

# Canadian Regional Development: The Quest for Convergence

PATRICK JAMES *University of Southern California*  
JONATHAN KRIECKHAUS *University of Missouri*

## Introduction

This article assesses the economic development of Canadian provinces in the context provided by the theory of convergence. Two basic questions will be asked and to some extent answered. First, to what degree do the Canadian provinces reveal convergence over time in terms of general economic performance? Second, what are the implications of convergence theory for Canadian provincial policy? These questions combine to give the article a purpose that is both academic and policy relevant in nature.

Within a comparative study of political economy, Canada is an especially interesting case to consider. Canada's inconsistent economic performance over time, as well as its long-standing debate over provincial inequality, allows for an important context within which to explore the effect of national performance on provincial outcomes. For such reasons the present article looks below the surface, at provincial economies, to see what can be learned from an investigation guided by convergence theory.

Four additional sections make up this article. The first explains the central place of convergence theory within the study of development, most notably as related to peripheries or lagging economies. Second, convergence theory is discussed within the special and interesting setting of the Canadian economy. Third, the research design and data analysis are presented. The results suggest that convergence is serving as a natural and

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**Acknowledgments:** We are grateful to Yitan Li for research assistance, as well as Serge Coulombe and Christine Drennen for valuable advice and access to data.

Patrick James, School of International Relations, University of Southern California, 3520 Trousdale Parkway, Social Sciences Building B2B, Los Angeles CA 90089-0037, patrickj@usc.edu

Jonathan Kriekhaus, Department of Political Science, University of Missouri, 113 Professional Building, Columbia MO 65211-6030, kriekhausj@missouri.edu

*Canadian Journal of Political Science / Revue canadienne de science politique*

41:1 (March/mars 2008) 187–202 doi: 10.1017/S0008423908080086

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and/et la Société québécoise de science politique

highly robust corrective to regional disparity. Fourth, and finally, conclusions are offered and policy implications derived.

### Convergence Theory

Within the discipline of economics, the primary analytical framework for understanding long-run economic performance is the neoclassical growth framework. Neoclassical growth theory assumes that economic output is a function of capital and labour. Furthermore, neoclassical theory assumes positive yet diminishing returns with respect to each input. The phrase “positive returns” refers to the claim that, if we increase one factor of production (say, investment) and leave constant the other factor of production (say, labour), then the total change in output will be positive. This claim captures the commonsense intuition that a given number of workers can produce more goods when they have access to more capital.

The concept of “diminishing returns” implies that the preceding increase in production will become smaller each time an extra unit of capital is added to the (fixed) stock of labour. A little additional capital, for instance, is very useful for a capital-scarce worker but that small addition will not be so useful for a capital-rich worker. Hence, while more capital will always generate more production, the size of this additional amount “diminishes” with further increments of capital.

This concept of diminishing returns yields the primary empirical prediction of neoclassical growth theory, namely, that poor countries or provinces grow more rapidly than rich countries or provinces. Rich provinces already have enjoyed dramatic increases in productivity due to investments and they therefore receive *relatively* less extra growth from further investment. Poor provinces, on the other hand, are relatively capital-scarce and therefore reap larger returns from additional investment. Holding everything else constant, this allows per capita income in poor provinces to grow more rapidly and slowly converge with that of richer provinces. In short, neoclassical growth theory predicts “conditional convergence”—lower levels of initial per capita income will generate more rapid growth (convergence), assuming all else is equal (making the prediction a “conditional” one).<sup>1</sup>

We concede, of course, that this prediction rests heavily on the *ceteris paribus* assumption that countries and provinces do not differ systematically along the many other dimensions that might influence economic growth rates. Nonetheless, we emphasize that conditional convergence theory not only lies at the heart of mainstream economic thought on long-run economic growth, but is also strongly supported by a large range of empirical studies. At the cross-national level, for instance, almost all studies confirm the conditional convergence hypothesis that a low initial level

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Four additional sections make up this article. The first explains the central place of convergence theory within the study of development, most notably as related to peripheries or lagging economies. Second, convergence theory is discussed within the special and interesting setting of the Canadian economy. Third, the research design and data analysis are presented. The results suggest that convergence is serving as a natural and highly robust corrective to regional disparity. Fourth, and finally, conclusions are offered and policy implications derived.

