

**CONVERGENCE IN A SMALL
OPEN ECONOMY**

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Abstract

This paper used data for the ten Canadian provinces to determine whether there was convergence of regional disparities during the 1961-99 period. The results show mixed evidence on convergence. There was convergence of nominal output, but no convergence of real output, per capita or per worker. During the 1984-99 period, there was no convergence of output, per capita or per worker, in nominal and in real terms. However, there was convergence of personal income per capita over the entire period and for the two sub-periods. Government transfers to persons increased the speed of convergence of personal income per capita.

JEL Classification: O18, R11, R12

Keywords: Regional disparities, convergence

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I. INTRODUCTION

The past fifteen years have witnessed the resurgence of the study of comparative growth through the work of Baumol (1986), Barro (1991), Barro and Sala-i-Martin (1991, 1995), and Mankiw, Romer and Weil (1992). The theoretical foundations to these studies are the convergence properties of the neo-classical growth model and the mechanism that generates convergence is diminishing returns to capital. In this model, the steady-state level of per capita income is independent of its initial value and the associated long-run growth rate is determined by the exogenous rate of technical change. If the current level of per capita income is below its long-run equilibrium, capital accumulation will stimulate the growth rate above its equilibrium level. This growth rate will converge towards its equilibrium level because diminishing returns to capital slow down the rate of capital accumulation. Within a country with large regional differences in per capita income, this process leads to different growth rates of the regional economies depending on their initial levels of per capita income. Because of diminishing returns, capital will accumulate at a faster rate in the poorer provinces because of the higher returns it earns there. Therefore, the regions with the lower initial per capita income will tend to grow at a faster rate. Eventually, rates of return on capital are equalized and the growth rates of the various regional economies will converge to the national average (*absolute convergence*) or to different steady-state growth rates (*conditional convergence*). Within a country, the speed of convergence is affected by the inter-provincial mobility of physical capital and labour (which also incorporates human capital). Neo-classical convergence models generally exclude labour mobility, therefore, convergence is attributed to capital mobility in search of higher returns. We applied existing neo-

classical models of convergence in order to facilitate a comparison of the results.

The neo-classical model of convergence was tested by Barro and Sala-i-Martin (1991,1992) for several countries and the results showed a positive speed of convergence. Similar results were obtained for Canada by Coulombe and Lee (1995) and Coulombe and Day (1999). Although the empirical evidence supports the convergence hypothesis, some issues about convergence in Canada require further exploration: (a) are the conclusions dependent on the economic indicator used?, (b) are the conclusions affected by the selected sample period ?, (c) is convergence general, i.e., does it occur within provincial sub-groups?, (d) is the observed convergence generated by the neo-classical mechanism or by other factors? These questions are addressed in this paper by exploring the pattern of convergence for the ten Canadian provinces during the 1961-1999 period through the use of two measures of convergence. The first measure shows the dispersion of the logarithms of the selected indicators and is called σ -convergence. The second measure shows the speed of convergence and is called β -convergence. Both measures were estimated for various concepts of income and for sub-periods as well as for the entire period.

Compared to the existing literature, the results presented in this paper offer a number of new insights. First, there is little evidence of convergence of real output, per capita and per worker. For measures of provincial output, convergence seems to be confined to relative product prices. Second, Canadian provinces are subject to region-specific external shocks which may accelerate or hinder the process of convergence. Finally, the speed of convergence has slowed down considerably during the past fifteen years despite the persistence of large regional economic

disparities in Canada.

Canada provides a useful basis for testing models of convergence for a variety of reasons. First, Canada is a federation characterized by the diversity of its regions in terms of land mass, population size, and resource endowments. Second, throughout Canada's history, this diversity has been associated with the persistence of regional disparities in employment, income and living standards. Reducing these regional economic disparities has been considered to be so vital to the strength of the federation that commitments by federal and provincial governments were enshrined in the constitution. Third, Canada is a small open economy heavily dependent on foreign trade. As such, it is strongly affected by world economic events. Because of the diversity of its regions, external shocks tend to affect the various regions in different degrees. Finally, within the Canadian federation there are no internal barriers to the mobility of capital or labour.

This paper is organized as follows. Section II discusses the methodology, section III presents the results and the final section contains some concluding remarks.

