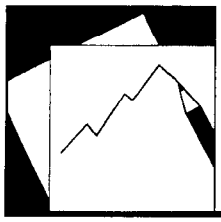
WP/03/97



IMF Working Paper

Regional Convergence and the Role of Federal Transfers in Canada

Martin Kaufman, Phillip Swagel, and Steven Dunaway

INTERNATIONAL MONETARY FUND

 WP/03/97

IMF Working Paper

Western Hemisphere Department

Regional Convergence and the Role of Federal Transfers in Canada

Prepared by Martin Kaufman, Phillip Swagel, and Steven Dunaway

Authorized for distribution by Christopher Towe

May 2003

Abstract

Differences in per capita output across Canadian provinces have narrowed less than disparities in per capita income in past decades. Using a panel regression framework, this paper studies the differential impact of federal transfer programs on output convergence. The evidence suggests that while the Employment Insurance (EI) system seems to have had a significant negative effect on output convergence—by discouraging migration within Canada—the Equalization transfers may have helped spur convergence. The EI system, despite reforms introduced in the 1990s, still appears to contain features that deter labor mobility.

JEL Classification Numbers: R12, R23, H59

Keywords: Canada, regional convergence, federal transfers, migration.

Authors' E-Mail Addresses: mkaufman@imf.org; pswagel@cea.eop.gov; and sdunaway@imf.org

Contents Page

I. INTRODUCTION[1]

Economic theory and evidence suggest that differences in income and output per capita between regions of a country tend to diminish over time, as factors of production relocate in response to relative cost/price advantages.[2] This convergence is typically viewed to carry important benefits, including a moreefficient use of resources and higher levels of output for the country as a whole.

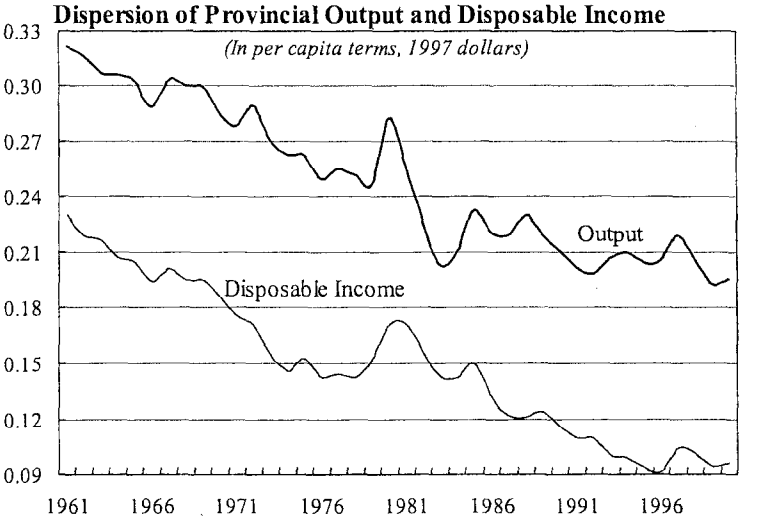
In Canada, however, although there has been some tendency toward convergence across provinces in recent decades, disparities in per capita output have narrowed much less markedly than in per capita income. This raises questions regarding the factors that may have hindered output convergence, and the extent to which government policies may have played a role. More specifically, federal transfer programs—such as the Employment Insurance (EI) and Equalization payments programs—may have discouraged factor movements and other adjustment to economic conditions, thereby contributing to slower output convergence.

The impact of federal transfer programs on output convergence across Canadian provinces is examined below using a panel regression framework. The evidence suggests that Equalization transfers may have helped spur convergence but that the EI system seems to have had a significant negative effect by discouraging migration within Canada. Despite the reforms to the EI system introduced in the 1990s, this program still appears to contain features that would deter labor mobility.

A. Stylized Facts of Regional Disparities

Differences in real per capita output across Canadian provinces are substantially larger, and have declined by less, than differences in per capita disposable income. This phenomenon can be illustrated by comparing the coefficient of variation of interprovincial per capita real GDP and disposable income over time (Figure 1). By this measure, the dispersion of per capita disposable income across provinces has fallen markedly in the last four

Figure 1. Canada:
Dispersion of Provincial Output and Disposable Income



[1] Preparation of this paper began when the authors were in the North American Division of the Western Hemisphere Department.

[2] Examples of studies of regional convergence in the United States and Europe include respectively Kim (1997) and Quah (1995).

decades. In contrast, the provincial dispersion in per capita output has shown a much smaller decline during this period and has remained largely unchanged since the early 1980s.