**Résumé.** Cet article examine le développement économique des provinces canadiennes dans le cadre de la théorie de la convergence. Il pose deux grandes questions, auxquelles il répond en partie. Premièrement, dans quelle mesure les provinces canadiennes présentent-elles une convergence à long terme pour ce qui est de leur performance économique? Deuxièmement, quelles sont les implications de la théorie de la convergence pour les politiques provinciales? Par ces deux questions, le présent article revêt à la fois une portée académique et une pertinence en matière de politique publique.

L'article comprend également quatre parties. La première explique la place centrale qu'occupe la théorie de la convergence dans l'étude du développement économique, notamment en ce qui concerne les périphéries ou les économies accusant un certain retard. La deuxième discute la théorie de la convergence dans le cadre spécifique et intéressant de l'économie canadienne. La troisième précise le cadre d'analyse et dévoile l'analyse des données. Les résultats démontrent que la convergence représente un correctif naturel et fort efficace des disparités régionales. La quatrième et dernière partie présente les conclusions et quelques implications politiques qui en découlent.

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of gross national product (GDP) per capita has a strong positive effect on subsequent growth rates (see, for example, Barro and Sala-i-Martin, 1995).

Even more relevant to this study, the empirical literature has provided strikingly strong confirmation of convergence theory *within* a wide range of countries. Barro and Sala-i-Martin, for instance, document that in the sample of 47 US states, a stunning 89 per cent of all long-run economic growth from 1880 to 1990 is explained by initial income levels alone.<sup>2</sup> Similarly in Australasia, Cashin finds that initial incomes alone can explain a striking 86 per cent of the variation in the seven colonies' economic growth over the period 1861–1991 (1995). This result is statistically significant, although the extremely small sample makes these results less compelling than the findings for the US.

Turning to Japan, however, there is once again a large sample to examine, namely 47 prefectures. Once again, initial income provides a strikingly powerful determinant of long-run economic performance. Indeed, over the period 1930–1990, initial income can explain fully 92 per cent of the variation across prefectures (Barro and Sala-i-Martin, 1995), and the results are obviously highly significant statistically.

Coulombe and his co-authors have similarly demonstrated in a variety of publications that convergence has taken place in Canada, with

poorer regions growing more rapidly than richer regions (Coulombe and Lee, 1995; Coulombe and Day, 1999; Coulombe, 1999, 2000; Coulombe and Tremblay, 2001).

Not all studies provide such striking confirmation of convergence theory. Hofer and Wörgötter find only weak confirmation of convergence theory in the Austrian context (1997). Moreover Chatterji and Dewhurst (1996) and Siriopoulos and Asteriou (1998) rejected the convergence hypothesis in Great Britain and Greece, respectively, suggesting that the strong effect of initial income in long-run growth does not hold for all countries.

Generally, however, most studies do confirm some convergence in incomes across regions within a country. Even when the results are not statistically significant, there is almost always some tendency towards convergence. Sala-i-Martin, for instance, does not explicitly test convergence theory in each country, but he emphasizes that across all prominent Western European countries (Germany, France, Britain, Italy, and Spain), regional divergences in income have consistently narrowed across decades averages ranging from 1950 to 2000 (1996).

In short, the convergence hypothesis is a central component of mainstream neoclassical growth theory. Moreover, it has been verified (to a varying extent) in most countries. Thus, our argument is that this conventional wisdom in economic analysis should be taken seriously in Canadian public policy debates concerning appropriate solutions to provincial income inequalities. We now explain this point further in the context of Canadian development policy. We then turn to empirical materials, showing that convergence theory sheds considerable light on the observed pattern of provincial growth over the last 50 years.

## **Convergence and Canada**

The purpose of this study is not ultimately to settle any ongoing debates about the proper paradigmatic vision of Canadian development. Rather, the goal is more specific, namely to demonstrate that convergence theory provides a powerful explanation of Canadian provincial growth and that provincial inequality is a policy problem that (happily) resolves itself with each passing decade.