II. METHODOLOGY

Empirical studies on convergence in Canada have involved tests of the neo-classical model developed by Barro, Mankiw and Sala-i-Martin (1995), hereafter called BMS (see, for example, Coulombe and Lee (1995), Coulombe and Day (1999), and Coulombe (1999, 2000)). By following the same methodology in this paper it will be possible to test the BMS model for

differences in sample periods and different definitions of the relevant variables.

A. Models

BMS have shown that, for economic unit i , the speed of convergence to the steady-state level of income may be derived from the following expression

$$(1) \quad \text{Ln}(y_{i,t}) = e^{-\beta} \text{Ln}(y_{i,t-1}) + (1 - e^{-\beta}) \text{Ln}(y_i^*)$$

where $y_{i,t}$ is income per effective unit of labour in economic jurisdiction i at time t , y_i^* is the steady-state value of y_i and β measures the speed of convergence per unit of t . If β is a positive fraction, y_i will converge to y_i^* (see endnote 1). Incorporating an additive error term allows the testing of (1) with time series data for a single economic jurisdiction or with cross-section data for cross-country comparisons or comparisons of different regions within a country.

BMS have also shown that, as an approximation around the steady-state of the neoclassical growth model, the speed with which the poorer countries or regions within a country catch up to the richer ones can be estimated through an equation which takes the form of

$$(2) \quad \text{Ln}(y_{i,t}) = a_i + e^{-\beta} \text{Ln}(y_{i,t-1}) + u_{i,t}$$

where a_i is a constant term that captures in each region the effect of the steady-state level of

income per worker and the speed of convergence, and $u_{i,t}$ is the error term that captures the effect of transitory shocks. When $a_i = a$, countries or regions differ only with respect to their initial levels of income per worker and absolute convergence occurs.

Coulombe and Day (1999) used the above model to test the convergence hypothesis for Canada. Since Canada has ten provinces, simple cross-section tests would not be reliable due to the lack of sufficient degrees of freedom. They used pooled annual time-series and cross-section data for Canada and calculated the value of β from the following modification of equation (2).

$$(3) \quad \text{Ln}(y_{i,t}) - M_t = e^{-\beta} [\text{Ln}(y_{i,t-1}) - M_{t-1}] + v_{i,t}$$

where M_t is the mean of the $\text{Ln}(y_{i,t})$ across regions i at time t and $v_{i,t}$ is the difference between $u_{i,t}$ and the associated mean. Since (3) is an equation in terms of deviations from the mean, it eliminates the effect of common shocks to all regions. Equation (3) was also used in our study.

B. Indicators

Six income indicators, divided into two groups, were used in our study. The first group includes four indicators of income generated from domestic production and assigned to the province where income is generated. This concept of income, or the value of output, is measured by gross domestic product (GDP) at factor cost by province. The four indicators are : (1) nominal GDP per capita, (2) nominal GDP per worker, (3) real GDP per capita and (4) real GDP per worker.

For the nominal GDP values, which are equivalent to real GDP values derived by using a single national price deflator, the estimated value of β measures the speed of nominal convergence which captures the effect of changes in relative growth rates of real GDP and producer prices. The terms of trade effect is eliminated by deflating nominal GDP with provincial-specific deflators as was done in the derivation of the real GDP by province used in our calculations. For the two nominal GDP indicators we included only nine provinces. The period under consideration includes the energy crisis of the 1970s. This external shock had a strong effect on producer prices in Alberta, the province that dominates the production of oil and gas in Canada. As a result, the GDP deflator for Alberta followed a different path than the national GDP deflator. Including Alberta in the list of provinces would have greatly distorted the results for nominal convergence. This relative price differential due to the energy crisis should be picked up by the provincial GDP deflator, therefore, all ten provinces were included in the calculations for the two real GDP indicators.

The second group contains indicators of income received by the residents of each province. The appropriate price deflator for developing real values of these indicators is the Consumer Price Index (CPI). Coulombe and Lee (1995) have shown that there is little interprovincial variation in CPI values and that similar results are obtained by using either nominal or real values. The same results were obtained with our expanded sample. Therefore, in this paper only the results for nominal values are presented with the understanding that they are the same as for real values. Two indicators of this income concept were used: (a) personal income and (b) personal income minus government transfers. A comparison of the results for these two income concepts provides

an indication of the effect of redistributive policies on the speed of convergence of regional living standards. Details on the sources of data are found in the Appendix.