These aggregate statistics reflect the marked differences in regional economic performance. Real per capita output in the four maritime provinces—the lowest-income region in Canada—increased from around 65 percent of the national average in 1981 to 72 percent in 2000. In contrast, real per capita disposable income in the Maritimes rose from 60–80 percent of the national average in 1981 to 80–90 percent in 2000. Even in Newfoundland, the lowest-income province, real per capita disposable income rose from 67 percent of the national average in 1981 to 81 percent in 2000.

The relatively more rapid convergence in income compared with output has reflected the significant redistributive effects of federal government transfer programs. For example, in 2000, Newfoundland and Prince Edward Island—provinces with relatively lower levels of per capita output—received 3–3½ times the national average in per capita EI benefits, up from 2–2½ times the national average in 1980 (see Figure 2). All other provinces actually received smaller per capita EI transfers in real terms, and the amount directed toward Ontario and Quebec—which are relatively more productive—fell compared to the national average.

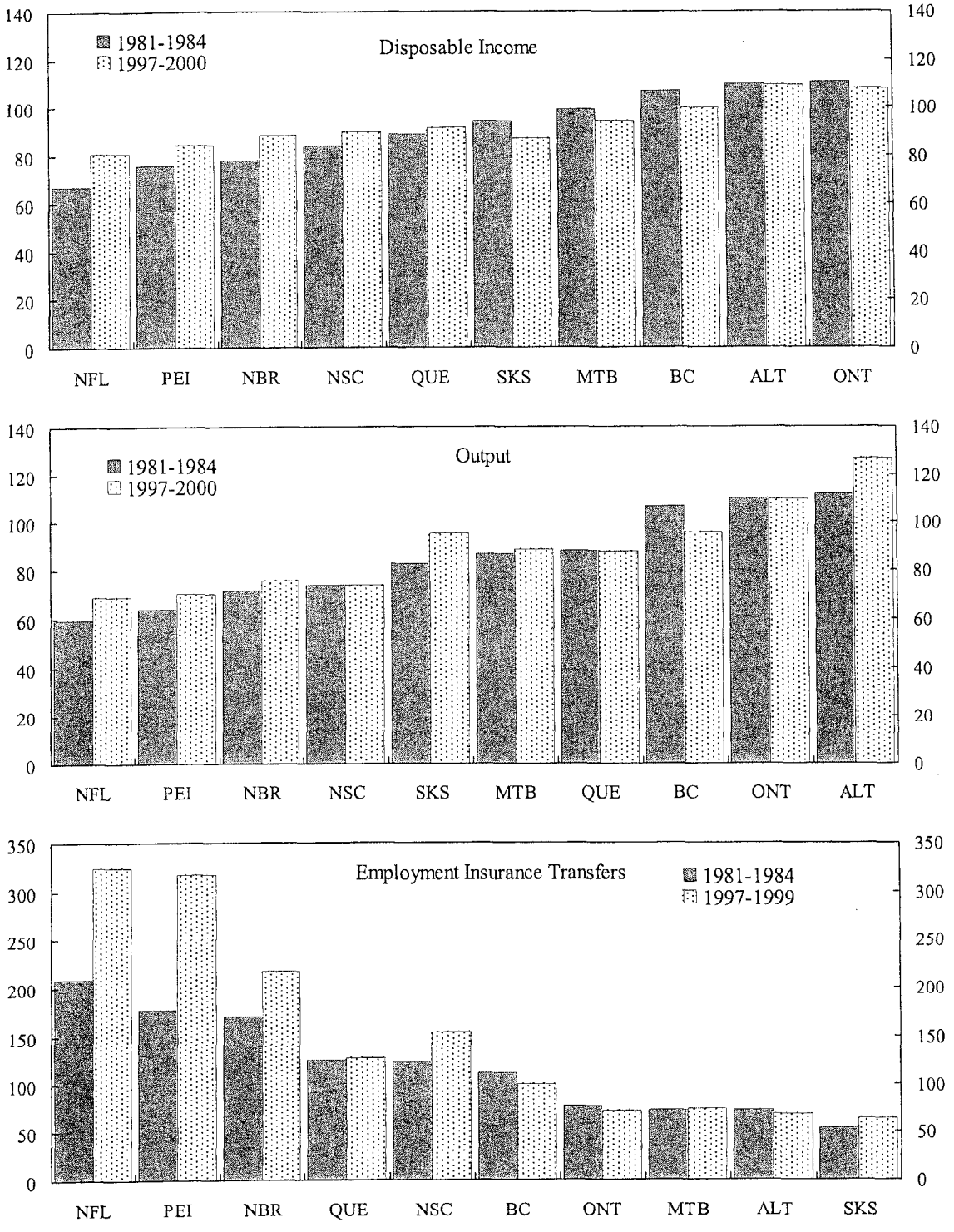
B. Equalization and Employment Insurance[3]