Although our emphasis is on convergence theory, our argument bears upon the broader debate in Canadian development studies. In this section we briefly note how our approach fits into policy debates over the last 50 years, and we describe some of the competing theories concerning the evolution of provincial incomes over time. We focus especially on four competing “narratives” concerning the dynamics of provincial growth.

Regionalism has been at the centre of the development story for Canada from Confederation in 1867 onward (Williams, 1995; Dyck, 1996; Innes, 1998). As the second-largest country in the world in terms of territory, Canada's history of regional disparity should not come as much of a surprise. The foundation of theorizing about Canadian economic development is the "staples thesis," articulated by the historian Harold Innis, with an emphasis on the essential role of natural resources.<sup>3</sup> While Innis did not say this himself in his classic exposition many decades ago, a simplified rendering of his thesis might be "geography is destiny." Consider the contrasting economic development, over the long term, of the Canadian Prairie versus Atlantic provinces. GDP per capita is at its maximum and minimum in Alberta and Prince Edward Island, respectively. Annual employment rates are lowest in the Atlantic region and highest in the Prairie region (and British Columbia).

From the point of view made famous by Innis, the basic explanation for persistent differences is at least in part a reflection of staples products. The Atlantic region's resource endowments are in fish and timber, which do not create the linkages needed for a robust economy. By contrast, the wheat industry eventually produced "strong linkages" (Kasoff and Drennen, 2007) that led to greater prosperity in the West. Thus one narrative about Canadian economic development is told by Innis's staples thesis: expect regional disparity, with a notably lagging performance inferred for Atlantic Canada.

A second narrative on provincial policy emphasizes the need to address these regional differences. Not surprisingly, Canadian policy always responds, at least to some degree, to the general public's felt need for some level of redistribution to preserve national unity by keeping the level of government services approximately the same from one province to the next, rich or poor. Quebec nationalism and alienation among the Western provinces are persistent problems, with a zero-sum character in the eyes of many Canadians that makes it inherently difficult to find a happy medium with respect to regional redistribution of income. In sum, Canadian governments can be expected to stand or fall on the basis of how well they trade off equality and efficiency in a country with significant regional disparities.

To some extent these disparities were addressed within an orthodox neoclassical framework. After the Second World War, for instance, development thought emphasized that labour mobility and capital outflows from depressed regions exacerbated their lower level of development. Federal policies in the era of Prime Minister Pierre Trudeau attempted to address such concerns through programs designed to stimulate growth in the poorest areas. Thus in the 1970s, the Department of Regional Economic Expansion put resources into Atlantic Canada.

Regional promotion was further supported by the dependency framework that came into favour in the 1970s. Briefly, a region such as Atlantic Canada might be regarded as suffering from an exploitative relationship with the “hub” of Central Canada. Transfer payments to Atlantic Canada might therefore be justified not only on equity grounds but also on the grounds that such transfers represent an important counter-balance to inter-regional exploitation.

Most of the debate in Canadian public policy over recent decades has focused on equalization payments as a solution to regional disparities. Indeed, these equalization payments epitomize, on a policy level, this second narrative of Canadian economic development. Briefly, the Canadian federal government’s equalization program transfers money on an annual basis among the provinces, in effect, a redistribution of income away from those performing above the national mean and toward those below it. The rationale for this sustained and substantial program of redistribution comes out of development theory, with its emphasis on cores and peripheries, as summarized ably by Kasoff and Drennen (2007). Peripheral regions are considered “doomed” to lag behind because of “geography, the concentration of population and economic activity in the centre, flawed capital markets, and lack of resources” (McMahon, 2000: viii). Only action by government, according to the theory, could overwhelm such a combination of forces. Actions by successive Canadian governments speak louder than words. From 1957 to 2000, the seven receiving provinces (that is, all but Ontario, British Columbia and Alberta) received \$180 billion in transfers from the federal government (Martin, 2001: vii).