III. RESULTS

A. σ - Convergence

Sigma-convergence provides a visual presentation of regional disparities by showing the time-path of the dispersion for each of the selected six indicators, where dispersion is measured by the standard deviation of the natural logarithms of each indicator. A downward trend in the degree of dispersion indicates sigma-convergence. To test the statistical significance of such a trend, we fitted a straight line through the estimated dispersion values. The results are presented in endnote (2). The discussion in the text is confined to the graphical presentation because the statistical analysis is reserved for the more meaningful concept of the speed of convergence.

1. All Provinces - The dispersion of nominal GDP, per capita and per worker, is shown in Figure III-1. This figure shows that there was a steady reduction in the dispersion of nominal GDP per capita over the entire period, thus suggesting a positive speed of convergence. This figure also shows that there was a sudden drop in the degree of dispersion during the 1980-83 period. This situation suggests that the speed of convergence will be lower for the periods before 1981 and after 1983 than for the entire period, a hypothesis that will be tested later under β convergence. A similar pattern is evident for the dispersion of nominal GDP per worker. The

degree of dispersion falls throughout the entire period and it experiences a sudden drop during 1980-83. The information provided by figure III-1 lends support to the hypothesis that there was convergence of nominal GDP among Canadian provinces over the period from 1961 to 1999.

Place figure III-1 here

The effect of changes in terms of trade among Canadian provinces is eliminated by deflating nominal GDP values by province-specific GDP deflators, as was done in the development of Figure III-2. This figure shows a very flat pattern of dispersion for real per capita GDP with a slight downward trend. There is still a sudden drop in 1980, but its magnitude is much smaller than that for the corresponding nominal GDP. For the sub-periods prior to 1980 and after 1983, the pattern of dispersion is virtually flat. The dispersion of labour productivity (real GDP per worker) followed a very shallow U-shape. It declined slowly from 1961 to 1983 and then started a slight positive trend. Even when the drop during 1980-83 is excluded from the analysis, what is left is a slight trend towards divergence during the 1984-99 period.

Place Figure III-2 here

Personal income and personal income minus government transfers, expressed on a per capita basis, exhibit a clear trend towards convergence. The degree of dispersion follows a declining pattern throughout the entire period. Thus, despite the lack of convergence in real output, there was convergence in living standards even when government transfers to persons are excluded.

Place Figure III-3 here.

2. Selected Sub-groups of Provinces - The neo-classical model predicts that, if all provinces were ranked in descending order of per capita income, each province would converge towards the mean, some from above and some from below. This pattern of convergence should occur for each sub-set of the ranked list of provinces. To test this hypothesis, the pattern of σ -convergence was developed for four subsets of provinces: (a) the richer provinces as a group (Ontario, Alberta and British Columbia), (b) the remaining seven provinces, (c) the four Atlantic provinces, and (d) Quebec, Manitoba and Saskatchewan (figures will be provided by the authors on request).

The dis-aggregated analysis shows that the richer provinces and the less affluent provinces followed opposite convergence paths during the 1961-99 period. The first group exhibits divergence for all indicators of output and minimal convergence for the indicators of personal income. This pattern of divergence resulted primarily from the poorer performance of the B.C. economy during the sample period that moved its level of income per capita and per worker closer to the national average. For the second group there is evidence of convergence for nominal GDP and for real GDP per capita. Real GDP per worker, however, shows a fairly flat pattern of dispersion. A falling trend from 1961 was reversed in 1982 so that the degree of dispersion in the final year was almost identical to that of the initial year. There is also evidence of convergence for the earnings component of personal income, but only slight convergence for personal income. However, the average degree of dispersion of personal income is substantially lower than that of the earnings component. Within the sub-group of the less affluent provinces, one notices that

most of the convergence action took place in the four Atlantic provinces. Quebec, Manitoba and Saskatchewan as a group show an erratic pattern of the dispersion of the various indicators along a roughly constant average value over the entire period. The one major similarity between these two groups of provinces is the moderate trend towards divergence of real labour productivity.

The above dis-aggregation of the pattern of σ -convergence suggests that there may be a variety of region-specific factors that affect the relative growth rates of different provinces and that any observed convergence may be the result of complex interactions. More formal tests of the BMS model are presented in the next section which provides estimates of the speed of convergence.