Equalization payments are provided directly to the provinces by the federal government and are designed to reduce fiscal disparities. The transfers are intended to ensure that lower-income provinces have access to sufficient resources to provide reasonably comparable levels of public services at reasonably comparable levels of taxation. No conditions are attached, and the provinces can use the transfers according to their own priorities.

The specific amount of Equalization payments provided to a given province is calculated according to formulas that are defined by federal legislation and regulations. The calculations involve first the definition of a standard level of revenue-raising capacity—presently defined on the average capacity of the five "middle-income" provinces: Quebec, Ontario, Manitoba, Saskatchewan, and British Columbia, and currently equal to $5,863 per capita.

[3] Helpful summaries are provided on the web sites of the Department of Finance (*www.fin.gc.ca*) and Human Resources Development Canada (*www.hrdc-drhc.gc.ca*).

Figure 2. Canada: Changes in Disposable Income, Output, and EI Transfers
(*Per capita of 1997 dollars relative to the national average*)



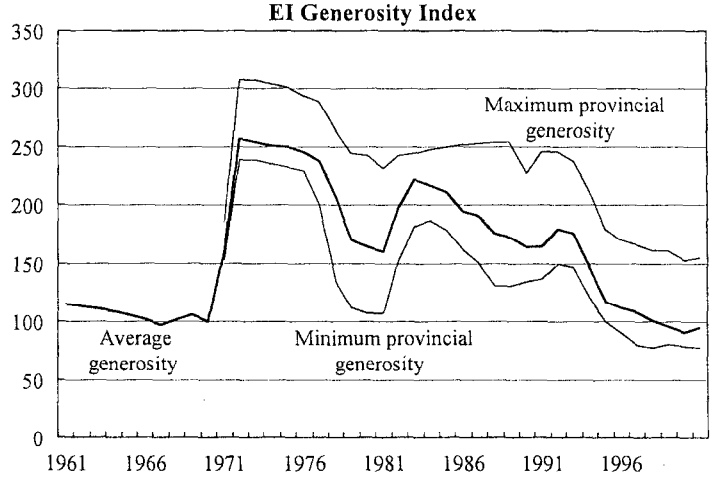
Sources: Cansim, and IMF staff calculations.

Provinces whose revenue potential falls short of this amount are provided Equalization payments that bring them to the standard. Currently, eight provinces qualify: Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Manitoba, Saskatchewan, and British Columbia.

It is important to note that the calculations are based not on actual revenues, but on benchmark estimates of revenue capacity. Over 30 separate revenue sources are considered, and a national average tax rate is then applied to the tax base in each province.[4] A floor on Equalization payments protects individual provinces against large year-to-year declines in payments, while a ceiling that increases with GDP also applies.[5]

The **Employment Insurance** (EI) system is a federally administered program that provides temporary income support for individuals facing involuntary unemployment.[6] The EI program is presently financed through payroll taxes paid by employers and employees on insurable earnings. In principle, the EI tax rate is set at a level that is expected to meet the costs of providing unemployment benefits over the business cycle, but the system presently runs large surpluses. In this context, EI premia were reduced by 10 cents to $2.10 in early 2003, for a cumulative reduction of nearly one third from a premium level of $3.07 in 1994.

Figure 3. Canada: EI Generosity Index



Source: Sargent (1995) and recent update.

EI benefits are based on hours worked during the previous year, past earnings, and previous use. EI premia are uniform for

[4] In order to avoid adverse incentives in situations where a tax base is concentrated in one province and that province's decisions significantly affects the national average tax rate, a "Generic Solution" applies in cases where a province generates more than 70 percent of a particular type of revenue. For such a province, every $1.00 a province generates in revenues from that revenue source reduces its equalization payment by only $0.70.

[5] The floor provision limits the amount that a province's entitlement can decline from year to year to 1.6 percent of the per capita value of the equalization standard. Floor payment entitlements are calculated before the application of any ceiling restrictions to total equalization entitlements. Since the introduction of the floor provision in 1982, there have been nine floor payments to provinces.

