essentially the same results.

The relationship between the three dispersion indexes is more clearly revealed in Chart 7 where annual variations are traced over the post-war period. The index for agriculture is seen to be high and relatively unstable in movement. The dispersion index for the nonagricultural sector rises during the first half of the post-war period and falls fairly continuously in the second half to a level slightly above that recorded in the first years following the end of the war. The curve traced out by the index of dispersion for earned income per worker is close to that for the nonagricultural sector and is almost identical to it in shape. Obviously the weight of the disparity in income per worker in agriculture in the dispersion of earned income per worker is small and even the widest swings in the former are reflected to a very limited extent in the latter.

# CHART 7



Source: Based on data from the Dominion Bureau of Statistics.

The above discussion has sought to evaluate the impact of intersectoral structural changes over time upon the interregional distribution of income. The implicit question is a "dynamic" one, so to speak, and has a counterpart question in "static" terms. What, it may be asked, is the effect of interregional differences in the structure of employment and income per worker upon the interregional distribution of income at any given point in time? Briefly stated, the answer is that differences in employment structure have little or no effect, while differences in income per worker or productivity do. This is to say that the index of interregional income dispersion would not be significantly altered if every region were to have identical employment structures (as between the agricultural and nonagricultural

sectors) equal to the Canadian average and with actual productivity levels in each region remaining unchanged. Turned the other way around, however, the interregional dispersion of income would fall significantly if every region were to have sectoral productivity levels equal to the Canadian average and with actual regional employment structures unchanged. At any given point of time, it is more the variation in productivity levels among regions and less the structural differences that contribute to the interregional disparity of income in Canada.

### IV. SUBREGIONAL INCOME DISTRIBUTION

The data examined so far are averages of income per capita or per worker for a province or a region. These vary greatly in size, but most are relatively large territories, embracing smaller differentiated areas or subregions. Conceptually, the averages might have been drawn from distributions of subregional incomes within the province or region. Since the centre of focus in the present analysis is upon the spatial or geographic dispersion of economic activity and the income it generates, it is of interest to consider the subregional level in the hierarchy of regional income distributions.<sup>1</sup> In fact, however, the income averages appearing in our calculations are obtained by taking total provincial personal income or its components as reported in the National Accounts and dividing by the number of provincial residents or workers, regardless of place of residence within the province. The geographical element within a region, therefore, does not appear in these statistics.

To evaluate the subregional distribution of income underlying the provincial average and to define the relationship between average income levels and the degree of subregional income dispersion, we must turn to another source of data.<sup>2</sup> The population sample taken in connection with the 1961 Census of Canada provides income data by county or census district for individuals 15 years of age and over for the year ended May 31, 1961. Unfortunately, it covers the nonfarm population only. Despite this apparent limitation, the population surveyed represents 83.8 per cent of the total adult population in Canada.<sup>3</sup> The income concept differs from that of personal income as defined in the National Accounts, and approximates more closely the notion of cash income received by the individual over a year. While these data fall short of the ideal requirements for an analysis of subregional income distributions, nevertheless they are useful for the present purpose. This is to illustrate, first, the degree of dispersion of subregional incomes and their relationship to average provincial income levels, and second to indicate the degree of variation in the rural-urban distribution of per capita incomes.

### **Subregional Dispersion**

Table 8 shows the ranking of the various provinces in respect of the level of average nonfarm income per person 15 years of age and over. The range of

<sup>&</sup>lt;sup>1</sup> The distribution of incomes by size class within each of the provinces was also examined. Since this material is outside the main lines of discussion, it is presented in Appendix Note CP

<sup>&</sup>lt;sup>2</sup>1961 Census of Canada, Population Sample, Catalogue 98-501 (Vol. IV), Dominion Bureau of Statistics. The differences in the two sources of income are to be set out fully in a forthcoming Dominion Bureau of Statistics Census Monograph being prepared by Miss J.R. Podoluk.

<sup>&</sup>lt;sup>3</sup>In provinces where agriculture remains important, the population represented is rather less than the national percentage. In Saskatchewan the survey covers only 62.0 per cent, and in Prince Edward Island 63.6 per cent, of the provincial population. In Newfoundland, on the other hand, the coverage is almost 93 per cent.

variation for income per adult is somewhat smaller than that for personal income per capita. Furthermore there is some difference in the rank ordering of provinces. Both Manitoba and Nova Scotia are each displaced by two ranks. The sum total of these differences is not insignificant, so that the rank orders yielded by the two sources of income data can only be said to be *approximately* the same.

Both the weighted and unweighted degree of subregional income dispersion for each province and major region is set out in the last two columns of Table 8.<sup>1</sup> Considering first the unweighted index, there would seem to be a reasonably close relationship between the various regional nonfarm income levels and their degree of dispersion among the subregions. If the five major regions are considered, the inverse relationship in terms of rankings is a perfect one. The association among the provinces, however, is not perfect since the indexes for British Columbia and Saskatchewan are both relatively low, given their average income levels. Imperfect as it is, the association, nevertheless, suggests that the higher the income level, the narrower is the spread of unweighted subregional incomes around the regional average. More broadly interpreted, it would suggest that high average provincial income levels not only reflect a relatively uniform degree of participation in the economic activity of the country as a whole, but also represent a uniform degree of participation among the subregions as well. The opposite inference applies to the lower-average-income provinces.

The relationship among regional levels of income and their weighted indexes of subregional dispersion does not reveal as consistent a pattern as that noted above. The procedure of weighting each subregion's income level by its population share in the province or region as a whole reduces the value of the index in some regions and raises it in others.<sup>2</sup> Weighting subregional income levels by population increases the degree of disparity most in Manitoba and Nova Scotia where average income levels are heavily influenced by the large population centres at Winnipeg and Halifax. In contrast, subregions with widely divergent income levels and small population (such as mining centres) are assigned less weight in the dispersion index in Ontario, British Columbia, Prince Edward Island, and Newfoundland. As a result of these divergent movements in the index of dispersion, calculated on a weighted basis, their relationship to average income levels among the various regions breaks down in the centre of the distribution, although it still holds for the comparison among provinces at the two extremes.

The significance of the weighted index in describing the relationship between average regional income levels and its intraregional dispersion is difficult to evaluate. This is because the income measure being examined here excludes the farm sector; and where large urban centres, with typically higher income per capita levels, account for sizeable shares of the regional nonfarm population, they exert a powerful influence upon the weighted dispersion index. Given this data limitation, the unweighted index may in fact provide a better indication of the degree of intraregional participation not only in terms of

<sup>&</sup>lt;sup>1</sup>The value of the unweighted dispersion index for Canada shown in Table 8 is lower than that based upon personal income per capita where the same number of provinces are covered (see Appendix Table A).

<sup>&</sup>lt;sup>2</sup> The index is raised where the subregions which deviate most from the regional average are heavily weighted in terms of their population shares in the total. The opposite is true where the index is reduced.

I ADEL V
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	Number of Subregions	Rank in Respect of Personal Income Per Capita	Average Nonfarm Income per Adult	Index of Di Unweighted	spersion Weighted
			\$	(per c	cent)
Ontario	10	1	2,407	11.7	10.3
British Columbia	10	2	2,365	8.3	6.3
Alberta	15	3	2,102	14.0	21.7
Quebec	10	5	1,877	15.5	23.0
Saskatchewan	18	6	1,858	14.8	20.8
Manitoba	20	4	1,678	17.3	39.7
New Brunswick	15	8	1,590	18.4	19.7
Prince Edward Island	3	9	1,505	16.1	15.8
Nova Scotia	18	7	1,460	18.5	32.6
Newfoundland	10	10	1,413	27.5	23.4
Prairies	53	_	1,859	17.9	30.2
Atlantic	46	-	1,495	21.0	26.1
CANADA	10		1,825	- 19.1	22.7
CANADA	238	-	1,832	27.2	33.4

SUBREGIONAL DISPERSION OF NONFARM INCOME PER ADULT, 1961

Note: Provinces are ranked in order of nonfarm income level in 1961. Subregions are defined by counties or census divisions except for Quebec and Ontario where the ten economic regions defined by each of the provinces were used. For Canada, the subregions are the ten provinces and the 238 counties or census divisions. Average nonfarm income per adult is obtained by summing the average income level for the subregions and dividing by their number. The subregional nonfarm population share within each province is the weight employed in calculating the weighted index of dispersion.

Source: Based on data from the Dominion Bureau of Statistics and in particular the Population Sample of the 1961 Census of Canada.

geographic areas, but also in terms of persons involved. This is all the more likely where average nonfarm income in a given rural area is an accurate reflection of the level of farm income in that area.

It will be noted that the income dispersions calculated for each of the provinces are based on a varying number of subregions. This raises a difficulty similar to that encountered earlier in the discussion of income dispersion among various regional groupings in Canada. To what extent, that is, does the comparative value of the dispersion index among the provinces reflect "true" disparity in subregional income levels rather than variations in number of subregions? It appears from the indexes shown in Table 8 that the larger the number of subregions, the higher the value of the dispersion index tends to be. This is perhaps truer for the unweighted than the weighted series of indexes, although in neither case is the relationship a systematic one. There are numerous exceptions to this general rule which leads to the suggestion that even where indexes are based on different numbers of subregions, comparisons can still be meaningful. Ultimately, the issue hinges upon the magnitude of the difference between the indexes being compared and the degree of arbitrariness that enters into the geographic delimitation of the subregions.<sup>1</sup>

That the effect of varying numbers of subregions does not emerge systematically from the data shown in Table 8<sup>2</sup> may be seen more clearly for those four provinces, each of which contains an equal number (ten) of subregions. In this comparison, British Columbia appears as the only province which does not conform to the expected order although the difference between the weighted indexes for Quebec and Newfoundland are probably not significant. Correcting then for varying numbers of subregions, the weight of evidence would appear to support the existence of a negative association between income levels and the degree of intraregional income dispersion.

Province (in	Average Nonfarm Income per Adult	Index of D (per c	ispersion ent)
rank order)	\$	Unweighted	Weighted
Ontario	2,407	11.7	10.3
British Columbia	2,365	8.3	6.3
Quebec	1,877	15.5	23.0
Newfoundland	1,413	27.5	23.4

A partial correction - at least at the visual level - for varying numbers of subregions among the provinces may be introduced by considering their frequency distribution. The distributions in the form of histograms are shown in Chart 8, and include those for the Atlantic and Prairie groupings as well as Canada. The percentage frequency distributions reveal more clearly the underlying influence upon the various provincial dispersion indexes. The distributions for the three Atlantic provinces are essentially bi-modal and this is reflected in the relatively high values of dispersion recorded there. The "stubby" distribution for British Columbia, on the other hand, is consistent with its low index of dispersion. The differences in skewness and range as between the distribution of Quebec and Ontario may be noted as well as those between the Atlantic region and the Prairies. The distribution for all Canada, which most approximates that of a normal distribution, provides a basis for comparison among the provinces. Finally, it will be observed that, despite considerable overlapping of provincial distributions, the subregions with the lowest levels of nonfarm income per adult are all located in the Atlantic region.

<sup>&</sup>lt;sup>1</sup>See Appendix Note A. It is of interest to note that the unweighted intraregional dispersion indexes are related to the intraregional distribution of nonfarm income by size category. The latter, measured by the Gini coefficient is shown in Appendix Note C, Table C-2. The Spearman rank correlation coefficient between the Gini coefficient and the dispersion index is .509, a value which is not quite significant at the 5 per cent level. The correlation is most affected by the rank deviations of Manitoba and Saskatchewan.