B. β - Convergence

1. Entire Sample Period - Our estimates of the speed of convergence of regional income indicators for the 1961-99 period are shown in Table III-1. Starting with nominal values, one notices that the estimated value of β for nominal GDP per capita is positive and statistically significant, thus providing support to the hypothesis of absolute nominal convergence. Our estimate of .027 for 1961-99 is similar to the values estimated by Barro and Sala-i-Martin (1991,1992) for selected developed countries. They found annual speeds of convergence of about 2 percent for the U.S. (1963-86), 2.3 percent for Germany (1950- 85), 2.4 percent for Belgium (1950-85) and 3.4 percent for the U.K (1950-85). Similar speeds of convergence were found for Canada by Coulombe and Lee (1995) for 1961-91. We also found a faster speed of convergence for nominal GDP per worker. The difference between per capita and per worker values is due to

the reduction in disparities of employment rates associated with the relative increase in labour force participation rates in the less affluent provinces.

Very different results are obtained for real output indicators. The estimated value of β for real GDP per capita is still positive, but is very small (.009) and is statistically insignificant. An almost identical result is derived for real GDP per worker ($\beta = .008$). The difference in the results between nominal and real output indicators is inconsistent with the underlying neo-classical model. This model generates convergence of real GDP per person or per worker. Our results indicate that all the convergence action was on the producer price side.

Differences in the rates of convergence of nominal and real GDP per capita were also found by Coulombe and Lee (1995). They explained this difference within a Staple-theory framework. In their view (p.895) “the comparative results on nominal versus real GDP convergence indicate that the evolution in the prices of natural resources and the relative prices of manufactured goods have been, since 1961, an important determinant of economic convergence in Canada.” We emphasize that changes in the relative prices of natural resources and manufactured goods have been affected by external factors. Canada is a small open economy which depends heavily on international trade. Its producers are generally price-takers in international markets, but the influences of changing world economic conditions are not uniform in all provinces because of interprovincial differences in economic structures. Therefore, the potential process of convergence in real output is associated with exogenous changes in relative producer prices which, during the period under investigation, led to convergence of nominal output values.

Moving from indicators of output to indicators of income received by persons residing in each province, one notices that the changes in relative producer prices are not shifted forward to consumer prices. We found that the value of β for personal income was almost identical for real and for nominal convergence, a result consistent with the findings of Coulombe and Lee (1995). The difference in the degree of inter-provincial variability of producer and consumer prices reflects the fact that production activity is unevenly distributed among Canadian provinces, partly because of differences in resource endowments, while patterns of consumption are similar among all provinces. Our estimate of β for the private income component of personal income (PI minus government transfers) was positive (.025) and statistically significant, suggesting convergence of living standards across Canadian provinces.

It may be worth noting that the speed of nominal convergence is very similar for GDP and personal income per capita. These two income concepts differ primarily with respect to the allocation of capital income. GDP contains all income generated by corporations, including retained earnings, and assigns it to the province where economic activity takes place. Personal income includes only income received by persons assigned on the basis of the province where those persons reside. The neoclassical model predicts a faster speed of convergence for GDP than for personal income because in the convergence process capital is moving from the richer to the poorer regions. Our results indicate that the different treatment of capital income under the two concepts of income has no effect on the speed of convergence in Canada.

Our results also show that government transfer payments to persons increased the speed of convergence of living standards. The estimated value of β for 1962-99 was .033, nearly one-third higher than that for PI minus government transfers. This result is consistent with a priori expectations. Transfers to persons are largely targeted at lower income individuals and families. Since the less affluent provinces contain a relatively larger share of low income households, they receive above-average per capita amounts of these government transfers.