Atlantic Canada stands out as a long-term recipient of equalization payments. The duration and magnitude of transfers to Atlantic Canada can be described as “rare, perhaps unique, for any region or nation” (McMahon, 2000: 5). To put this assertion into perspective, the per capita transfers to Atlantic Canada exceed those received by Israel, which likely would not exist without massive US financial backing. Corsica and parts of southern Italy are examples of other regions that receive enormous transfers and, like Israel and Atlantic Canada, have suffered from significant periods of stagnation (McMahon, 2000: 5). Another illustration of the centrality of equalization funding in Atlantic Canada is provided by the percentage that equalization represents within own-source revenues. For the Atlantic provinces the percentages are Newfoundland (56.0), Prince Edward Island (44.5), Nova Scotia (40.6) and New Brunswick (39.4) (Martin, 2001: 15). The level of dependency conveyed by such numbers is quite substantial.<sup>4</sup>

This emphasis on subsidies as the crux of provincial policy lost support with the ascendancy of Brian Mulroney’s free trade-oriented Conservative government, which held sway until the early 1990s and represents a third general narrative on regional inequality. The free-market orienta-

tion implicitly suggests that equalization payments are unnecessary, and some scholars argue that such payments might even make the situation worse. Equalization payments, for instance, subsidize poor economic policy and therefore reduce the incentive toward change (Crowley, 2002: 7). A further potentially harmful effect of equalization payments is that people are encouraged to remain in low-productivity regions rather than seeking work elsewhere (Coulombe, 1999).

Rather than becoming bogged down in an ideologically oriented discussion about the normatively “good” or “bad” nature of government intervention, the present study takes the position that equalization may well work at cross-purposes. If it reveals a significant positive or negative effect on growth rates, that would tend to support arguments based on, respectively, centre-periphery perspectives versus efficiency perspectives.

We should note that our own emphasis on convergence theory represents a variant of the free-market perspective, namely, that in a market economy provinces will closely converge towards similar incomes, making government promotion of this process unnecessary. We hasten to add, however, that our claim is specific to the convergence hypothesis, and we do not suggest that our findings can adjudicate more generally the ongoing debate concerning the proper role of government in the economy. Rather, we wish to bring to the attention of academics and policy makers the striking finding that most countries experience greater provincial equality over time and that this same process has substantially decreased regional disparities within Canada itself.

We also explore another variant of the free-market perspective, namely the idea that a “rising tide lifts all boats.”<sup>5</sup> The intuition is that national economic growth benefits, at least to some extent, most individuals and regions within a country. Increased demand for consumer goods at the national level, for instance, increases demand across many of the specific regions in the nation. Similarly, increased technological progress at a national level should lead to higher technological development in other regions.

Although this perspective is often overlooked in regional-level debates, if one examines the issue from a cross-national perspective it is obvious that the single most important determinant of a province’s income is simply the country within which this province is located. All Canadian provinces, for instance, are wealthier than all sub-national units throughout Africa or South Asia, and this is equally true for all other OECD countries as well. We therefore examine whether Canada’s overall national economic performance helps explain variations in provincial-level economic performance.

A fourth and final narrative of Canadian economic development, and regional policy more specifically, is the importance of education. Consider Coulombe’s analysis of human capital with respect to Canada. “In



the absence of interprovincial migration (which can cause a readjustment of human capital), the accumulation of human capital in the poorest regions can result only from an internal process, external financing of its formation being difficult because individuals face a lack of collateral.... Disparities in human capital can largely explain the level and evolution of disparities of per capita income and output in Canada” (1999: 14; see also Coulombe and Tremblay, 2001: 156).

This summary reads like a direct invitation to provincial governments in the poorer provinces to dedicate further resources to education. The opinion seems to be shared by both skeptics about government spending as well as those more tolerant of a sizable public sector. McMahon, for example, labels education as a key priority in promoting economic development and reducing regional disparity (2000: 71). From a different perspective, Coulombe and Tremblay nevertheless reach the same conclusion. Convergence will be determined by “the incentive to invest in education in the poor provinces” (2001: 158). Evidence for the period from 1951 to 1996 supports this assertion; Coulombe and Tremblay find that convergence among Canadian provinces would have occurred at a much faster pace if all age groups had invested in education at the same rate as those in the relatively youthful cohorts (2001: 166).<sup>6</sup>