[6] The EI system also provides other programs aimed at broader social objectives, including training and self-employment assistance, as well as sickness, maternity, and parental leave.

all employers across Canada, and are not experience-weighted, i.e., the premiums paid by firms and employees do not depend on the likelihood of layoffs or past use of EI benefits by a firm's employees.

EI benefits vary considerably across provinces owing to the introduction of regional extended benefits in the early 1970s (Figure 3). The number of hours of insurable employment required to qualify for EI benefits is lower in high unemployment regions, and the number of weeks of benefits that claimants are eligible for are also higher in such regions. Claimants in the Atlantic provinces are the largest net beneficiaries of the system, reflecting their dependence on seasonal, resource-based industries. Reforms during the 1990s substantially lowered the generosity of EI benefits, and the average level of generosity has returned to close to the level of the 1960s. However, the system continues to differentiate benefits depending on the level of unemployment within regions and the generosity index for high unemployment regions is still high.

C. Regional Convergence of Output Per-Capita

Several aspects of the Equalization and the Employment Insurance systems could work against promoting convergence of per capita output across the provinces. For example, the Equalization system has sometimes been argued to result in a form of "transfer dependency," in that provinces below the revenue standard have little incentive to boost their revenue bases. The absence of experience rating of EI premiums also implies a cross-subsidization of seasonal and other industries, where employment demand varies predictably, and an implicit tax on sectors with more stable employment.[7] Moreover, the larger benefits paid in high unemployment regions may tend also to discourage individuals to respond to changes in economic conditions by migrating to areas with better employment prospects.[8]

To assess the effect of these federal transfers programs on regional convergence in Canada, a model of provincial output convergence is estimated using panel data of Canadian provinces for the period 1961–2000.[9] The model contains a standard convergence equation, in which provincial GDP growth (in per capita terms) is assumed to depend on the previous year's level of provincial per capita GDP. In this case, however, provincial GDP growth is also assumed to depend on the amount of Equalization payments and, indirectly, EI transfers that the province receives. The convergence equation also incorporates a number of province-specific factors, including net-inward migration. The latter would be expected to lower provincial growth in per capita terms, assuming decreasing returns to scale.

---

[7] For a detailed analysis see *Canada: Selected Issues* (2000).

[8] Previous studies on the structure of transfers in Canada include Bayoumi and Masson (1995).

[9] For a critical discussion of convergence issues, see Quah (1996).

The equations are estimated to take into account the fact that the amount of Equalization and EI transfers received by a province are not strictly exogenous but dependent on other factors. In this case, the transfers are assumed to depend on a province's GDP and unemployment, and on changes in the generosity of the EI system. Finally, a migration equation is included; migration patterns into a province are expected to occur in response to relative unemployment conditions, GDP per capita, and EI transfers to provincial residents.

Summary of the Model

Growth of real GDP/person = f(Log(real GDP/person)$_{-1}$, Log(real Equalization payments/person), Log (real EI payments/person), migration/person, other control variables and constant)

Log(real EI payments/person) = f(relative unemployment rate, EI generosity, constant)

Log(real Equalization payments/person) = f(relative GDP, constant)

Migration/person = f(relative unemployment rate, Log(real EI payments/person), Log(real GDP/person), constant)

The results of the panel estimation are presented in Tables 1 and 2.[10] In the first specification, province-specific controls are included in the convergence equation (growth of hours worked and the capital stock) to take into account differences in endowments that may not be accounted for by the level of GDP per capita (Table 1). The coefficients on lagged GDP and migration in the convergence equation are both negative and significant, as expected, whereas the Equalization parameter is not significant. The coefficient on the EI generosity index is positive and significant in the EI transfers, and the effect of EI transfers per capita is positive and significant in the migration equation. [11] In this case, therefore, EI transfers seem to deter migration and hinder convergence, whereas Equalization appears to have no significant effect.

Table 2 presents an alternative specification that allows for province-specific effects through "fixed effects" terms—that is, the constant term in the convergence equation was allowed to vary across provinces. In this case, the convergence parameter and the migration coefficient

[10] Given the endogeneity introduced by using transfers and migration in the convergence equation, a three-stage procedure for estimating the panel was used. In addition, weighted least squares was applied using provincial GDP.

[11] There are, however, some studies that use micro-level data and find that EI has had a small or nonsignificant deterrent effect on migration (Day and Winer, 2001, and Audas and McDonald, 2002).

remain negative, but the Equalization parameter becomes positive and significantly different from zero. EI generosity is positive and significant in the EI transfers equation, and EI transfers are positive and significant in the migration equation.[12] Thus, these latter results seem to confirm that EI transfers appear to deter migration and indirectly retard convergence, while suggesting that Equalization payments act to promote convergence.[13]

The reforms to the EI system in the 1990s according to this analysis, may have had important beneficial effects by promoting labor migration and regional convergence. At the same time, however, significant differences in regional generosity remain. Lowering these distortions, and introducing other reforms that would address the lack of experience rating, could have further significant benefits.

D. Conclusions

Despite a tendency toward convergence across provinces in recent decades, disparities in per capita output in Canada have narrowed less than the differences in per capita income. Although various factors could have contributed to hindering output convergence, this paper has sought to assess, in particular, the extent to which federal transfer programs may have played a role. The Employment Insurance and Equalization programs may have affected, albeit differentially, factor mobility and other adjustment mechanisms to economic conditions, and they could have contributed to the slower convergence in output.

Using a panel regression framework, the differential impact of federal transfer programs on output convergence across Canadian provinces was studied. Interestingly, the evidence suggests that while the Employment Insurance system seems to have had a significant negative effect on output convergence—by discouraging migration and labor mobility within Canada—the Equalization transfers may have helped spur convergence. Importantly, despite the reforms to the EI system introduced in the 1990s, this program still appears to contain features that would deter labor mobility.

---

[12] The estimated coefficients for EI transfers in the migration equation are significant in both specifications, but the magnitude of the effect varies considerably. In the specification with fixed effects, the coefficient is significantly larger than in the one with a common constant term.

[13] Under an alternative specification without a migration channel, EI payments were found to have a significant and negative direct impact on convergence, but the result was not maintained with the inclusion of fixed effects.

Data Appendix

Per capita GDP growth
The series was constructed using data from Statistics Canada Tables 380-0002, Gross Domestic Product of Provinces, and 051-0005, Estimates of Population. As of 1980, GDP data were spliced backward using growth rates in provincial GDP, Table 384-0015, deflated by 1992 GDP deflator, code D15612.

Net-migration
Derived as in-migration minus out-migration. Series are from Statistics Canada Table 051-0017, inter-provincial migrants.

Transfers
Employment Insurance data are from Table 276-0005. The EI time series in the table is composed of data before and after 1996. The EI series for the paper is constructed by splicing the new series, i.e., 1996–01 backwards, using growth rates in the EI series before 1996. The series are concatenated in 1996 by using monthly observations.

Equalization data for the period 1980–2000 are from the Department of Finance. The series was extended backwards to 1960 by splicing Equalization series using growth rates in Transfers under Taxation Agreements from Table 384-0033.

Unemployment Rate
Variables are compiled from Tables 282-0087,1976–current, LFS estimates by sex and age group, 384-0035, Selected economic indicators, 1966-1975, and Unemployment Rates for different regions, 1961–66 from Statistics Canada, Labour Statistics Division.

Employment (hours worked)
Data are from Table 281-0023, Employment, 1991-current. Data were spliced backward using growth rates from Tables 281-0001, Number of employees, by type of employee and Standard Industrial Classification, 1983-00; 281-0005, Number of employees, by type of employee and Standard Industrial Classification, 1983-00; 281-0001, Number of employees, by type of employee and Standard Industrial Classification, 1983-00; and 281-0015, Estimates of employees, by industry, 1961–83.

Capital Stock
Data are from Statistics Canada, National Wealth, and Capital Stock Section. Data are provided in 1997 prices; capital stock are constructed by Statistics Canada using hyperbolic delayed methodology.

EI Generosity Index
The series is an updated version of the index described in Sargent (1995).

Table 1. Canada: Convergence Equation, with Migration Channel
(Three-stage least squares regression)

	Per Capita Real GDP Growth			ln(Real EI Transfers Per Capita)			ln(Real Equalization Transfers Per Capita)			Migration Per Capita		
	Coef.	z	P>|z|	Coef.	z	P>|z|	Coef.	z	P>|z|	Coef.	z	P>|z|
ln(Real GDP Per Capita) (-1)	-0.024	-2.5	0.01							-0.170	-1.5	0.14
ln(Real Equalization transfers Per Capita)	-0.001	-0.4	0.70									
Migration Per Capita	-0.039	-3.3	0.00									
Growth of Capital Stock	0.087	0.5	0.64									
Growth of Hours Worked	0.254	3.4	0.00									
Relative Unemployment Rate				0.902	11.8	0.00				-0.342	-3.0	0.00
Index of EI Generosity				0.005	9.2	0.00						
ln(Real EI Transfers Per Capita)										0.269	4.3	0.00
Relative GDP							-2.911	-5.3	0.00			
Constant	-0.099	-2.2	0.03	-9.641	-88.5	0.00	-5.244	-12.1	0.00	1.469	3.0	0.00
RMSE	0.040			0.534			1.195			0.457		
chi^2	58.9			330.0			28.1			21.0		
P	0.00			0.00			0.00			0.00		

Source: IMF staff calculations.

Table 2. Canada: Convergence Equation, With Migration Channel and Fixed Effects
(Three-stage least squares regression)

	Per Capita Real GDP Growth			ln(Real EI Transfers Per Capita)			ln(Real Equalization Transfers Per Capita)			Migration Per Capita		
	Coef.	z	P>|z|	Coef.	z	P>|z|	Coef.	z	P>|z|	Coef.	z	P>|z|
ln(Real GDP Per Capita) (-1)	-0.548	-5.7	0.00							0.176	1.1	0.28
ln(Real Equalization transfers Per Capita)	0.360	6.8	0.00									
Migration Per Capita	-0.221	-6.9	0.00									
Relative Unemployment Rate				1.352	9.3	0.00				-0.755	-5.8	0.00
Index of EI Generosity				0.004	8.1	0.00						
ln(Real EI Transfers Per Capita)										0.395	5.7	0.00
Relative GDP							3.628	7.4	0.00			
Alberta										4.241	8.8	0.00
British Columbia	2.059	6.3	0.00	-9.886	-31.5	0.00				4.051	9.3	0.00
Manitoba	0.350	4.9	0.00	-9.987	-67.8	0.00	4.281	11.8	0.00	4.501	9.0	0.00
New Brunswick	0.117	3.0	0.00	-9.979	-44.7	0.00	5.444	14.3	0.00	4.262	7.6	0.00
Newfoundland	-0.183	-4.2	0.00	-10.398	-35.5	0.00	6.145	15.2	0.00	4.579	9.4	0.00
Nova Scotia	0.172	3.9	0.00	-10.052	-48.8	0.00	5.302	14.0	0.00			
Ontario				-9.804	-43.6	0.00	6.015	15.1	0.00	4.594	9.0	0.00
Prince Edward Island	0.449	5.5	0.00	-10.164	-50.5	0.00	4.142	11.4	0.00	4.441	9.5	0.00
Quebec	0.934	6.1	0.00	-9.977	-72.1	0.00	2.656	7.2	0.00	3.809	8.8	0.00
Saskatchewan	0.141	1.4	0.15				-15.018	-26.0	0.00			
Constant												
RMSE	0.251			0.508			0.692			0.372		
chi^2	70.5			64780			637.0			513.5		
P	0.00			0.00			0.00			0.00		

Source: IMF staff calculations.

References

Audas, R. and McDonald, J.T., 2002, "The Role of EI in Migration Decisions," unpublished, University of New Brunswick.

Bayoumi, T., and P.R. Masson, 1995, "Fiscal Flows in the United States and Canada: Lessons for Monetary Union in Europe," *European Economic Review*, Vol. 39, pp. 253–274.

Canada: Selected Issues, 2000, IMF Staff Country Report 00/34, March.

Day, K.M., and Winer, S.L., 2001, "Policy-Induced Migration in Canada: An Empirical Study," unpublished, November, University of Ottawa.

Kim, S., 1997, "Economic Integration and Convergence: U.S. Regions, 1984–1987," NBER Working Paper 6335, Cambridge, MA: National Bureau of Economic Research, December.

Lee, K., Pesaran, M.H., and Smith, R., 1997, "Growth and Convergence in a Multi-Country Empirical Stochastic Solow Model," *Journal of Applied Econometrics,* Vol. 12, pp. 357–92.

Quah, D., 1995, "Regional Convergence Clusters Across Europe," CEPR Discussion Paper 274 London: Centre for Economic Performance, November.

____, 1996, "Empirics for Economic Growth and Convergence," *European Economic Review 40,* pp. 1353–75.

Sargent, Timothy C., 1995, "An Index of Unemployment Insurance Disincentives," Working Paper 95-10, Economic and Fiscal Policy Branch, Department of Finance Canada, December.