Table III-1. Speed of Convergence of Regional Income Disparities in Canada

Income Measure and Sample Period	β	T-value	R2	# of Observations
Nominal GDP per Capita (excluding Alberta)				
1961-99	.0269	.3.59	.981	342
1961-80	.0180	1.75*	.982	171
1984-99	.0221	1.94*	.981	144
Nominal GDP per Worker (Excluding Alberta)				
1966-99	.0567	4.04	.942	297
1966-80	.0436	2.11	.947	126
1984-99	.0238	1.16*	.942	144
Real GDP per Capita				
1961-99	.0086	1.53*	.988	380
1961-80	.0068	.821*	.987	190
1984-99	.0008	.096*	.990	160
Real GDP per Worker				
1966-99	.0079	.91*	.975	330
1966-80	.0250	1.61*	.967	140
1984-99	-.0115	-1.16*	.985	160
Personal Income minus Government Transfers				
1961-98	.0247	3.36	.980	370
1961-80	.0188	1.73*	.978	190
1984-98	.0287	2.62	.985	150
Personal Income				
1961-99	.0329	4.05	.975	370
1961-80	.0296	2.45	.972	190
1984-99	.0331	3.08	.981	160

Note: * statistically insignificant at the 5% level.

2. Selected Sub-periods. The estimated values of β discussed above measure the average speed of convergence for the whole period. We further explored the pattern of convergence by dividing the sample period into two sub-periods for two reasons. First, we wanted to determine whether the economic re-structuring that followed the 1982-83 recession and the long expansion of the 1990s had a significant impact on the speed of convergence. Second, inspection of the pattern of dispersion of regional disparities shows that, particularly in the case of indicators based on nominal GDP, there was an abrupt increase in σ -convergence during the economic slowdown of the 1980-83 period which was only partly corrected during the 1984 recovery. We want to explore whether the sharp increase in convergence during the 1980-83 period was caused by differential regional impacts of external shocks.

Responding to the US recession, the Canadian economy began to slow down in 1981 and recorded a substantial drop of real output in 1982. The downturn was particularly severe in manufacturing, especially the durable goods sector including automotive industries. The least affected sectors were agriculture, fishing and services, which include the government sector. Because the most severely affected sectors, mostly manufacturing, were predominantly located in the richer provinces while the less severely affected sectors were located in the less affluent regions, the externally-induced Canadian recession produced a sudden and large reduction of regional disparities. Since this convergence effect was not generated by the built-in mechanism incorporated into the neo-classical model which serves as the foundation for the convergence models, it should be excluded from the data set used in the estimation of the speed of

convergence. In order to eliminate the effect of this external shock, we re-estimated the β value for two sub-periods, namely, 1961-80 and 1984-99. The results, shown in table III-1, contradict some of the conclusions derived for the entire period.

Eliminating the 1980-83 shock still generates absolute convergence of nominal GDP per capita, but the speed of convergence is lower in each sub-period than for the entire period. The estimated β value is reduced by 33% for the 1961-80 period and by 18% for the 1984-99 period. However, there is no longer general convergence of nominal GDP per worker. The speed of convergence of this indicator for the period 1961-80 is reduced by 23% and the β value for the 1984-99 period becomes statistically insignificant.

The lack of convergence for real GDP per capita and per worker is confirmed by the results for the two sub-periods. The significant result for the sub-periods is that, when the shock of 1980-83 is eliminated, there is no evidence of convergence for labour productivity, either in nominal or in real terms. Moreover, the estimated β value for real GDP per worker is negative, though statistically insignificant, for the 1984-period. This result suggests that, instead of receiving comfort from convergence in labour productivity, the less affluent provinces may have to be concerned about the potential for divergence.

The breakdown of the sample period into two sub-periods has little effect on the two indicators based on income received by the personal sector. Convergence is retained for both periods, but the first period has below-average speed of convergence and the second period above-average

speed of convergence. There is some indication that the effect of government transfers on convergence of personal income was substantially reduced after 1984. The ratio of the β value for personal income minus transfers to the β value for personal income, which amounted to 75% for the entire period, was 64% during 1961-80 but increased to 87% in the 1984-99 period. Thus, the extent to which regional disparities in the private earning component of personal income were reduced by government transfers fell by more than two-thirds in 1984-99. This conclusion is consistent with the results obtained by Ruggeri and Yu (2000). These authors calculated the redistributive effects of all components of the federal budget for 1992 and 1997. They concluded that, during this period, there was an increase in the degree of inequality of private income per capita among provinces, i.e. income net of the redistributive effect of federal fiscal activity, and a reduction in the degree of federal fiscal redistribution among provinces.