<sup>&</sup>lt;sup>2</sup> For Ontario and Quebec, counties or census districts have been grouped into ten economic regions. It is interesting to note that the unweighted index of dispersion for 54 subregions in Ontario is 18.75 per cent, and for 75 subregions in Quebec it is 19.48 per cent.

### CHART 8

### FREQUENCY DISTRIBUTION OF SUBREGIONAL INCOME PER ADULT BY PROVINCE, MAJOR REGION AND CANADA, 1961



Note: For Canada, the distribution covers 238 counties or census districts. Source: Based on data from the Dominion Bureau of Statistics.

### **Rural-Urban Differentials**

It was suggested above that the divergence among provinces in the weighted and unweighted intraregional dispersion of income can be traced, in part, to the influence of urban concentrations of population. The geographical dispersion that is suggested by urban and rural place of residence cuts across that which we have been considering hitherto. Here, it is proposed to do nothing more than indicate the order of importance of rural-urban differentials in interregional income comparisons, and bring to the fore the differences which are suppressed by a provincial average.<sup>1</sup>

Table 9 sets out the interprovincial differences in nonfarm income per adult, when account is taken of rural and urban<sup>2</sup> place of residence. The average urban income levels are everywhere significantly higher than those of rural nonfarm areas. What is more, the dispersion of average urban incomes around the national average is very much lower – almost 8 percentage points – than the spread of average rural nonfarm incomes around its national average. Thus the degree of dispersion of rural nonfarm incomes apparently exerts an important influence upon the dispersion of total nonfarm income per adult.

Comparing the rural-urban income differential within each province (Table 9, Col. 4) the divergence is least in British Columbia, Ontario and Alberta, the provinces with the highest levels of total nonfarm income per adult. In these provinces rural incomes, on the average, are approximately three quarters as large as those in urban areas. In contrast, rural nonfarm residents in Newfound-land, Prince Edward Island and New Brunswick received little more than three fifths the income of urban dwellers in 1961. Considered in relation to the proportion of urban residents in the total nonfarm adult population within each province (Table 9, Col. 5), rural-urban differentials accord reasonably well with the provincial ranking in respect of total nonfarm income per adult. The relationship is less clear-cut when the urban share of the total population (Table 9, Col. 6) is considered.

An examination of the data shown in Table 9 suggests that, in general, where the degree of urbanization is greater, the total provincial income per adult tends to be higher and the rural-urban income differential is lower. These relationships emerge most clearly when we compare the groups of provinces at either extreme of the total income distribution or in comparing the Atlantic and Prairie regions. The experience of Manitoba and Quebec, however, depart significantly from the association among the variables suggested above. In both cases the relatively high degree of urbanization affects their rank ordering.

<sup>&</sup>lt;sup>1</sup> The data underlying the following discussion are also taken from the Population Sample of the 1961 Census of Population. A more detailed analysis of rural-urban differences based on this source of data will be found in the forthcoming Dominion Bureau of Statistics Census Monograph being prepared by Miss J.R. Podoluk. See also Frank T. Denton, op. cit., Tables A-18 and A-19, and Appendix D, where the influence of interregional variations in size of urban areas upon average earnings is explored.

<sup>&</sup>lt;sup>2</sup> Urban centres are those with at least 1,000 persons and includes the urbanized fringe of metropolitan areas.

### TABLE 9

	(1)	(2)	(3)	(4)	(5)	(6)
Province or Region	Average Income per Adult in Urban Areas	Average Income per Adult in Rural Nonfarm Areas	Average Nonfarm Income per Adult	$\frac{\operatorname{Col}(2)}{\operatorname{Col}(1)}$	Urban Share of Adult Nonfarm Population	Urban Share of Total Population
		(Dollars)			(Per cent)	
Ontario	2,613	1,928	2,518	73.8	86.1	77.3
Alberta	2,572	1,817	2,441	70.6	82.5	63.3
British Columbia	2,532	2,054	2,428	81.1	78.2	72.6
Manitoba	2,399	1,498	2,226	62.4	80.9	63.9
Quebec	2,224	1,407	2,103	63.3	85.2	74.3
Saskatchewan	2,338	1,530	2,063	65.4	66.0	43.0
Nova Scotia	2,021	1,335	1,745	66.0	59.8	54.3
New Brunswick	1,971	1,312	1,671	66.4	54.1	46.5
Prince Edward Island	1,902	1,259	1,594	66.2	52.0	32.4
Newfoundland	1,780	994	1,406	55.8	52.5	50.6
Index of Dispersion						
(per cent)	12.8	20.6	18.5			
Prairies	2,464	1,617	2,275	67.6	77.5	57.6
Atlantic	1,948	1,235	1,634	63.4	55.9	49.7
CANADA	2,421	1,615	2,266	66.7	80.8	69.6

### RURAL-URBAN DISTRIBUTION OF NONFARM INCOME PER ADULT, 1961

Note: Provinces are ranked in order of the level of total nonfarm income per adult. For each province urban income per adult is derived by dividing total urban income by the number of adult urban residents. Similarly rural income per adult is obtained by dividing total nonfarm income by the number of adult nonfarm rural residents.

Source: Based on data from the Dominion Bureau of Statistics and in particular the Population Sample of the 1961 Census of Canada.

Interregional income disparity, when viewed from the standpoint of ruralurban distributions reveals itself in still another form. On the basis of the 1961

data, there appears to be a significant difference in the index of dispersion as between urban and rural incomes. If the evidence for this single year can be taken to reflect a more permanent condition, it suggests that interregional inequality is greater among rural than urban geographic areas. Moreover, it is the Atlantic group of provinces, and particularly the rural dwellers of that region, that appear to depart furthest from what might be called the average degree of participation.

Owing to the limitations of the data, it would be hazardous indeed to draw firm conclusions from the rural-urban income comparisons made above. The available evidence would suggest, however, that the extent of urbanization (and all it implies for the structure and organization of economic activity) appears to be an important factor in explaining interregional income differentials. This is true at least for the provinces at the extreme ends of the distribution.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Frank T. Denton, op. cit., concludes from his examination of rural-urban differences that the "Rural-urban distribution clearly is a factor in accounting for differences in the level of earnings". In that study earnings refer to average annual earnings of male wageearners taken from the 1961 Census.

### V. INTERREGIONAL DISPERSION OF REAL INCOME

To this point, the discussion of interregional income disparity has been based upon data in current dollars. The National Accounts, which have been the major source of information for our analysis, do not provide constant dollar estimates for any regional series. Thus, no allowance has been made for distortions in interregional income comparisons that might arise from differential price levels or price movements among the various regions. Our ultimate interest is in real rather than money income comparisons. In this section the effect of variations in prices upon income disparity is evaluated to the extent permitted by the data. Only tentative conclusions can be drawn, however, in view of certain deficiencies in the basic price data.

An important source of information for our purposes is the consumer price indexes prepared by the Dominion Bureau of Statistics for eleven regional cities across Canada. These series, however, are intended to measure changes in prices of consumer goods and services over time, for each of the cities taken separately and are therefore in appropriate for a comparison of price levels as between two cities. It is the latter type of comparison that is relevant to the analysis of interregional real income disparity.

There are numerous conceptual problems surrounding the construction of over-all price indexes which permit comparisons among geographic areas.<sup>1</sup> On a purely experimental basis, and drawing upon the data from the regular DBS survey of consumers prices, a *common* market basket was evaluated for major regional cities as of January 1963. The basket covered roughly two thirds of the normal content of the consumer price index. The major items excluded were part of household operations (including shelter costs), clothing and jewelry.<sup>2</sup> While admittedly incomplete, the resulting spatial price indexes provide a preliminary basis for evaluating real income levels among regions.<sup>3</sup>

The January price indexes were corrected for seasonality, so as to provide estimates for the year 1963. The 1963 spatial price indexes were then extended through time by applying the published consumer price series for each regional city. The end result is a set of regional price indexes based upon Winnipeg

<sup>&</sup>lt;sup>1</sup>Spatial price indexes are published by the DBS but these cover the food group only, which represents 26.7 per cent of the consumer basket.

<sup>&</sup>lt;sup>2</sup> We have assumed, somewhat boldly perhaps, that the city price index is representative of the consumer price structure for the province as a whole. Since the price survey did not cover a city in Prince Edward Island, the 1963 base index for New Brunswick was taken to represent the level of prices in the former province.

<sup>&</sup>lt;sup>3</sup> The omission of shelter costs, which represent approximately 18 per cent of the consumer basket, is perhaps the most serious deficiency. A potential deficiency is the untested assumption that price levels compared among the various major cities reflect the interprovincial structure of consumer prices. The effect of assuming a common basket with constant weights was also explored. It emerged that a varying weighting pattern for 11 regional cities (that is, each city's price level weighted by every other city's consumption pattern) affects the price index by no more than two percentage points.

(Manitoba) 1963 - 100, covering the years back to 1939 (see Appendix Table B). Calculated in this way, regional price indexes permit comparisons of price levels among regions for any of the years covered. Finally, the regional price indexes were applied as deflators to yield real personal income per capita series for each province for the period 1939 to 1964.<sup>1</sup>

The influence of spatial price differences upon the interregional structure of personal income per capita is shown in Table 10 in which regional incomes in current and constant dollars are compared for 1963. Also shown are the spatial price indexes for 1963 and regional price changes since 1940. The price indexes clearly reveal a significant variation in price levels among the regions of Canada. Newfoundland and British Columbia show the most marked deviation, while the Atlantic region as a whole emerges as an area of relatively high consumer prices.

We may also note the apparent relationship between regional price levels and proximity to the "centre" of Canada. If the base of the price index were shifted to Ontario one could say roughly that prices tend to rise with increasing distance either east or west. The provinces at the extremes, at least, bear out this suggestion. From the viewpoint of exclusively horizontal trade flows, varying transport costs are probably an important element in contributing to the spatial price differentials that are revealed in Table 10.

	Person Per Ca	al Income pita, 1963	Regi	Regional Price Indexes			
	Current Dollars	Constant Dollars	1963	Average Percentag	e Annual ge Change		
	\$	\$	\$	1940-63	1947-63		
Ontario	2,025	2,002	101.1	4.4	3.5		
British Columbia	1,966	1,799	109.3	4.5	3.4		
Alberta	1,750	1,717	101.9	3.9	3.0		
Saskatchewan	1,749	1,659	105.4	4.2	3.1		
Manitoba	1,721	1,717	100.2	4.1	3.2		
Quebec	1.521	1,450	104.9	4.5	3.4		
Nova Scotia	1,302	1,224	106.4	4.0	3.1		
New Brunswick	1,167	1,094	106.6	4.3	3.4		
Prince Edward Is	1,115	1,045	106.6	4.3	3.4		
Newfoundland	1,009	878	114.9		1.6		

### TABLE 10

PERSONAL	INCOME	PER	CAPIT	A IN	CUR	REN	T AND
CONSTANT D	OLLARS	AND	PRICE	INDE	XES	BY	PROVINCE

Note: Provinces are ranked in order of personal income per capita in current prices. Price indexes for Prince Edward Island are assumed equivalent to the price index for New Brunswick. The average annual change in prices for Newfoundland is for the period 1952-63.

Source: Based upon data from the Dominion Bureau of Statistics.

<sup>&</sup>lt;sup>1</sup> For Newfoundland, the constant price series begins in 1951.