In our empirical analyses, we draw upon all four of the prominent narratives discussed above. First, the potential for regional effects must be recognized, so a variable that treats Atlantic Canada as a cluster should be introduced to the provincial-level data analysis. This represents the first (regionalist) narrative within Canadian political economy. Second, there is an ongoing debate about equalization payments. The second (core-periphery) narrative suggests that such payments are useful while the third (free-market) narrative argues that payments damage efficiency. We therefore evaluate whether equalization payments influence provincial economic growth either positively or negatively. Third, we examine two other variants of the third (free-market) narrative, namely the arguments that a rising tide lifts all boats, and the convergence argument. To test for rising-tide effects we examine whether national economic growth influences provincial growth, and to test for convergence effects we examine whether poorer provinces grow more rapidly than richer provinces. Finally, we examine the fourth narrative, which emphasizes the importance of education. We evaluate whether the provinces with higher educational attainment enjoy more rapid economic growth than less well-educated provinces.

## Research Design

Since there are only ten provinces with appropriate data, it is inherently more difficult to test convergence theory within Canada than on a cross-



national basis (Coulombe and Lee, 1995). Put simply, ten data points is a collection too small to justify statistical tests. Coulombe and Lee, therefore, created a *pooled* dataset that makes it possible to examine variation across both provinces and time (1995). A series of studies based on that pooled dataset show that convergence has taken place in Canada (Coulombe and Lee, 1995; Coulombe and Day, 1999; Coulombe, 2000; Coulombe and Tremblay, 2001).

We therefore examine decade-averages of economic growth in ten Canadian provinces during each of the five decades in the second half of the twentieth century, resulting in 50 data points. The choice of decade averages is driven by data availability, in that our educational data is only available on a decadal basis for the 1950s and 1960s. Our measure of educational attainment is the percentage of the population 25 years or older who have obtained a university degree. The original data comes from Statistics Canada census data on educational achievement and was kindly provided by Serge Coulombe (see Coulombe and Tremblay, 2001: 159–60, for example, for detailed discussion).<sup>7</sup> The overall data set includes ten Canadian provinces on a decadal basis starting in 1951: Newfoundland, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, Alberta, and British Columbia.<sup>8</sup>

Our data on income levels and government transfers come from the CANSIM dataset. Real per capita income is measured as personal income per person (Tables 384-0035 and 384-0013) divided by national consumer price inflation (Table 326-0002). Consistent with most previous research, we log the income data when testing its effect on subsequent economic growth. The rate of economic growth is measured as change in real per capita income over each ten-year period.<sup>9</sup> Data on government transfers to the provinces comes from Tables 380-0047 and 384-0009. These data are adjusted for population (Tables 380-0043 and 051-0001), and inflation, and then expressed as a percentage of personal income to generate a meaningful measure of equalization payments.

One important difference between our approach and that of earlier work on Canadian provincial convergence is that we include human capital in our analyses. The cross-national literature on economic growth demonstrates that education is an important determinant of long-run prosperity, so most analyses include both initial GDP and human capital (for example, Barro, 1997). The Canadian convergence literature has focused on the bivariate relationship between initial income and convergence, or more recently, between initial human capital and convergence. We wish to synthesize these two approaches, and explore whether initial income (a proxy for initial physical capital) and education (a proxy for human capital) might *simultaneously* influence economic growth.

For our analyses, we use the most common statistical technique in the comparative political economy literature, namely, ordinary least

squares (OLS) with panel corrected standard errors (PCSE), recommended by Beck and Katz (1995).<sup>10</sup> This technique simultaneously corrects for contemporaneous correlation (correlation of the errors across countries) and panel heteroscedasticity. Beck and Katz demonstrate that this procedure is less likely to generate overconfident standard errors than feasible generalized least squares (FGLS) (1995).

We include fixed time effects in all analyses, so that the results are comparable with previous research on Canadian convergence, which have examined the deviation of each province from the national mean.<sup>11</sup> We also tested all analyses for autocorrelation using Lagrange multiplier tests, and found that most of the analyses exhibited mild first-order serial correlation. All reported findings, therefore, utilize an AR(1) correction to adjust for serial correlation, although this correction had a negligible impact on the substantive results.

## Findings

As indicated in our theoretical discussion, there are different ways to understand economic growth in the Canadian “periphery.” Following the cross-national literature on economic development, as well as previous work on Canadian convergence, we hypothesized that initial income and education will have a strong effect on provincial growth rates. We also noted literatures, however, arguing that the four Atlantic Canada provinces might suffer policy failures that could explain their slower growth rates. We also put forth the hypothesis that provincial growth rates might have little to do with provincial characteristics per se but rather are driven by Canada-wide effects. Thus our research design is sufficient to incorporate all four of the narratives identified with respect to Canadian political economy.

We begin with the last hypothesis, since it turns out to be the most powerful explanation for provincial growth rates and is therefore an important control variable in the remaining analyses. We employ dummy variables for four of the five decades, so that the coefficient for each decade represents the change in average growth during that decade as compared with the 1950s. Since these dummies are the same for each of the ten provinces, they capture only *national* variation across the decades.

Column 1 of Table 1 provides the results using only the four decade dummies. Surprisingly, this simple model explains over three-quarters of all observed variation in decadal provincial growth rates during the second half of the twentieth century. The constant term indicates that in the 1950s provincial growth rate averaged 2.6 per cent per annum. Growth was significantly ( $p < .001$ ) higher in both the 1960s and 1970s, averaging 3.8 per cent per annum and 4.0 per cent per annum respectively.<sup>12</sup> In the 1980s and the 1990s, by contrast, overall growth was significantly

TABLE 1  
Dependent Variable: Growth in Provincial Personal  
Income Per Person

|                     | (1)                | (2)                | (3)                |
|---------------------|--------------------|--------------------|--------------------|
| 1960s               | 1.2<br>(3.80)**    | 1.265<br>(2.65)**  | 1.683<br>(25.40)** |
| 1970s               | 1.65<br>(4.19)**   | 2.19<br>(2.62)**   | 2.842<br>(17.37)** |
| 1980s               | -0.742<br>(1.72)   | -0.188<br>(0.11)   | 1.244<br>(4.56)**  |
| 1990s               | -1.837<br>(4.08)** | -1.504<br>(0.67)   | 0.492<br>(1.54)    |
| Income (initial)    |                    | -2.026<br>(3.67)** | -1.886<br>(7.29)** |
| Education (initial) |                    | 0.167<br>(1.08)    |                    |
| Atlantic            |                    | -0.201<br>(0.72)   |                    |
| Subsidies           |                    | 0<br>(1.07)        |                    |
| Constant            | 2.561<br>(7.67)**  | 5.349<br>(3.62)**  | 5.898<br>(12.88)** |
| R <sup>2</sup>      | 0.76               | 0.91               | 0.90               |
| N                   | 50                 | 50                 | 50                 |

\* significant at 5%; \*\* significant at 1%

( $p < .001$ ) lower than in the 1950s, with the average growth being 1.6 per cent in the 1980s and merely 0.5 per cent in the 1990s.

Given the strength of these results, we examined the raw data for each of the 50 data points and confirmed that there exist strong nationwide trends. Discarding only one outlier from the 10 provincial growth rates during each decade, for instance, we found *all* provinces in the 1970s enjoyed growth rates over 3.3 per cent per annum, while *no* provinces in the 1980s enjoyed growth over 2.5 per cent per annum and, even more starkly, *no* provinces in the 1990s enjoyed growth over 1 per cent.<sup>13</sup> Clearly, provincial growth rates are primarily driven by national growth rates, suggesting that the most powerful way to increase prosperity in Canada's periphery is to increase national growth rates.

Having established that provincial growth rates are overwhelmingly driven by *national* growth rates, we now examine the convergence hypothesis as well as the other variables put forth by other narratives on provincial development. Specifically, column 2 contains measures of initial income, education, a dummy variable for the four Atlantic provinces and a measure of government transfers as a percentage of personal income.

Initial GDP is highly significant ( $p < .001$ ), confirming the convergence hypothesis in the Canadian provinces. The coefficient is not

only highly significant *statistically*, but also very significant *substantively*.<sup>14</sup> Increasing a province's initial income by a standard deviation decreases growth rates from the sample average of 2.61 per cent to a mere 1.56 per cent. To provide a sense of the magnitude of this effect, consider a comparison of Newfoundland and British Columbia in 1980. Newfoundland was the poorest province with an income of \$13,067, while British Columbia was the wealthiest province with income at \$21,513. Given the difference of \$8,447, the model suggests that British Columbia's economic growth during the 1980s would have been less than Newfoundland's by 1 per cent per annum. In fact, Newfoundland grew at 2.8 per cent while British Columbia grew at 0.8 per cent, representing a 2 per cent difference. The divergence in initial income, therefore, by itself explains about half of these radically different growth outcomes.

While these results strongly confirm the importance of nationwide effects, as well as convergence effects, we found much less support for the idea that education is a major growth determinant. The coefficient is positive, but insignificant. Nor is there any evidence that there is something distinctive about "Atlantic Canada," given that economic growth in those provinces are no different than other provinces, once one controls for the strong convergence effect. Federal equalization subsidies are also insignificant, which suggests that existing criticisms of these equalization payments are overstated. Such payments apparently have little effect on long-run provincial growth—positively or negatively.<sup>15</sup>

Given that most of the substantive variables in column 2 are insignificant, we examine a final set of results in column 3, which contains only the decade-specific effects and the convergence effects associated with initial income. Strikingly, there is almost no decline in  $R^2$ , falling merely from .91 in column 2 to .90 in column 3. This further suggests that initial income is driving provincial growth rates, rather than the other variables in column 2.

Even more striking is the size of the  $R^2$  in column 3. The model demonstrates that fully 90 per cent of the variation in economic growth across Canadian provinces is explained by national growth rates and the convergence effect. This supports our general thesis, that convergence theory provides a powerful and parsimonious understanding of provincial growth dynamics and public policy debates concerning provincial inequality would be well advised to take more seriously these findings.

## Conclusions and Policy Implications

This study started out with two basic questions: Does convergence work in the context of Canadian provinces and, if so, what are the implications for Canadian provincial policy?

The results in Table 1 answer the first question and have significance for both the cross-national literature on development and the Canadian-specific literature. Concerning the cross-national literature, we again confirm the importance of initial income in explaining growth variation across individual units. We find that higher levels of initial income slow subsequent growth rates, as occurred in the US, Europe, Japan, and Australasia. Thus the answer to the first question that animated this study is that Canadian provinces do show convergence over time in terms of overall economic performance.

Previous country-specific studies of convergence generally have not included alternative explanations for provincial growth, such as simultaneous measures of initial income, initial education expenditure, country-wide effects, subsidies and the “Atlantic” effect. Our results suggest that aggregate national growth and convergence theory both explain provincial growth, but that alternative narratives find little support in the data. Specifically, after controlling for national trends and the convergence effect, there is relatively little evidence that education and subsidies influenced provincial growth. Moreover, after controlling for convergence, there is no evidence that there is anything distinctive about Atlantic Canada compared to other regions of Canada.

From a public policy perspective, moreover, we emphasize that national economic performance and convergence effects are not merely statistically significant determinants of provincial economic performance. Much more importantly, these two phenomena in conjunction largely *determine* growth in the provinces: they explain fully 90 per cent of the total variation in provincial growth rates.

Policy implications from the preceding results would appear straightforward. First, it is important to focus not merely on provincial inequalities but also the absolute level of prosperity in the provinces. Our findings strongly suggest that a rising tide lifts all boats, meaning that when the national economy is strong all of the provinces enjoy rapid economic growth. Conversely, when the national economy is sluggish, all of the provinces suffer economic stagnation. Meaningful economic progress in the provinces, therefore, will primarily come about as a result of national policy rather than provincial policy.

Second, even if policymakers remain preoccupied with relative gains rather than absolute gains, our findings suggest that provincial inequality is a problem that is taking care of itself. As predicted by mainstream economic theory and has been found in many countries around the globe, the poorer provinces of Canada have been growing at a rate significantly faster than the richer provinces. We do not dispute that province-specific policies might accelerate the process, and policies such as education and subsidies are justifiable on equity grounds as well as economic performance grounds, but from an economic policy perspective

it is important to recognize that provincial inequality is largely a self-correcting problem.

## Notes

- 1 It is important to note that conditional convergence also can arise due to technological transfer from rich to poor countries (Barro and Sala-i-Martin, 1995). Thus convergence should be seen as a flexible and multifaceted process rather than narrow and monocausal in outlook.
- 2 Barro and Sala-i-Martin (1995: 387–92). The sample is 47 because Alaska and Hawaii had not yet joined the union, and data for Oklahoma [became a state only in 1907; Idaho, Montana, North and south Dakota, Washington, Wyoming, Utah, Arizona and New Mexico also joined the union after 1880] were not available for the year 1880.
- 3 The discussion that follows is based primarily on Kasoff and Drennen (2007).
- 4 The Atlantic region variable, which will appear in Table 1, is acknowledged as a first approximation that is flawed in some obvious ways. First, it is necessarily over-aggregated due to lack of more fine-grained data. Thus prosperous sub-regions such as Halifax-Dartmouth are included along with very poor areas in the region. Second, the variable misses possible extensions of the Atlantic region, most notably into Quebec. For such reasons the impact of this variable may be attenuated in the forthcoming statistical analysis.
- 5 This phrase is said to be coined by Sean Lemass but was popularized by John F. Kennedy when he used the phrase to justify tax cuts for wealthier citizens with the reasoning that all citizens would benefit.
- 6 A possible indirect effect of federal transfers should be noted. Some of the support from equalization payments might find its way into spending on education. If so, this could produce an indirectly positive impact from such expenditures.
- 7 Serge Coulombe, University of Ottawa, Ontario, Canada. Email: scoulombe@uottawa.ca. Their own data source is the Statistics Canada census data, but Coulombe and Tremblay contracted with Statistics Canada to recalculate some of the data to make them more comparable across time. As such, the Coulombe and Tremblay data are the best existing data set on education achievement and preferable to the publicly available data from Statistics Canada.
- 8 After 1971, the education data also are available every five years, but in order to examine periods of comparable length we use only the decadal data.
- 9 Due to changes in the Canadian system of national accounts, there is no single per capita income series running throughout the ten-year period. Instead, Table 384-0035 provides data for 1950–1990 while Table 384-0013 provides data for 1980–1990. We constructed a scalar equal to the average difference between the two series for the overlapping period of the 1980s and then used this scalar to adjust figures in the 1990s so that they are comparable with the earlier period. We made a similar adjustment for data on government transfers to the provinces.
- 10 For our first analysis, in column 1 of Table 1, we utilize OLS without panel corrected standard errors since the PCSE method will not work when all of the independent variables are dummy variables, as is the case in column 1.
- 11 The fixed time effects, implemented with dummy variables for the 1960s, 1970s, 1980s, and 1990s, strip out all decade-specific effects, and the transformed dependent variable represents deviations from the cross-sectional sample mean. The inclusion of time dummies is equivalent to the procedure used in Canadian studies since Coulombe and Lee (1995).

- 12 Adding the decade-specific beta coefficient to the constant terms yields the predicted growth rate for that decade.
- 13 The outliers are as follows: Ontario suffered a relatively low (2.7 per cent) growth rate in the 1970s, while Newfoundland enjoyed a relatively good growth rate for the 1980s (2.8 per cent). During the 1990s, the outlier was New Brunswick, whose 1.2 per cent growth rate was relatively good in what was otherwise an abysmal decade for Canadian growth.
- 14 See Achen for this important distinction between the probability that a variable is a significant correlate of some dependent variable, versus the *magnitude* of this effect (1982).
- 15 Coulombe provides *indirect* evidence that equalization payments might facilitate convergence. Specifically, he finds that initial income has a stronger convergence effect when income is measured after taking into account government transfers, as opposed to measuring initial income based purely on earned per capita income (2000).

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