IV. CONCLUSIONS

This paper used the neo-classical model developed by BMS to test whether there was convergence among regions in Canada during the 1961-99 period. The results show mixed evidence of convergence. There was convergence of living standards, with and without government transfer payments, for the entire period and for the two sub-periods. We found convergence of nominal GDP per capita, but non convergence of real GDP, per capita and per worker. For the 1984-99 period, there was no convergence of output per worker either in nominal or in real terms. Moreover, convergence, when it occurred, was not generalized to all provinces. Instead, there was a mix of convergence and divergence among sub-groups of provinces.

Previous studies had led to a general view that convergence in Canada was an established fact. Our results cast some doubts on that view. Some of our results are also inconsistent with the predictions of the neo-classical convergence model. This model leads to convergence of real variables through the movement of capital from the richer to the less affluent regions. Our results, however, show that most of the action on convergence took place on the producer price front. There was no convergence of real output per capita or per worker. Also, because the inter-regional movement of capital is the convergence mechanism, the neo-classical model predicts a faster speed of convergence for output indicators than for personal income indicators. No such evidence was found for Canada. Finally, in theory, the neo-classical model predicts that convergence should take place in each province so that all provinces move towards the mean, some from above and some from below. The Canadian data, however, show a segmented pattern of convergence. In particular, we noticed some divergence among the three richer provinces, convergence among the Atlantic provinces and no convergence among Quebec, Manitoba and Saskatchewan. These findings suggest that there are region-specific factors that affect the relative position of each province over time and that convergence is a complex process which involves the interaction of a variety of mechanisms in addition to the potential effect of capital movements.

We interpret our results as indicating that the process of convergence in a small open economy is a complex phenomenon which cannot be fully captured by the commonly-used neoclassical models. We suggest that the analysis of convergence within a country which operates as a small open economy be extended to include the following elements. First, explicit recognition must be

given to inter-provincial migration. In the knowledge-based economy, where economic growth is increasingly driven by human capital, the mobility of labour within a country plays an important role in the evolution of regional disparities. Moreover, if there is complementarity between human and physical capital, inter-provincial labour migration may also affect the inter-provincial distribution of investment in physical capital. Second, the potential for economies of scale from the concentration of knowledge-based activities must be fully explored. Such concentration in the larger urban centers of the richer provinces will lead to a pattern of migration of human capital that will tend to increase regional disparities. Finally, the Canadian provinces represent small open economies within a small open economy. As such, they are subject to region-specific external shocks which may reinforce or weaken the neo-classical convergence mechanism. In this case, convergence models may have to explicitly incorporate the elements of trade models.

In conclusion, policy-makers in Canada may derive some comfort from the trend towards shrinking regional disparities in personal income per capita. They should be concerned, however, about the lack of convergence of labour productivity and signs of divergence during the past fifteen years. Over the long-run, productivity growth will largely determine the relative standards of living of the residents of different regions. Unless market forces generate productivity convergence, reducing regional income disparities will require increasing net fiscal transfers to the less affluent regions.

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ENDNOTES

(1) As pointed out by a referee, given that $(\ln y_t - \ln y_{t-1})$ is approximately $(y_t - y_{t-1})/y_{t-1}$ and that $\ln y^* - \ln y_{t-1}$ is approximately $(y^* - y_{t-1})/y^*$ and realizing that the Taylor series expansion for $e^{-\beta}$ is just $1-\beta$, it emerges that β is the ratio of the proportional one year change in y to the proportion by which y^* exceeds y_{t-1} .

(2) For the entire period, a statistically significant negative trend coefficient was found for nominal GDP , per capita and per worker, personal income per capita and personal income minus transfers per capita. Real GDP per worker had a statistically significant positive trend. For the

1984-99 period, statistically significant negative trends were found for nominal GDP per capita and for personal income per capita and personal income minus transfers per capita. Nominal GDP per worker and real GDP per capita has a statistically insignificant negative trend, while real GDP per worker had a statistically significant positive trend.

APPENDIX

SOURCES OF DATA

GDP at factor cost was computed for each province by subtracting indirect taxes net of subsidies from GDP at market price. Data on provincial GDP at market price for the period 1961-1980 were obtained from CANSIM: D46980-D45169 while Data on provincial GDP at market price for the period 1981-1999 were obtained from CANSIM: D28629-D28818. Data on Indirect taxes net of subsidies also came from CANSIM. For the period 1961-1980 we used the series of D12547-D12565 and for the period 1981-1999 we used the series of D24019-D24127.