It is evident from Table 10 that the interprovincial structure of personal income in constant dollars differs in a number of respects from that in current dollars. The effect of allowing for price differences lowers the level of real income in all provinces in relation to Manitoba. At the same time, the difference between the high and low provinces in respect of real income is increased in both absolute and relative terms. The increase in the real income range follows from the fact that the relative price level in Newfoundland is the highest of all while that of Ontario is next to the lowest. Furthermore, the rank ordering of provinces in respect of real income of the latter province becomes identical with that of Alberta. Thus, the evidence for 1963 suggests that there is some deterioration in the position of the lower-income provinces in the interregional distribution of personal income when spatial price differences are taken into account. The price effect is particularly significant in the case of Newfoundland.

The average annual rates of change in regional price levels during two overlapping periods are indicated in the last two columns of Table 10. Excluding Newfoundland, where the period is different, it will be seen that the annual rates of price change among the provinces are closely bunched. The maximum spread is six tenths of a percentage point for both of the periods shown. Considering that the longer period under review included a World War, post-war dismantling and reconstruction and the Korean hostilities, the magnitude of the spread may be taken to reflect a fair degree of uniformity in interregional price movements.<sup>1</sup> Under these circumstances differential price changes are not likely to exert a strong distorting influence upon varying interregional income disparity when this is measured in terms of personal income per capita in current dollars.<sup>2</sup>

That this has in fact been the experience since  $19\overline{40}$  is revealed by the data in Table 11. There, the dispersion of personal income per capita in both current and constant dollars is compared for three periods.

<sup>&</sup>lt;sup>1</sup> It is recognized that a spread of .6 of a percentage point in the annual rate of price increase between the extreme regions could, over a long period, produce a significant divergence. For example, over a period of 23 years, such as we have under review, it is possible for price levels to diverge by as much as 13.8 per cent. The ultimate effect upon interregional income disparity in real terms, however, cannot be estimated from the price movements alone, since the initial levels of income in the various provinces are also important in determining the end result. Indeed, the total effect on the structure of interregional incomes will depend upon the mesh between the initial distribution of incomes per capita and the distribution of price changes. As shown in the subsequent discussion, the experience in Canada since 1940 suggests that the interregional divergence in rates of change of prices was almost completely offset. It may also be noted that over the 23-year period, the three largest provinces (together accounting for almost three quarters of the Canadian population) recorded a divergence in the rate of price increase of only one tenth of a percentage point. On a weighted basis, therefore, the influence of divergent price movements is considerably reduced.

<sup>&</sup>lt;sup>2</sup> A study of the United States experience from 1929 to 1953 concludes, "Variations in price change between states were not of sufficient magnitude to shift the position of most states from their relative levels in terms of current dollar per capita income which changed so dramatically over the twenty-five year period". A. Hurwitz and C.P. Stallings, "Interregional Differentials in Per Capita Real Income Change", in *Regional Income*, Studies in Income and Wealth, Volume Twenty-one, National Bureau of Economic Research, Princeton, 1957, p. 217.

### TABLE 11

	(1)	(2)	
	Constant Dollars	Current Dollars	Difference (1) - (2)
Nine provinces (1940	29.5	28.3	1.2
excluding Nfld. (1947	22.4	21.3	1.1
(1963	20.9	19.7	1.2
Ten provinces 1963	24.5	22.7	1.8

### INTERREGIONAL DISPERSION OF PERSONAL INCOME PER CAPITA IN CURRENT AND CONSTANT DOLLARS for 1940, 1947 and 1963

Note: Constant dollar dispersion indexes are based upon consumer prices in Manitoba 1963 = 100.

Source: Based on data from the Dominion Bureau of Statistics.

All the dispersion indexes for income in constant dollars are slightly higher than those for current dollars. The maximum spread in the dispersion indexes for the nine provinces excluding Newfoundland is only 1.2 percentage points.<sup>1</sup> Furthermore, there is virtually no variation between the indexes over time in respect of either direction or magnitude. Between 1940 and 1947 both indexes fall significantly while over the post-war period they show little or no change. When Newfoundland, the province with the lowest personal income per capita, is added for the 1963 comparison, the degree of income dispersion is increased in respect of both constant and current dollars. At the same time the difference between the two indexes rises to 1.8<sup>1</sup> percentage points owing to the fact that the relative price level in Newfoundland is the highest of all the regions in Canada.

The interregional pattern of real income growth is portrayed in Chart 9. Plotted there, are series of real personal income per capita for nine provinces covering the period 1939 to 1964, while for Newfoundland the shorter period from 1951 to 1964 is traced. Evident from the Chart is the rapid growth of real income experienced by all the provinces during the war period and the setback associated with the economic readjustment in the post-war years. For some of the provinces the impact of the Korean boom may be detected, but the changes in real income are not as marked as those before 1950. During the remainder of the period the movement in real income for most of the provinces is steadily upward.

The major changes in the interprovincial structure of real income since 1939 emerge fairly clearly from Chart 9. A striking feature to be noted, however, is the sharp fluctuations in real income experienced by the Prairie provinces in general and by Saskatchewan in particular. Of the other provinces, Prince Edward Island displays a marked degree of fluctuations in real income but these

<sup>&</sup>lt;sup>1</sup>On the basis of the standard significance test for differences between means, the difference recorded is not significant at the 5 per cent level.

are moderate in comparison with the Saskatchewan experience. In all these cases, the volatility of income movements is to be attributed to the farm income component of personal income. This is the same phenomenon encountered in the earlier discussion of personal income dispersion.

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### CHART 9

GROWTH OF REAL PERSONAL INCOME PER CAPITA, BY PROVINCE, 1939-64



Note: The consumer price indexes with base Winnipeg 1963 = 100 were employed as the deflators.

Source: Based on data from Dominion Bureau of Statistics.

The evidence, tentative as it is, appears to support the inference drawn earlier that differential price movements among the various regions have not significantly influenced the degree of income dispersion recorded over the past quarter century. For any given year, moreover, differences in regional price levels do no significantly affect the degree of interregional income disparity. In terms of real income, the extent of disparity as measured by our index is not altered. In other words, the degree of provincial participation in national economic development and its changes over time as measured in terms of personal income per capita in current dollars, would seem to accurately reflect changes in real incomes as well.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup>This conclusion applies equally well to comparisons made in terms of weighted indexes of dispersion.

### VI. INTERNATIONAL COMPARISONS

Comparisons among countries can be useful, since they provide a basis for evaluating the experience of any one country within a wider range of observation. With this limited purpose in mind, this section compares the level and variations in the degree of interregional income dispersion for Canada with the experience of Australia and the United States.<sup>1</sup> These three countries are all relatively large in size and have federal systems of government organization. These common factors enhance the degree of comparability among measures of income dispersion. It must be recognized, however, that international comparisons in general are subject to serious limitations, if only because the economic structure, the stage of development and system of economic organization vary from country to country. More particularly, differences among countries in the number of regions defined<sup>2</sup> in the time periods for which the data are available, and in the various forces which affect interregional cohesion, will reduce the value of comparisons which focus upon interregional income disparity.

Bearing these limitations in mind, roughly comparable data have been assembled to permit a comparison of the experience in Canada with that of Australia and the United States. The number of regions vary from country to country as does the time period covered by the data. For Canada the index based on the five major regions<sup>3</sup> was deemed most appropriate for comparison with indexes based on eight for the United States and six for Australia. Moreover, the comparison among the countries is made in terms of both weighted and unweighted dispersion indexes.<sup>4</sup> These appear in Charts 10A and 10B.

From Chart 10A it will be seen that the degree of income dispersion in both North American countries is significantly higher than that in Australia. As between Canada and the United States, the index of income dispersion in the

<sup>&</sup>lt;sup>1</sup> The experience of Brazil was also examined but omitted from the discussion in view of the widely disparate economic and social conditions between that country and the other three. The resulting comparison was not judged to be useful for present purposes. International comparisons of interregional income dispersion, covering as many as 24 countries, are imaginatively explored in Jeffrey G. Williamson, op. cit.

<sup>&</sup>lt;sup>2</sup> See Appendix Note A for a discussion of comparisons based on varying numbers of regions.

<sup>&</sup>lt;sup>3</sup> For ten provinces, the index of dispersion curve undergoes an upward vertical displacement throughout its length. The same is true for the United States curve based on 48 states.

<sup>&</sup>lt;sup>4</sup> Williamson, *ibid.*, employs weighted dispersion indexes presumably to overcome the difficulty of making international comparisons, where the number of regions vary. The weighting procedure can reasonably be expected to correct for arbitrariness in the delineation of regions within each nation. The extent of the correction required, however, turns out to be relatively small. For the 24 countries appearing in Table 1, page 12 of Williamson's study, the Spearman rank correlation coefficient between the weighted and unweighted coefficient of variation is .898. All that this suggests is that the rank ordering of countries is almost equally well represented by either index of dispersion. It is interesting to note that Canada displays the largest rank deviation of all countries. More generally, in the international comparisons made by Williamson, Canada's experience appears to have been fairly unique.

former is equal to or below that of the latter country until the early post-war years. Thereafter, the index for Canada lies above that for the United States.

CHART IOA UNWEIGHTED INTERREGIONAL DISPARITY IN PERSONAL INCOME PER CAPITA FOR AUSTRALIA, CANADA AND THE UNITED STATES



Source: Australia – Commonwealth Bureau of Census and Statistics, Australian National Accounts 1948-49 to 1962-63 and Official Yearbook of the Commonwealth of Australia, Canberra, Australia.

Canada - based on data from Dominion Bureau of Statistics.

United States -

U.S. Department of Commerce, Survey of Current Business, April 1965, and Supplement, Personal Income by States since 1929, Washington, D.C.

The intercountry comparison on the basis of a weighted index of dispersion is shown in Chart 10B. The Australian index when weighted falls in value and remains below those of the other two countries. The weighting procedure, as we have already seen, tends to reduce the value of the Canadian index throughout the period. This is because the influence of the Atlantic (the most divergent region in respect of level of income), and to a lesser extent British Columbia, upon the value of the dispersion index is reduced. In contrast, the effect of weighting the various regions in the United States by their population shares, is to raise the degree of dispersion in every year shown, by roughly two to three percentage points. The displacement of the curve for the United States is less than that for Canada and reflects the relatively more evenly distributed pattern of personal income and population among the eight regions in the United States. As a consequence of these changes in the two curves, the difference in the index of income distribution as between Canada and the United States is widened for the period until the early post-war years; the two indexes become virtually identical thereafter.<sup>1</sup>



The relative position of the dispersion curves for the three countries varies in accordance with the basis of calculation, although their shape undergoes little or no alteration. The curve describing the unweighted index for Australia is negatively sloped while that based on the weighted index of dispersion is approximately a horizontal straight line. Both indexes for Canada display a slightly negative trend – the slope being somewhat larger in the case of the unweighted series. For the United States the indexes trace out curves with distinct and significant downward movements throughout the period covered. The decline in both indexes from 1930 to 1962 is of the order of 50 per cent. Of the three countries, the United States experience suggests an almost continuous tendency towards convergence in the degree of interregional income disparity; a tendency

<sup>&</sup>lt;sup>1</sup> The value of the dispersion index for Brazil for various post-war years is roughly 70 per cent on a weighted basis and somewhat higher when the unweighted measure of calculation is used. The high index value for Brazil reflects what has been termed the "dualistic" structure of its economy. Some parts of the country are very highly developed, while in others, notably the Northeast, the stage of economic development is primitive. Under these circumstances, the interregional income distribution will be bi-modal and the index of dispersion relatively high. An especially interesting feature of the Brazilian experience is the relative stability displayed by the dispersion indexes in recent years in the face of extremely large increases in the level of prices.

which emerges, moreover, whether regional income levels are weighted by their population shares or not.<sup>1</sup> In comparison, the Canadian experience is one of relative stability in the pattern of both the weighted and unweighted interregional income distribution over time. Over the relatively brief fifteen-year period recorded for Australia, there was a tendency towards convergence in the unweighted degree of income disparity. The tendency is eliminated, however, when variations in the interregional distribution of population are taken into consideration.

The longer series available for Canada and the United States provides the basis for a more detailed comparison. One prominent feature to be noted in the comparison is the erratic short-period variations that characterize the Canadian dispersion indexes. In part, this is a reflection of the differing importance of primary production in the aggregate and in the pattern of interregional distribution as between the two countries. A second comparative feature of interest is the fairly close parallel movement displayed by the dispersion indexes in the two countries between the late 1920's and the end of the War. In the post-war period, however there was considerable divergence in the movement of the indexes. In Canada the degree of interregional income disparity rose significantly until the early 1950's while that of the United States continued its downward trend. The comparison suggests that, until the early post-war years, the forces affecting interregional income disparity were similar in the two countries or, if not similar, were at least in the same direction. In the subsequent period, however, there would appear to have been a marked change as between the two countries, in the quality or magnitude of the underlying factors affecting the interregional distribution of income.

There are a number of general considerations which contribute to an understanding – if not to an explanation – of the differences in the degree and variation of interregional income disparity among the three countries. The relatively low value of the dispersion index for Australia is of special interest.<sup>2</sup> Among the likely contributing factors are the pattern of settlement and the high degree of urbanization in that country. Furthermore, highly centralized policies which produce nation-wide uniformities in respect of wage determination and public investment, are combined with a strong tradition in favour of income redistribution. Absent in Australia are the economic "problem areas" common to many of the European countries, or to Canada and the United States. Indeed the high degree of egalitarianism that pervades much of Australian economic and social life appears to be reflected in the equality of regional participation in the national economy as well.

The outstanding feature of the United States experience has been the convergence in interregional income levels; in contrast, the Canadian experience has been one of persistence in the degree of interregional income disparity over

<sup>&</sup>lt;sup>1</sup> There is evidence to suggest that the convergence in the interregional income distribution in the United States is of much longer standing than indicated by the period under review here. See for example, Easterlin, op. cit., who pushes the record back to 1880. Williamson, op. cit., however, has an estimate of the weighted interregional dispersion of income for 1840 which is below that for 1880.

<sup>&</sup>lt;sup>2</sup> The Australian index is the lowest of all the 24 countries studied by Williamson, op. cit.

time. The contrast between the two countries is particularly marked for the postwar period. It may be noted, in this connection, that a dominating feature of recent economic history in the United States has been the geographic dispersal of industry and the redistribution of population in favour of southern and westem regions. In other words, the capacity for economic growth has become more widespread regionally and has embraced areas which traditionally were outside the mainstream of economic advance. Of special significance has been the rapid economic development in the southern regions of the United States (where per capita income levels have been lowest of all regions) during and since the Second World War. Thus, the extremely high rate of economic growth experienced in these regions in recent years, combined with a significant out-migration of population, has contributed in large measure to the continued fall in the degree of income dispersion for the United States as a whole.<sup>1</sup>

This brief and limited comparison of international experience is not intended to yield firm conclusions applicable to Canada. The comparison in the levels and variations of income dispersion among the three countries, however, does provide a broader perspective within which Canada's experience may be better judged.<sup>2</sup>

<sup>&</sup>lt;sup>1</sup> This is an oversimplification of a complex process underlying the United States experience. The question has been explored in depth in the monumental study by S. Kuznets, Ann Ratner Miller and Richard A. Easterlin, *Population Redistribution and Economic Growth*, United States 1870-1950, Volume II, The American Philosophical Society, Philadelphia, 1960. The more recent period is covered in Harvey S. Perloff, Edgar S. Dunn Jr., Eric E. Lampard, and Richard F. Muth, *Regions, Resources and Economic Growth*, Resources for the Future Inc., Baltimore, 1960.

<sup>&</sup>lt;sup>2</sup> In his study, Williamson, op. cit., seeks to establish a systematic relationship between the stage of national economic development and the degree of interregional income inequality. The hypothesis posed is that the long-run movement in interregional income dispersion over the various phases of a country's economic development is described by an inverted "U". The Canadian experience, he finds, does not always conform with expectations. The difficulty, in part, is the arbitrary slice of history that he is required to examine for Canada; and there is no assurance that it is at all comparable with that of the United States, let alone other countries. A more detailed comparison between Canada and the United States and covering a longer historical period should prove to be highly rewarding. A start on providing the necessary, historical estimates of regional income and population has been made by R.M. McInnis, op. cit. In this connection the work of Alan G. Green, op. cit., is also relevant.

### VII. INCOME AND POPULATION GROWTH

The various income estimates employed in this study have all been considered in relation to the population or labour force within the province or subregion. Conceptually, the resulting ratio is a rough measure of productivity on the one hand and the level of economic welfare in the region, on the other. At the same time, the per capita or per worker indicator is a standardized unit of measurement which provides a basis for comparisons among regions. It is well to recognize, however, that this procedure, in respect of personal income per capita for example, obscures the separate movements of personal income in the numerator, on the one hand, and population in the denominator of this ratio, on the other. Our major concern in this section is to examine the rate of growth of the separate elements of personal income per capita.

### TABLE 12

		1927-63			1947-63	
Province	Personal Income Per Capita	Total Personal Income	Population	Personal Income Per Capita	Total Personal Income	Population
Ont	3.9	5.9	2.0	4.6	7.5	2.8
B.C	3.7	6.6	2.8	4.4	7.7	3.1
Alta	3.5	5.8	2.2	4.1	7.6	3.4
Sask	3.8	4.2	0.3	4.9	5.6	0.7
Man	3.8	4.9	1.0	4.3	6.0	1.6
Que	3.9	6.0	2.0	4.9	7.5	2.5
N.S	4.2	5.3	1.1	4.2	5.5	1.3
N.B	4.1	5.3	1.2	4.1	5.6	1.4
P.E.I Average	4.3	4.8	0.6	5.4	6.3	0.8
for						
Provinces (Nfld.)	3.9	5.4	1.5	4.5 (5.3)	6.6 (7.8)	2.0 (2.4)

### GROWTH OF PROVINCIAL INCOME AND POPULATION (Average annual percentage change in current dollars)

Note: Provinces are ranked in respect of level of personal income per capita in 1963, and the period for Newfoundland is 1950-63.

Source: Based on data from the Dominion Bureau of Statistics.

The growth of regional personal income per capita for various periods since 1926 was described in an earlier discussion. The relevant data are reproduced in Table 12 and cover the periods 1927 to 1963 and 1947 to 1963. It was noted that the rate of growth of per capita income over the four decades was closely comparable among the various provinces, ranging between 4.3 per cent for Prince Edward Island to 3.5 per cent for Alberta. Moreover, the modest narrowing in the relative spread of provincial incomes was related to the interregional pattern of rates of growth — rates of advance in income per capita in the higher-income provinces were at or below the provincial average, while those in the lower-income provinces were at or above the average rate of per capita income growth.

During the post-war period, rates of income growth in per capita terms were generally higher than those for the longer period but were less closely bunched around the provincial average. The largest deviation was recorded by Prince Edward Island. However, the effect upon interregional income disparity over this period does not emerge as clearly from the pattern of regional growth rates. Of those provinces with below-average income levels, two recorded higher-thanaverage rates of income advance and two were lower. There was also a mixed pattern among the higher-income provinces. On balance the degree of interregional income disparity between 1947 and 1963 actually increased slightly.

The rate of growth of the two elements — total personal income and population — are also shown in Table 12. It emerges that total personal income has grown at more variable rates than personal income per capita. Moreover, for neither period is there a consistent pattern in the rates of growth of the two measures of regional income. The highest rates of advance in total personal income were recorded in Ontario, British Columbia and Alberta. At the same time they experienced the highest rates of population growth and, as a consequence, personal income per capita grew at average or even below-average rates. In contrast, below-average growth in total personal income was experienced by Prince Edward Island and Saskatchewan during the post-war period. However, these were coupled with the lowest rates of population growth so that per capita incomes in the two provinces grew as fast as, or faster than, any of the other provinces.

The absence of a systematic relationship between per person and total income growth among the various provinces is due to the differential rates of population increase. The interaction among these three variables is clearly portrayed in Chart 11. The underlying data are taken from Table 12 and refer to the longer-run period 1927 to 1963. The provinces are ordered in respect of the rate of growth of total personal income with British Columbia at one extreme and Saskatchewan at the other. The contrasting experience between these two provinces is sharply defined by the graphic form of presentation. Despite the fact that the two provinces recorded extreme variations in the rate of growth of both total personal income and population, personal income per capita advanced at virtually the same rate between 1927 and 1963. The experience in some of the other provinces provide equally interesting illustrations of the interaction among the three variables.

The provincial groupings and the source of their divergence as between personal income and population growth are strikingly revealed in Table 13. Shown there are the results of an analysis comparing the direction and magnitude of changes in income and population among the various regions in relation to the national average.<sup>1</sup> The provinces in the columns labelled "upward shifts" are those which, over the post-war period, have experienced increases in personal income and population which are above the average increases for the nine provinces as a whole. The opposite applies to the group showing "downward shifts". While the latter have recorded absolute increases in both population and income, nevertheless, their growth has been less than the average. The percentages, moreover, not only indicate the relative change (upward or downward according to sign) but also the proportions of the net changes for all provinces that are accounted for by the particular province.



CHART II INCOME AND POPULATION GROWTH BY PROVINCE, 1927 - 1963

Among the various provinces shown in Table 13, the preponderant role of Ontario in post-war income and population growth may be noted. In respect of both variables, that province accounts for almost half the upward shift. Over the longer period British Columbia experienced the largest relative advance in both income and population. In the group of provinces which experienced downward shifts are found the three Maritime provinces as well as Manitoba and Saskatchewan. The latter two provinces together account for roughly two thirds of the downward shifts in respect of both income and population growth for the two periods shown. The relative lag in growth of population in Saskatchewan was dominant over the years from 1927 to 1963 as well as the subperiod 1947 to 1963. The magnitude of the changes in the separate elements, however, varies from province to province, and in this way contribute to the interprovincial pattern of growth in terms of personal income per capita.

<sup>&</sup>lt;sup>1</sup>The method of analysis, often referred to as "shift analysis", has been widely applied in regional studies. See for example H.S. Perloff, *et al.*, *op. cit.* 

TABLE 13

# INTERREGIONAL SHIFTS IN TOTAL PERSONAL INCOME AND POPULATION (Percentages)

otal sonal come 1.7 9.8	Shifts Population 27.5 P 21.8 N	E.I	Downwa Total Personal Income 2.2 8.5	Population 4.2 16.3	Quebec	Upward Total Personal Income 24.9 46.8	Shifts Population 3.4 45.8	n P.E.I N.S	Downwa Total Personal Income 1.4 22.3	Population 4.4 21.2
	13.7 N 37.1 M S	.B an ask	5.4 27.9 56.0	10.4 21.0 47.8	Alberta B.C	10.1	26.7 24.3	N.B Man Sask	14.8 26.4 35.0	

Note: Upward shifts imply an increase in income or population more than in proportion to the national average. Downward shifts imply an in-crease in income or population less than in proportion to the national average. Newfoundland is excluded from the calculations.

Source: Appendix Table C.

In contrast the data shown in Table 13 reveal a strong positive association among the provinces in the direction of change between personal income and population growth. In all cases, the direction of shift in population and income are the same for both periods under review as are the provincial groupings which emerge. This means, in other words, that relatively high rates of advance in regional income (and as a rough approximation, regional output) have gone hand in hand with relatively rapid growth in regional population. At the same time those regions which experienced slower than average increases in total personal income also recorded slower rates of population growth.

In a longer-term growth perspective — one which takes account of the rate of advance of total income and population growth — two groups of provinces are distinguished. The group displaying relatively more dynamic growth includes Quebec, Ontario, Alberta and British Columbia. The relatively lagging group of provinces, on the other hand, includes the Maritimes as well as Manitoba and Saskatchewan.

It would be wrong to conclude from the association between income and population growth that a province need only increase its population size to secure rising levels of personal income. A high rate of population growth, in itself, is not a sufficient condition for income growth. It must be accompanied by other conditions which favour economic advance before its positive influence can become effective.

Underlying the changes which occur in per capita income are complex functional relationships between income and population growth that are not easily evaluated. To illustrate the complexity of the problem, consider the question: Does the loss of population by a region adversely affect its level of income and the process of income generation there? The answer will depend, first, on the surrounding economic circumstances and, second, upon the time horizons within which the question applies. Clearly, the out-migration of unemployed and underemployed workers from a region in which labour is in excess supply is not likely to adversely affect the level of income or the process of income generation in the short or medium term. The out-movement of population, indeed, would reflect a process of adjustment whereby the region's population and the labour force becomes better attuned to the availability of productive capacity. However, the longer-run impact of out-migration upon the region's growth potential will be adverse to the extent that the movement of population reduces the quality of the regional labour force, diminishes the possibility of securing external economies associated with large, high-density population centres and induces a psychology of economic stagnation or decline. The net effect, therefore, is far from obvious.

The question posed above was in terms of regional growth. There is the related question as to the nature of population redistribution among all regions of a country and its consequence for the national rate of growth and interregional disparity.<sup>1</sup> Similar considerations to those noted above apply to this broader question but the interregional relationships are an added complication.

<sup>&</sup>lt;sup>1</sup>This is the focal issue examined in the study by S. Kuznets, et al., op. cit. In its Canadian context, it is explored in Isabel B. Anderson, Internal Migration in Canada, 1921-1961, Staff Study 13, Economic Council of Canada, Ottawa, 1966. See also, H. Whalen, "Public Policy and, Regional Development", in Abraham Rotstein, ed., The Prospect of Change, Toronto: McGraw-Hill, 1965, pp. 109-9; Manitoba Economic Consultative Board, Third Annual Report, Winnipeg, March 1966, Chapter four.

It is not proposed to develop these issues here. It may be noted, however, that in so far as the interregional movement of population is concerned, the evidence<sup>1</sup> appears to suggest that a process of redistribution in response to economic forces has been going on in Canada for some decades. There has been a large and sustained flow of population from the Atlantic and Prairie provinces to Ontario and British Columbia. In the most recent period, Alberta and Quebec also experienced net inflows of population, thereby reversing earlier trends in both provinces. Indeed the net movement of population into Alberta between 1951 and 1960 was the most striking shift of all, considering the historical experience.

The outstanding feature of the population movements described above (and reflected in Table 13) is that the flow has generally been from those regions where the level of income per capita and the rate of advance in total personal income has been relatively low, to those regions where they have been relatively high. Since the redistribution of population reflects a process of adjustment to regional differences in economic opportunity (labour requirements), it may be inferred that the consequence for the rate of national income and output growth was favourable. The nature of the adjustment process and its impact upon interregional income disparities, however, is less clear.

<sup>&</sup>lt;sup>1</sup>Assembled by Isabel B. Anderson, op. cit. See in particular Tables 15, 16 and 17.

## VIII. CONCLUSION

With the object of enhancing our understanding of the regional problem in Canada, certain aspects of the relation between the economy as a whole and its various parts or economic regions have been examined here. In general terms, the degree of participation among the various regions or provinces in national economic development has been estimated and those regions which have participated relatively more and those relatively less in national growth have been isolated. Participation has been measured by the degree of dispersion in the interregional (and intraregional) distribution of personal income per capita and its components. The Canadian experience has also been placed in a broader, but admittedly limited, international perspective. Finally, we have evaluated the effect of differences in regional price levels and movements and considered separately the post-war growth of personal income and population.

Taken as a whole, the analysis emphasizes the significant disparity in per capita income levels among the various regions and subregions in Canada. The disparity is somewhat greater in terms of real income comparisons. While the degree of income disparity in relative terms has varied with changing levels of economic activity, the longer-run tendency, over a period of roughly forty years, has been one of little or no change. The long-run persistence in the extent of interregional income disparity, moreover, has been accompanied by a fairly fixed ranking among regions. That is, the provinces which, about forty years ago, recorded relatively high levels of personal income per capita, are today still among the high-income regions. Similarly, the relative position of the lower-income provinces has not altered.

A number of qualifications to the major findings set out above emerge when the income concept is varied or when different analytical methods are employed. While these qualifications alter the scale of the regional problem in Canada, its essential nature remains unchanged. This is that Canadians have for many decades now experienced significant differences in real rewards for participation in economic activity according to place of residence.

Among the important issues which have not been adequately explored in the previous analysis is the relationship between the degree of dispersion in interregional income differentials and the level of economic activity. If it can be established that high levels of economic activity go hand in hand with its widespread regional diffusion, then the guidelines for a regional development policy might not be very different than those for national economic growth. If the contrary is true, it would imply that a high rate of national growth is not in itself a sufficient condition for securing an increased degree of regional participation. The data examined above, while far from conclusive, would tend to support the latter hypothesis, at least for the post-war period. Under these circumstances, the formulation of special policies aimed at specific regions may be called for. As a conceptual aid one might think of the degree of interregional economic cohesion within an economy at a given time as the result of two opposite sets of forces. One set contains all those influences which favour convergence of regional per capita income levels. Among these are the absence of artificial barriers to trade in goods and services and the movement of persons and capital; relative ease of communication and transportation; uniform legal systems and currency and banking arrangements; and most important, the powerful integrating force that comes from a single national identity and all that it implies. On the other hand, there are the forces of differentiation such as differences in natural and human resource endowments, including educational attainment; geographic distance from major markets and material supplies; and differences in those institutional arrangements and attitudes which facilitate and promote economic advance.<sup>1</sup> The Canadian experience, whereby interregional economic cohesion has undergone little or no change since the middle 1920's, suggests that the two sets of forces have been roughly offsetting.<sup>2</sup>

That this has been the nature of the Canadian experience is somewhat surprising in view of the fact that a number of powerful forces favouring interregional economic cohesion have been at work. As we have seen from the pattern of population redistribution and the uniform movement in the interregional structure of prices, natural market forces have been operative. When the competitive market system works efficiently in a developed economy, it might be expected to overcome many of the elements of regional economic differentiation.<sup>3</sup> However, Canada's experience (particularly when contrasted with that of the United States) suggests that operating market forces have not been so effective as to produce a significant convergence in the degree of interregional income disparity.

Advances in the technology of communications represent another important force affecting the degree of interregional cohesion. Its impact is dramatically conveyed in the frontispiece map. It shows in graphic form the effect upon one of the important aspects of communication – the reduction of distance in terms of travel and transport time. In the narrow sense, the map reflects the influence of changing technology upon transportation. In approximately 75 years the "size" of Canada has shrunk enormously and with it the relative cost of transport. In this way, the interregional flow of mobile resources and the exchange of goods has been facilitated. It also reflects, however, the enhancement of communications in the broader sense of ideas, information and awareness of differences and similarities among regions. In short, it has favoured those influences that can contribute to a high degree of economic, social and political cohesion among

<sup>&</sup>lt;sup>1</sup>Government economic policy at both the national and regional level is an important force that will fit into one or other of the two sets delineated here. This cannot be done in general terms. The impact of specific policies must first be assessed.

<sup>&</sup>lt;sup>2</sup> This conceptual approach also implies that there exists a "natural" degree of interregional income disparity for an economy. If as previously suggested, the complete absence of dispersion in the interregional distribution of income (that is a zero value for the index) is an unrealistic notion, is there a limiting positive degree of dispersion which is also appropriate for the economic characteristics of the Canadian economy; and has this limit been reached?

<sup>&</sup>lt;sup>3</sup>In this connection, misguided national and regional economic policy can pose obstacles which are not readily surmounted.

Canadians, whatever their region of residence. Despite this far-reaching set of influences, however, the problem of regional imbalance has not been significantly ameliorated.

The limited object of this study has been to define the nature and magnitude of interregional income disparity in Canada. This, however, is only the first step towards elaborating a set of criteria for the formulation of national policy. Involved here is the more difficult task of explaining the magnitude of interregional income disparity and its persistence. Without such an understanding the notion of regionally balanced economic development cannot be meaningfully defined.
### APPENDIX NOTE A

#### DISPERSION INDEXES AND VARIATIONS IN NUMBER OF REGIONS

At various points in the body of this study we have compared two or more dispersion indexes which are calculated from distributions with varying numbers of regions. There is evidence to suggest, however, that the value of the dispersion index (the coefficient of variation) varies directly with the number of regions or geographic units in the distribution. For example, the index of dispersion of interregional income disparity for the five major regions of Canada is less than that for nine provinces; the index for nine provinces is less than that for 10 provinces; and the index for ten provinces is less than that for 238 counties or census districts. A similar pattern emerges from the United States data associated with varying geographical units.

In his study, Williamson<sup>1</sup> provides a number of interesting calculations which represent additional sources of evidence. First, if the weighted dispersion indexes of forty-four states are rank correlated with the number of counties each contains, it yields a Spearman correlation coefficient of .703. Second, in the international comparisons combining twenty-four countries, the Spearman rank correlation coefficient between each country's weighted dispersion index and the number of regions is .376. Excluding the Philippines and Yugoslavia, the two countries which inordinately influence the degree of correlation, the coefficient is raised to .552 and is significant at the one per cent level.<sup>2</sup>

Judging from this evidence – which is admittedly more suggestive than conclusive – the index of dispersion is not invariant with respect to the number of regions covered by the distribution. It follows, therefore, that comparisons between countries or between regions with differing numbers of geographic areas cannot be unequivocally interpreted. The indexes of dispersion may be unequal because of *real* differences in the distribution of income or because the number of regions upon which the distributions are based vary.

The problem, as described above, arises from an economic analysis of interregional income differentials. However, it is commonly encountered in other fields such as agriculture and geography, where geographic or spatial units are the focus of analysis. At root the problem is statistical and has been defined in

<sup>&</sup>lt;sup>1</sup>Op. cit. Williamson refers briefly to the problem of comparisons among varying numbers of regions (p. 30, footnote 35) in discussing interstate income disparity. Curiously, he does not raise the issue in connection with his international comparisons, where one might think it is of some importance.

<sup>&</sup>lt;sup>2</sup> There is a qualitative difference, it will be noted, in comparing intracountry distributions as among the states and national distributions among various countries. In the former case, the parent distribution is well defined. In the latter, the comparisons are rather among unrelated distributions. To the extent that the countries are at similar stages of economic development, comparability is enhanced.

general terms (in a discussion of correlation and regression) by Yule and Kendall.<sup>1</sup> In statistical terms, according to the authors, a geographical area is essentially a "modifiable unit" in the sense that it can be selected and varied arbitrarily. Time is another example of a modifiable unit. Under these circumstances, the indexes of dispersion based on modifiable units"...measure, as it were, not only the variation of the quantities under consideration, but the properties of the unit-mesh which we have imposed upon the system in order to measure it".<sup>2</sup>

The problem of varying sets of territorial units, as it arises in studies in geography, has been succinctly stated in the following terms:

"In geographic investigation it is apparent that conclusions derived from studies made at one scale should not be expected to apply to problems whose data are expressed at other scales. Every change in scale will bring about the statement of a new problem, and there is no basis for presuming that associations existing at one scale will also exist at another."<sup>3</sup>

The term "scale" is used here in the sense of a system of geographic units.

The effect upon the measure of interregional dispersion of arbitrarily varying the number of regions may be illustrated by a purely hypothetical example. Consider a square which is first divided into sixteen area units each with a

5	15	20	40
5	15	20	40
5	15	20	40
5	15	20	40

<sup>&</sup>lt;sup>1</sup>G. Udny Yule and M.G. Kendall, An Introduction to the Theory of Statistics, New York, 1950, pp. 310-315.

<sup>2</sup> *Ibid.*, p. 312. Also discussed is a related phenomenon which is termed an "attenuation effect". This results from successive grouping of units with the consequence that the effect of erratic values upon the total are reduced. This occurs, for example, when we move from ten to five regions in Canada or fifty to eight regions in the United States. <sup>3</sup> H.H. McCarty, J.C. Hook and D.S. Knos, *The Measurement of Association in Industrial* 

Geography, Department of Geography, State University of Iowa, Iowa City, 1956, as quoted in O.D. Duncan, R.P. Cuzzort and B. Duncan, Statistical Geography, The Free Press of Glencoe, Illinois, 1961, p. 111.

number describing its characteristic; and then by grouping among the sixteen, four quadrants are formed. If for each of the quadrants we calculate the group mean, we have:



For this grouping,  $V_4 = 50$  per cent (where V stands for the coefficient of variation). This is considerably less than the underlying  $V_{16} = 64$  per cent; and in moving from a sixteen to a four regional grouping there has been some loss of information. If the square is now divided vertically into four regions, we obtain:

- 515
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In this case  $V_4 = 64$  per cent and is identical to that for sixteen regions. In other words this particular grouping of four regions successfully describes the properties of the sixteen regional grouping as regards dispersion. Finally, if the square is divided horizontally into four regions, we obtain:

210	
210	
20	
20	

With this delineation, there is no variation at all, and  $V_4 = 0$ . The information concerning the interregional dispersion for the area has been lost.

The hypothetical example reveals two important features of the problem. The first is that, in comparing the dispersion among areas with different numbers of regions,  $V_{4} \leqslant V_{16}$ . The second is that, even among areas with equal numbers of regions, the degree of dispersion need not be the same.

From the purely statistical point of view, therefore, there is considerable arbitrariness underlying comparisons of dispersions based on "modifiable units". Such comparisons should be treated with reservations. However, the important question for economic analysis in which the basic data are associated with spatial units, is to what extent the units delineated represent "natural" regions which accord with certain criteria related to the purposes of the analysis. In other words, to what extent do the economic regions defined for purposes of analysis depart from the notion of a "modifiable unit" and are hence less subject to arbitrary variation.

For our purposes Canada has been divided into ten provinces and five major regions. The former represent political-administrative units, while the latter take fuller account of physical and geographic features of the country. Similar considerations apply to the 50 states of the United States and to the eight or nine larger regions into which the states are grouped. In an important sense, therefore, the geographic units delineated in this way are *not modifiable* and are not subject to arbitrary selection and variation. In the terms of Yule and Kendall quoted above, the "properties of the unit-mesh" employed in the analysis of income differentials *are* important.

The basis upon which subregions within provinces are defined is, in a sense, more arbitrary. The boundaries of counties and census districts represent more the accidents of historical settlement, or the administrative requirements for the collection of statistics, than substantive considerations. Under these circumstances, an analysis which employs a subregional system based on counties or census districts is likely to yield uncertain comparisons. It may be noted, however, that the set of economic regions defined in Quebec and Ontario in recent years goes far towards reducing the degree of arbitrariness that marked the older system.

The value of comparisons among territories which embrace varying numbers of regions hinges, therefore, on the acceptability of the criteria which underlie the system of regions used. The more relevant and less arbitrary is the system of regions, the more meaningful is the comparison; and vice versa. This consideration re-emphasizes the need for systematic efforts to define a set of regions (with an associated data system), which are most relevant and appropriate for the formulation of regional development policies and programmes.

#### **APPENDIX NOTE B\***

### THE COEFFICIENT OF VARIATION OF AN AGGREGATE AND ITS COMPONENTS

This note is concerned with the relationship between the coefficient of variation of per capita income and the coefficients of variation of its components (for three components).

Let  $\Lambda$  denote  $\frac{\sigma}{\overline{x}}$ , the coefficient of variation for total per capita income; Let  $\Lambda_e, \Lambda_p$  and  $\Lambda_t$  denote the coefficients of variation for the respective components of per capita income: earned income, property income and transfers.

From theorems on the variance of a sum and mean of a sum, we have

(1) 
$$\Lambda = \frac{1}{\bar{\mathbf{x}}_{e} + \bar{\mathbf{x}}_{p} + \bar{\mathbf{x}}_{t}} \left( \sigma_{e}^{2} + \sigma_{p}^{2} + \sigma_{t}^{2} + 2\sigma_{ep} + 2\sigma_{pt} + 2\sigma_{et} \right)^{\frac{1}{2}}$$

where  $\sigma_i^2$  is the variance of the ith component,  $\sigma_{ij}$  is the covariance of components i and j, and  $\bar{x}_i$  is the mean of the ith component. Equation (1) can be written as a function of  $\Lambda_i$  (i=e,p,t) and an interaction term:

(2)  $\Lambda^{2} = \Lambda_{e}^{2} w_{e}^{2} + \Lambda_{p}^{2} w_{p}^{2} + \Lambda_{t}^{2} w_{t}^{2} + 2 \frac{(\sigma_{ep} + \sigma_{et} + \sigma_{pt})}{(\Sigma_{i} \overline{x}_{i})^{2}}$ where  $w_{i} = \frac{\overline{x}_{i}}{\Sigma_{i} \overline{x}_{i}}$  (i = e,p,t). To find  $\frac{\partial \Lambda}{\partial \Lambda_{i}}$  (i = e,p,t) equation (2) is differentiated implicitly (since (2) is

not a single-valued function) to obtain:

(3)  $\frac{\partial \Lambda}{\partial \Lambda_{i}} = \frac{\Lambda_{i}}{\Lambda} w_{i}^{2}$  (i = e,p,t),

or, alternatively, in terms of standard deviations:

(3a)  $\frac{\partial \Lambda}{\partial \Lambda_i} = \frac{\sigma_i}{\sigma} \mathbf{w}_i$  (i = e,p,t).

It should be noted that although (3) and (3a) are derived for the three-variable case, they apply as well to the general case (i = 1, ..., n).

For the case with explicit weights we have:

(1a) 
$$\Lambda = \frac{1}{\lambda_{e}\overline{x}_{e} + \lambda_{p}\overline{x}_{p} + \lambda_{t}\overline{x}_{t}} \left[\lambda_{e}^{2}\sigma_{e}^{2} + \lambda_{p}^{2}\sigma_{p}^{2} + \lambda_{t}^{2}\sigma_{t}^{2} + 2\lambda_{e}\lambda_{p}\sigma_{ep} + 2\lambda_{e}\lambda_{t}\sigma_{et} + 2\lambda_{p}\lambda_{t}\sigma_{pt}\right]^{\frac{1}{2}}$$

<sup>\*</sup>This note was prepared by L. Bakony of the Staff of the Economic Council of Canada.

where  $\lambda_i$  are the explicit weights. The analogue to (2) becomes:

(2a) 
$$\Lambda^{2} = \Lambda_{e}^{2} w_{e} + \Lambda_{p}^{2} w_{p}^{2} + \Lambda_{t}^{2} w_{t}^{2}$$
  
+  $2 \frac{(\lambda_{e} \lambda_{p} \sigma_{ep} + \lambda_{e} \lambda_{t} \sigma_{et} + \lambda_{p} \lambda_{t} \sigma_{pt})}{(\lambda_{e} \overline{x}_{e} + \lambda_{p} \overline{x}_{p} + \lambda_{t} \overline{x}_{t})^{2}}$ 

where the w<sub>i</sub> are redefined as:

(4) 
$$W_i = \frac{\lambda_i \overline{x}_i}{\sum_i \lambda_i \overline{x}_i}$$

The derivative with respect to  $\Lambda_e$ , for example, becomes:

(5) 
$$\frac{\partial \Lambda}{\partial \Lambda_e} = \frac{\Lambda_e}{\Lambda} w_e^2$$

i.e. as before but with w redefined in (4).

## APPENDIX NOTE C

### INTRAREGIONAL INCOME DISTRIBUTION BY SIZE

#### **Taxation Statistics**

One source of data for measuring the degree of inequality of income distribution by size within a province or region is provided in the series of taxation statistics. These statistics are based on tax returns and are deficient in an important respect. In calculating the Gini<sup>1</sup> index of concentration, only the *taxable returns* can be used since data on *non-taxable returns* are not available by income class at the provincial level. The number of non-taxable returns represents a sizeable share of total returns, and most of these probably fall within the lowest income classes. Variation in the number of non-taxable returns over time, therefore, is a serious source of error in the calculation of the index of concentration. The Gini indexes shown in Table C-1 are to be examined, bearing this restriction in mind.

#### TABLE C-1

PROVINCE	1950	Rank	<u>1956</u>	Rank	<u>1958</u>	Rank	<u>1960</u>	Rank	<u>1962</u>	Rank
Newfoundland	.2995	(7)	.2708	(1)	.2730	(1)	.3420	(10)	.2927	(1)
Prince Edward Island	.2959	(5)	. 3241	(10)	.3386	(10)	.3248	(9)	.3287	(9)
Nova Scotia	.2819	(2)	.2747	(3)	.2858	(2)	.2951	(4)	.3053	(4)
New Brunswick	.2831	(3)	.2731	(2)	.2940	(4)	.2935	(3)	.3089	(5)
Quebec	.3274	(10)	.3034	(9)	.3182	(9)	.3161	(8)	.3520	(10)
Ontario	.2882	(4)	.2989	(7)	.3026	(6)	.3078	(6)	.3180	(8)
Manitoba	.3074	(9)	.2982	(6)	.2995	(5)	.3087	(7)	.3099	(6)
Saskatchewan	.2989	(6)	.2816	(4)	.3058	(8)	.2845	(1)	.3001	(3)
Alberta	.3011	(8)	.3029	(8)	.3031	(7)	.3032	(5)	.3141	(7)
British Columbia	.2801	(1)	.2890	(5)	.2914	(3)	.2927	(2)	.2980	(2)

#### INDEXES OF INCOME CONCENTRATION BY SIZE, BY PROVINCE AND SELECTED YEARS, 1950-1962

Note: The index is the Gini coefficient of concentration. Provinces are ranked in order of the degree of income equality; the first rank is assigned to the lowest coefficient. Source: Taxation Statistics, Department of National Revenue, Ottawa.

It may be observed that there are differences among the provinces in the degree of inequality of income distribution in any year. These range as high as

twenty per cent and must be assumed to be significant. The change in the index

<sup>&</sup>lt;sup>1</sup> The Gini index or coefficient of concentration measures the degree to which the distribution of income departs from perfect equality. The higher the value of the coefficient, therefore, the greater is the degree of inequality of distribution.

for each province since 1950, however, is relatively smaller. No marked tendency emerges from the data but rather an unsystematic variation in the degree of inequality from one year to the next and from one province to another. Nevertheless, it would appear that Prince Edward Island and Quebec almost always display relatively high degrees of inequality, while British Columbia, Nova Scotia and New Brunswick, display the lowest.

#### 1961 Census Population Sample

Another source of data for measuring the degree of inequality in income distribution by size among the provinces, is the Population Sample which was undertaken as part of the 1961 Census of Canada.

Gini coefficients for each province were calculated on the basis of these data and are shown in Appendix Note Table C-2. The value of the coefficients varies from a low in Ontario of .4593 to a high in Prince Edward Island of .5063 - the percentage difference being lower than that revealed by the tax data in 1960. There is the suggestion, however, that the high-income provinces have the lowest degree of income concentration, a suggestion which appears to contradict that drawn from the coefficients shown in Table C-1. Finally, it will be noted that the value of the coefficients based on the Population Sample are significantly higher than those based on the Taxation Statistics.

#### TABLE C-2

#### INDEXES OF INCOME DISTRIBUTION BY SIZE, BY PROVINCE FOR 1961

Ontario	.4593	New Brunswick	.4748
Manitoba	.4673	Nova Scotia	.4772
British Columbia	.4676	Newfoundland	.4894
Alberta	.4693	Saskatchewan	.4940
Quebec	.4745	Prince Edward Island	.5063
CANADA			

Note: The index is the Gini coefficient of concentration

Source: Based on data from the Dominion Bureau of Statistics, particularly the Population Sample of the 1961 Census of Population.

Comparisons between the two sources of data are hazardous, in view of some important conceptual differences. The Population Sample covers income from all sources including transfer payments, whereas some major items in the latter category are, in effect, excluded from taxable income. The tax data cover all individuals who submit a return with a taxable income, regardless of the branch of economic activity. The Population Sample excludes those who reside on farms.

It is difficult to judge the net effect upon the Gini coefficients, if the two sources were to be made more comparable. Adding all transfer payments to taxable income might be expected to reduce the degree of inequality, but the opposite would occur if account could be taken of non-taxable returns. Similarly, adding the incomes of the farm population to the Sample data is likely to increase the degree of inequality. Because these influences are not all in the same direction, however, the net result upon the measure of inequality must be left an open question.

# APPENDIX TABLES

### APPENDIX TABLE A

#### INDEXES OF DISPERSION

(Per Cent)

				nal Income	me Per Capita				
		Const	ant Pr	ices					
Year	<u>All Pr</u> Incl. Nfld. from 1949	Excl. from	Nfld. 1949	Five Major Regions	Six Provinces Excluding Atlantic Region	Five Provinces Excluding Atlantic Region and Saskat- chewan	All H Incl. Nfld from 195	Provinc . Exc 1 from	es 1. Nfld. n 1951
1926	2	5.4		21.0	10.2	11.6			
1927	2	6.2		21.1	13.1	13.9			
1928	2	5.1		21.1	10.5	11.2			
1929	2	6.8		23.2	20.3	14.6			
1930	2	8.0		23.2	22.3	14.5			
1931	3	4.2		27.2	31.5	20.3			
1932	3	1.6		26.2	26.4	17.8			
1933	3	4.0		27.7	31.6	21.9			
1934	3	1.6		25.9	27.7	17.8			
1935	2	8.8		24.6	25.4	19.8			
1936	2	9.0		24.9	27.5	20.4			
1937	3	1.6		24.6	29.1	14.8			
1938	2	9.0		24.5	23.8	16.7			
1939	2	6.7		22.6	18.4	17.0		27.8	
1940	2	7.3		22.8	20.5	17.1		28.7	
1941	3	0.2		25.1	24.4	19.6		32.3	
1942	2	.6.2		20.5	13.3	13.6		27.6	
1943	2	5.6		22.4	19.9	17.4		27.3	
1944	2	3.1		18.6	12.9	14.4		24.6	
1945	2	0.3		19.2	15.5	15.2		22.7	
1946	1	9.8		15.7	11.2	12.1		21.2	
1947	2	20.7		16.2	11.8	11.4		21.5	
1948	2	.3.8		18.9	10.8	10.9		24.5	
1949	26.8		22.6	21.1	11.4	12.3		23.6	
1950	27.2		23.5	21.8	14.4	13.4		24.1	
1951	29.7		26.3	22.4	12.0	13.2	30.5		26.4
1952	29.3		25.2	22.2	12.3	12.9	30.4		25.9
1953	28.5		25.3	21.9	12.0	12.9	29.6		25.6

APPENDIX	TABLE	A (Con't)
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			1. Perso	nal Income	Per Capita				
		Curre	nt Prices	3		Constan	Constant Prices		
Year	All Provinces		Five Pro Major Ex Regions At	Six Provinces Excluding Atlantic	Five Provinces Excluding Atlantic Region	All Provinces			
	Incl. Nfld. from 1949	Excl. Nfld. from 1949		Region	Saskat- chewan	Incl. Nfld. from 1951	Excl. Nfld. from 1951		
1954	26.6	23.9	21.2	16.5	13.1	27.6	24.6		
1955	27.0	24.2	21.9	13.2	13.2	27.8	24.6		
1956	26.5	23.6	21.6	12.2	12.9	27.4	24.0		
1957	26.7	24.2	21.5	15.0	13.2	27.8	24.5		
1958	25.6	22.7	20.3	12.8	11.2	26.9	23.2		
1959	24.5	21.7	20.2	13.1	11.7	26.4	22.9		
1960	22.9	19.8	18.9	10.9	11.3	24.8	20.9		
1961	23.3	21.1	18.7	13.9	10.8	24.9	22.2		
1962	23.0	20.2	18.4	8.9	10.0	25.1	21.2		
1963	23.6	21.1	18.8	10.0	10.4	25.3	21.9		
1964	21.6	18.9	18.1	10.5	10.0	23.4	19.7		

		2. Personal	Income Compone	ents	
Year	Labour Income Per Capita	Net Income Received by Farm Operators from Farm Production Per Capita	Net Income of Nonfarm Unincorporated Business Per Capita	Property Income Per Capita	Government Transfer Payments Per Capita
1926	32.8	76.7	36.8	35.6	55.9
1927	34.4	95.3	40.6	29.0	67.2
1928	34.0	80.8	34.4	35.7	65.8
1929	33.9	50.7	34.1	34.0	63.8
1930	34.8	44.7	31.2	40.0	71.4
1931	34.6	42.9	32.0	40.6	65.7
1932	33.3	49.2	24.5	37.3	51.2
1933	35.2	43.5	40.1	42.2	59.3
1934	36.0	51.6	30.6	38.7	41.4
1935	36.8	26.4	31.1	42.6	43.7
1936	38.1	37.6	26.6	34.9	42.7
1937	37.7	55.2	22.5	43.8	51.2
1938	37.8	72.2	35.0	39.6	40.0
1939	36.3	69.1	33.3	39.2	36.8
1940	37.8	65.4	32.9	31.6	31.9
1941	40.2	49.1	30.0	37.6	26.9
1942	42.8	92.5	30.1	26.6	43.0
1943	41.4	61.0	20.7	29.1	28.2
1944	36.2	94.5	19.1	30.0	32.0
1945	33.7	66.8	20.0	26.9	6.0
1946	30.8	82.0	19.8	30.6	14.5
1947	31.9	82.9	22.4	28.5	11.0
1948	35.0	88.2	23.8	33.1	12.7
1949	35.5	97.0	25.0	36.4	18.3
1950	36.4	85.2	23.0	38.1	18.3
1951	36.2	118.1	23.9	35.4	18.6
1952	36.8	119.7	24.7	37.8	18.9
1953	34.8	120.4	23.7	37.8	19.6
1954	33.5	76.3	23.5	39.6	17.4
1955	33.7	104.2	25.9	37.6	16.3
1956	33.8	117.4	24.0	35.9	10.5
1957	33.4	85.1	19.9	39.1	13.8
1958	32.3	83.2	22.8	38.9	12.8
1959	31.6	91.1	17.4	37.3	12.7
1960	30.2	104.8	16.9	37.3	8.7
1961	28.5	84.8	16.4	38.4	10.1
1962	28.6	129.7	17.1	38.3	6.5
1963	28.4	152.9	19.1	38.9	9.5
1964	28.0	112.6	17.5	37.8	5.7

	3. Influer	ice of Transfer	Payments a	nd Direct Pers	onal Ta	axes	
	Perso Govt. 1	onal Income Le Fransfer Payme Per Capita	ss nts	Disposa	ble Per Per Ca	sonal In apita	come
	All Pro	ovinces	Diese	All Pr	ovinces	6	Dive
Year	Incl. Nfld. from 1949	Excl. Nfld. from 1949	Major Regions	Incl. Nfld. from 1949	Excl. from	Nfld. 1949	Major Regions
1926	25	5.0	21.1	2	5.3		21.1
1927	26	5.4	20.9	2	6.9		21.6
1928	24	1.7	19.9	2	5.6		21.2
1929	25	5.8	22.7	2	5.9		23.3
1930	26	5.9	23.3	2	7.6		23.8
1931	34	1.4	27.4	3	2.8		26.5
1932	3(	).7	25.1	3	0.9		25.2
1933	33	3.5	27.4	3	3.5		26.7
1934	32	2.8	26.2	3	2.0		25.3
1935	29	9.2	24.4	2	9.4		25.5
1936	29	9.0	24.8	2	8.5		25.6
1937	34	4.8	24.9	3	1.7		23.6
1938	3(	).3	24.7	2	9.4		23.8
1939	26	5.5	23.1	2	5.8		23.0
1940	27	7.8	22.6	2	6.0		22.2
1941	3	1.1	25.6	3	0.2		24.7
1942	26	5.3	21.1	2	5.7		20.5
1943	2	5.7	22.4	2	3.2		20.4
1944	23	3.0	19.3	2	2.7		17.5
1945	2	1.4	19.7	1	8.9		18.0
1946	22	2.1	17.2	1	8.4		15.3
1947	2	2.5	17.4	1	9.7		15.1
1948	2:	5.6	20.3	2	2.8		18.5
1949	28.6	24.4	21.9	25.8		21.6	20.4
1950	28.9	25.2	23.2	26.1		22.6	20.5
1951	32.0	27.7	23.8	29.1		25.6	21.6
1952	31.5	26.8	23.6	28.2		24.4	21.2
1953	31.0	27.4	22.9	27.4		23.8	20.7
1954	28.9	25.8	22.6	25.0		22.7	19.9
1955	29.2	26.0	23.2	25.5		22.8	20.6
1956	28.9	25.5	22.7	25.5		22.6	20.7
1957	29.2	26.6	22.9	25.0		23.0	20.4
1958	28.9	25.6	22.6	24.1		21.6	19.4
1959	27.4	24.2	22.0	23.1		20.2	19.3
1960	25.7	22.5	20.7	21.3		18.7	18.0
1961	26.5	24.3	20.8	21.5		19.7	17.3
1962	26.3	23.1	20.7	21.5		19.0	17.2
1963	26.7	23.9	21.0	22.3		19.9	17.6
1964	24.5	21.8	20.4	19.6		17.0	16.6

	4. Earned Income Per Capita						
Vere	Unwei	ighted	Weig	ghted			
rear	All Provinces	Five Regions	All Provinces	Five Regions			
1926	25.2	21.0	17.0	16.9			
1927	27.1	20.5	18.6	17.2			
1928	25.0	19.8	16.5	16.4			
1929	26.6	22.5	20.2	19.0			
1930	27.4	23.1	20.9	19.3			
1931	34.8	27.4	27.4	25.2			
1932	32.6	26.2	24.2	22.4			
1933	35.3	27.1	26.7	24.6			
1934	33.6	26.0	25.3	22.7			
1935	29.8	24.8	22.8	21.8			
1936	30.3	25.6	23.8	22.5			
1937	34.7	25.2	27.2	22.0			
1938	31.9	24.4	23.3	20.8			
1939	27.1	22.4	19.8	19.4			
1940	28.1	22.6	21.6	20.9			
1941	31.5	24.4	25.0	24.0			
1942	26.5	21.0	19.6	19.2			
1943	25.5	21.8	21.6	21.1			
1944	23.3	19.1	19.1	18.1			
1945	21.0	19.3	19.8	19.6			
1946	22.0	16.3	16.2	16.2			
1947	22.1	16.8	16.0	15.4			
1948	24.8	20.1	17.7	17.4			
1949	28.4	21.6	20.3	20.0			
1950	28.2	22.8	21.3	20.8			
1951	31.6	23.3	21.6	21.2			
1952	31.0	23.1	21.4	20.7			
1953	30.7	22.5	20.6	20.1			
1954	27.7	21.8	20.4	19.6			
1955	28.6	22.6	20.3	20.0			
1956	28.0	22.2	19.6	19.4			
1957	28.3	22.4	20.2	19.8			
1958	27.6	21.4	19.9	19.3			
1959	26.4	20.9	19.2	18.7			
1960	24.4	20.0	17.9	17.6			
1961	25.1	19.5	18.4	17.6			
1962	25.2	19.3	17.3	17.1			
1963	25.2	19.8	17.6	17.3			
1964	22.9	19.0	17.1	16.9			

	5. Int	ternational Com	parisons — P	ersonal Income Per Capita				
		Unweighted		Weighted				
Year	<u>Canada</u> (5 regions)	United States (8 regions)	<u>Australia</u> (6 states)	Canada (5 regions)	United States (8 regions)	<u>Australia</u> (6 states)		
1926	25.4			17.6				
1927	26.2			18.7				
1928	25.1			17.2				
1929	26.8	30.2		21.1	33.3			
1930	28.0	31.7		22.2	35.3			
1931	34.2	33.2		27.3	35.8			
1932	31.6	34.5		24.4	37.3			
1933	34.0	33.5		27.1	35.6			
1934	31.6	32.1		25.0	33.9			
1935	28.8	28.3		23.8	30.8			
1936	29.0	29.0		24.0	31.7			
1937	31.6	27.3		25.4	29.9			
1938	29.0	27.1		23.0	29.9			
1939	26.7	27.4		20.6	30.0			
1940	27.3	28.4		22.1	30.3			
1941	30.2	26.4		25.0	28.3			
1942	26.2	22.8		19.5	24.9			
1943	25.6	21.5		21.5	24.0			
1944	23.1	19.2		18.9	21.7			
1945	20.3	17.9		19.2	20.5			
1946	19.8	18.7		15.9	21.2			
1947	20.7	17.4		15.6	20.5			
1948	23.8	16.6		16.8	19.4			
1949	26.8	16.2	11.2	19.3	19.2	5.9		
1950	27.2	16.7	10.1	20.0	19.8	5.8		
1951	29.7	16.4	11.1	20.6	19.6	6.6		
1952	29.3	16.1	9.7	20.4	19.0	7.5		
1953	28.5	16.4	7.8	19.5	19.4	5.4		
1954	26.6	15.7	7.2	19.6	18.4	5.6		
1955	27.0	16.0	6.0	19.4	18.3	6.4		
1956	26.5	16.5	5.6	18.9	18.5	6.5		
1957	26.7	16.0	8.7	19.4	18.4	6.4		
1958	25.6	14.8	8.9	18.6	17.2	6.4		
1959	24.5	15.1	7.9	18.6	17.4	6.9		
1960	22.9	15.0	7.3	17.3	17.4	7.5		
1961	23.3	14.8	9.8	17.3	17.0	7.6		
1962	23.0	14.8	7.4	16.3	16.9	6.9		
1963	23.6	14.5	7.5	16.8	16.5	6.8		
1964	21.6	14.5	-	16.2	16.3	-		

-	6. Total and Sectora (Five major re	al Earned Income per Emplo egions excluding Newfound	oyed Person land)
Year	Earned Income per Employed Person	Agricultural Income per Agricultural Worker	Nonagricultural Income per Nonagricultural Worker
1946	10.4	32.9	7.5
1947	10.2	33.9	7.2
1948	14.3	32.5	11.9
1949	14.6	33.2	12.7
1950	16.4	29.5	13.4
1951	18.0	39.5	15.4
1952	17.0	40.0	14.5
1953	16.7	41.4	15.0
1954	15.2	37.2	14.0
1955	15.2	18.9	15.3
1956	15.2	31.0	14.4
1957	15.0	36.0	13.2
1958	14.0	35.7	11.8
1959	13.5	35.8	11.2
1960	13.3	25.5	11.6
1961	13.6	40.7	10.4
1962	12.1	39.8	10.5
1963	11.7	48.1	10.4
1964	11.2	38.5	9.9

Notes: The index of dispersion is the value of the coefficient of variation expressed as a percentage. For the weighted index, regional population shares are employed as weights. The dispersion indexes in constant prices are based on income series deflated by the price indexes shown in Appendix Table B. Property income includes interest, dividends and net rental income of persons. Data for Australia are for financial years as of the end of June.

Sources: For Canada, based on data from the Dominion Bureau of Statistics. For Australia, data are from Commonwealth Bureau of Census and Statistics, Australian National Accounts 1948-49 to 1962-63 (1963) and Official Yeerbook of the Commonwealth of Australia (1965), Canberra, Australia. For the United States, data are from U.S. Department of Commerce, Survey of Current Business, April, 1965, and Supplement, Personal Income by States since 1929 (1956), Washington, D.C. APPENDIX TABLE B

REGIONAL CONSUMER PRICE INDEXES, 1939-1964 (Manitoba 1963 = 100) 1

British Columbia	51.6	52.9	55.6	58.4	60.2	60.5	61.2	63.1	69.3	79.8	83.2	86.1	95.0	97.6	96.5	97.6	98.0	99.5	101.9	104.4
Alberta	52.0	53.0	55.2	57.6	59.1	59.7	60.3	62.3	67.7	76.9	80.0	83.1	90.8	91.9	91.2	91,9	91.7	92.6	95.1	97.1
Saskatchewan	51.3	53.0	56.1	58.6	59.5	60.2	60.6	62.8	69.2	79.4	81.9	83.7	91.5	92.4	92.7	93.6	93.9	94.9	97.6	100.0
Manitoba	50.0	51.1	53.6	55.9	56.8	57.2	57.7	59.5	64.7	73.5	76.7	7.67	88.0	89.1	87.8	88.5	88.9	89.9	92.1	94.4
Ontario	48.3	49.6	52.3	54.9	55.7	55.9	56.3	58.2	64.1	73.0	75.4	78.2	87.1	88.4	87.4	88.5	89.0	90.5	93.7	95.9
Quebec	49.1	51.1	54.1	56.7	57.9	58.0	58.7	60.7	66.5	76.2	78.9	81.8	91.6	92.8	91.7	92.1	92.2	93.4	96.1	0.66
New Brunswick	51.4	53.2	55.9	58.7	59.8	60.4	60.7	62.4	67.7	7.77	80.1	82.7	91.3	94.0	92.3	93.3	94.2	95.1	98.2	100.3
Nova Scotia	53.3	55.6	57.8	60.2	61.6	62.3	62.9	64.5	70.0	78.5	81.1	82.8	6.06	93.5	91.8	92.5	93.1	94.1	97.1	9.66
Prince Edward Island	51.4	53.2	55.9	58.7	59.8	60.4	60.7	62.4	67.7	7.77	80.1	82.7	91.3	94.0	92.3	93.3	94.2	95.1	98.2	100.3
Newfoundland													96.0	99.4	98.1	98.7	100.0	102.5	105.0	107.5
Year	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958

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106.4	107.3	107.6	107.9	109.6	110.3
98.4	99.3	100.0	101.0	102.1	102.6
100.9	101.9	102.8	104.5	105.3	106.4
94.9	96.4	97.9	99.1	100.0	101.5
96.5	1.76	98.6	99.4	101.1	102.9
100.1	100.9	102.0	103.2	104.9	106.6
102.2	103.4	104.2	105.2	106.8	107.9
102.1	103.1	104.2	105.5	106.6	107.0
102.2	103.4	104.2	105.2	106.8	107.9
109.7	110.9	112.0	112.9	115.2	116.5
1959	1960	1961	1962	1963	1964

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Note: The original base for the price indexes is Winnipeg, January 1963 = 100. The indexes for Prince Edward Island are assumed equivalent to those for New Brunswick.

Source: Based on data from the Dominion Bureau of Statistics.

INTERREG	ONAL SHIF	TSIN PE	RSONAL	INCOME A	ND POPU	JLATION	1927-1963			are a	
	Canada	Prince Edward Island	Nova Scotia	New Brunswick	Quebec	Ontario	Manitoba	Saskat- chewan	Alberta	British Columbia	
Personal Income 1927-1963											
(1) Actual Personal Income 1927 (\$000,000)	4,267	22	154	110	1,005	1,639	296	378	322	341	
<ul> <li>(2) Actual Personal Income 1963</li> <li>(\$000,000)</li> <li>(3) "Expected" Personal Income 1963</li> </ul>	32,363	119	982	715	8,320	13,087	1,631	1,636	2,455	3,418	
(assuming same percentage in- crease 1927-1963 as for Canada).		167	1,168	834	7,622	12,431	2,245	2,867	2,442	2,586	
(4) Net Shift of Personal Income ±[(2) - (3)]	± 2,199	- 48	- 186	-119	+ 698	+ 656	- 614	-1,231	+ 13	+ 832	
(5) Percentage Net Shift ±[(4)Pr./(4)Can. × 100]	± 100	- 2.2	- 8.5	- 5.4	+ 31.7	7 + 29.8	- 27.9	- 56.0	+ 0.6	+ 37.8	
Population 1927-1963											
(1) Actual Population 1927 (000)	9,641	87	515	398	2,658	3,220	651 948	841 935	633	636 1,737	
<ul> <li>(3) "Expected" Population 1963</li> <li>(assuming same percentage in-</li> </ul>					1			203 1	000 1	3101	
crease 1927-1963 as for Canada) (4) Net Shift of Population		166	984	/00/	2/0/2	0,152	1,244	1,00/1	1,209	C12(1	
$\pm [(2) - (3)]$	. ± 1,407	- 59	- 230	-147	+ 387	+ 307	- 296	- 672	+ 193	+ 522	
<pre>(5) Percentage Net Shift ±[(4)Pr./(4)Can. × 100]</pre>	± 100	- 4.2	- 16.3	3 - 10.4	+ 27.5	5 + 21.8	- 21.0	- 47.8	+ 13.7	+ 37.1	

APPENDIX TABLE C EGIONAL SHIFTS IN PERSONAL INCOME AND POPULATION 197

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rsonal Income 1947–1963	) Actual Personal Income 1947 (\$000,000)	) Actual Personal Income 1963 (\$000.000)	('Expected'' Personal Income 1963	(assuming same percentage in- crease 1947 - 1963 as for Canada)	) Net Shift of Personal Income ±[(2) - (3)]	Percentage Net Shift	$\pm [(4)Pr./(4)Can. \times 100]$	pulation 1947 - 1963	Actual Population 1947 (000)	Actual Population 1963 (000)	(assuming same percentage in- crease 1947-1963 as for Canada).	Net Shift of Population	±[(2) - (3)]	Percentage Net Shift	$\pm [(4)Pr./(4)Can. \times 100]$	

Source: Based on data from the Dominion Bureau of Statistics.

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