Population data for the period 1961-1980 are from CANSIM series: D44967-D45156 and the data

for the period 1981-1999 are from CANSIM: D28616-D28805. From CANSIM series: D44970-D45159 and D28619-D28808 we obtained the data on Provincial Employment for the period 1966-1980 and 1981-1999 respectively.

Data on the provincial GDP deflators before 1980 were provided by Professor Serge Coulombe. They were originally compiled by the Conference Board. The data 1981-1999 period were calculated from from CANSIM: D28628-D28817.

The data on Personal Income Per Capita for the period 1961-1980 and 1981-1999 were obtained directly from CANSIM. The series are D44974-D45163 and D28623-D28812. The data on Personal Income for the period 1961-1980 are from CANSIM: D44973-D45162 and the rest of period 1981-1998 are from CANSIM: D28622-D28811. Data on Government Transfer Payments to Persons for the period 1961-1980 are from CANSIM: D43206-D44455 and for the period 1981-1998 are from CANSIM: D27617-D27816.

FIGURES

Figure I I I-1:

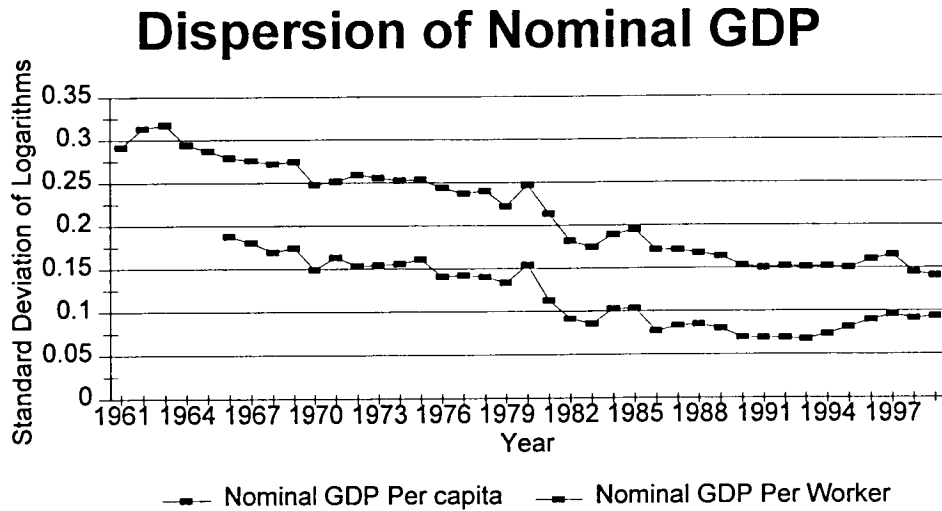


Figure I I I-2:

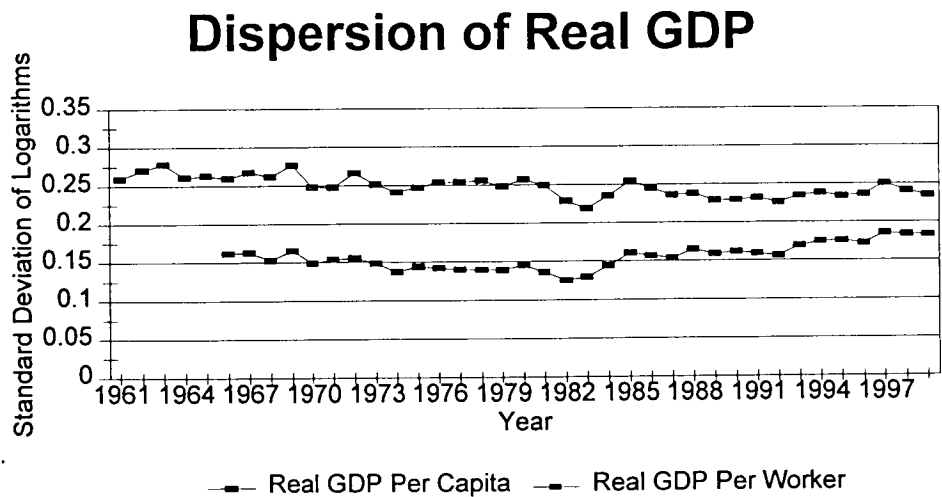


Figure I I I-3:

