Immigration and Economic Development in Prince Edward Island: An Empirical Investigation

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By

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ABSTRACT:

The key development challenge for Prince Edward Island is to find ways to enhance productivity and overall economic growth. Promotion of immigration pursued as a solution is expected to play a crucial role in tackling this challenge. Socioeconomic and demographic characteristics of immigrants and their labour market experiences in PEI, however, suggest that the productive potential of immigrant inflow has not been fully realized. The present study investigates the empirical evidence of the role of immigration inflow in PEI's economic growth using an economic model which relates economic growth rate to the private investment output ratio and growth rates of labour, government investment, exports, and immigration inflow.

This study finds that the growth rate of immigration inflow is a significant determinant of the economic growth rate in PEI. The estimated immigration elasticity of output is very small. However, the marginal productivity of immigration inflow has increased over time and remains positive. As such, promotion of immigration can help increase economic growth potential in the province, and thereby raise levels of productivity and overall standard of living. A carefully crafted immigration policy and strategies that form an integral component of a comprehensive growth strategy are necessary to realize the growth potential and maximize the net benefits of immigration.

Key Words: Immigration inflow, Economic Growth, Productivity, Prince Edward Island

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1. Introduction

The purpose of this study is to undertake an empirical investigation into the relationship between immigration inflow and economic growth in the provincial economy of Prince Edward Island (PEI). This is achieved by formulating an econometric model of economic growth within the framework of an aggregate production function and estimating it using PEI data for the period from 1981 to 2005. The estimated model relates the economic growth rate to the private investment output ratio and growth rates of labour, immigration inflow, government investment and exports.

Figure 1: Annual Growth Rates of Real GDP and Immigration Inflow, 1982-2005

Annual Growth Rates of Real GDP and Immigration Inflow 1982-2005
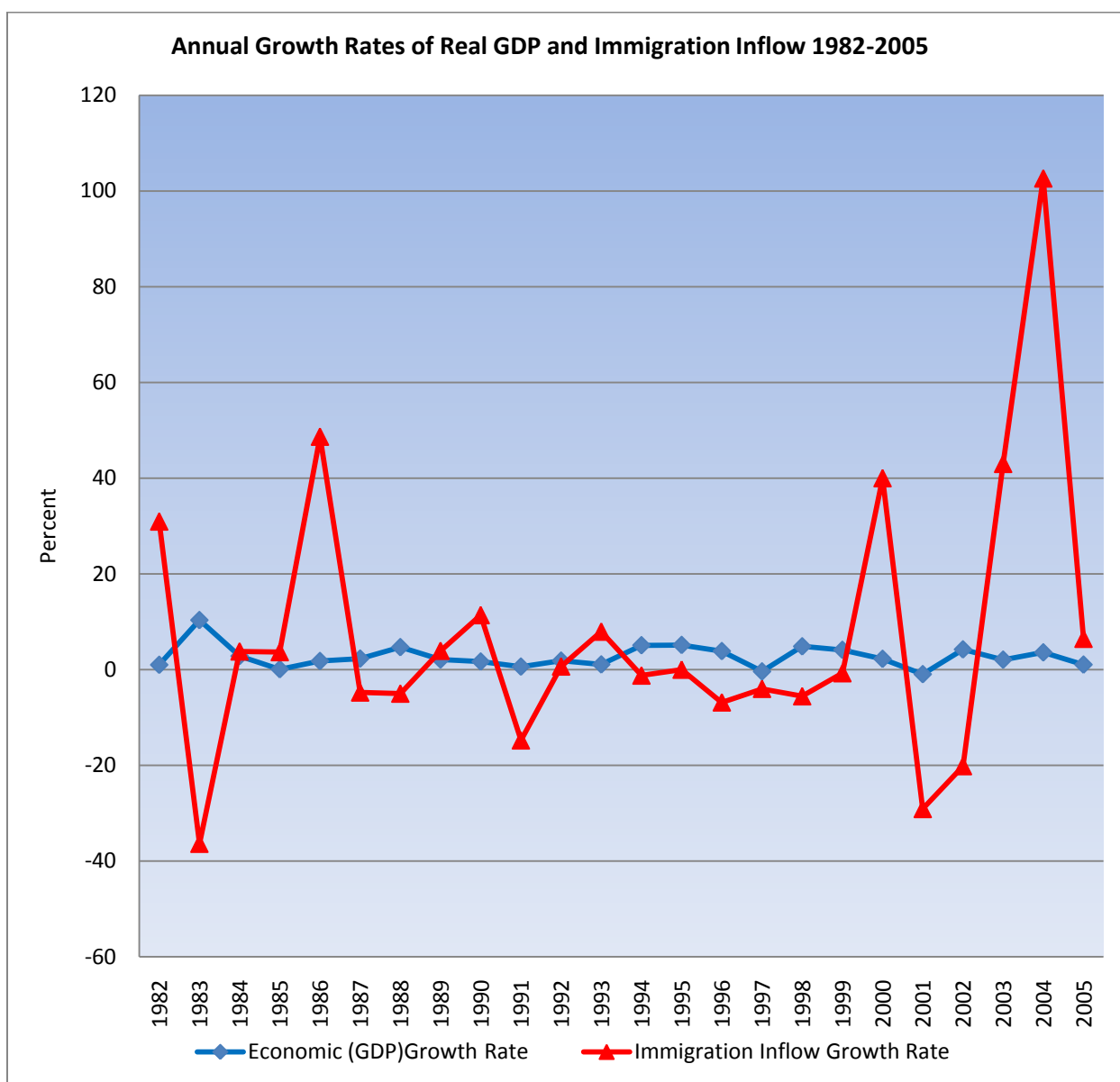
Source: Author's calculations based on Statistics Canada and CIC Data

Figure 1 displays the fluctuations in growth rate of annual immigration inflow and economic growth rate (i.e., of real GDP) in PEI during the period from 1982 to 2005. These fluctuations do not clearly   indicate any strong relationship between the two variables. However, at present, provincial policy-making bodies in Atlantic Canada, including those in PEI, consider immigration a solution to a number of demographic and socioeconomic problems, such as declining population, depopulation in rural areas, skill shortages in labour markets, and low levels of both productivity and overall standard of living. For example, the promotion of immigration has been declared a major component of the PEI government's recently approved population strategy. Research into various issues of immigration, including those of attraction, integration and retention, has also been recognized as vital for the design and implementation of the strategy. However, the role of immigration in economic development remains one of the least researched subjects in the PEI economy. Except for a few studies analyzing socioeconomic and demographic profiles of immigrants (see, for example, Akbari, Lynch, McDonald, and Rankaduwa, 2007) and their preferences (see, for example, Baldacchino, 2006), no comprehensive scientific study has been conducted on the relationship between immigration and macroeconomic development in the province. To the author's knowledge, the present study is the first systematic attempt to assess the effect of immigration inflow on overall economic development in PEI.

For an economy with slow population growth, immigration inflow is a relatively faster way to increase the supply of labour in various categories, such as skilled and unskilled catogories, in domestic labour markets. However, from an economics point of view, it cannot be considered merely as an inflow of labour. In fact, immigrants constitute a comprehensive economic resource whose inflow is directly associated with inflows of a multiplicity of other production factors, such as labour, human capital, and non-human capital. For example, immigration inflow is generally associated with financial inflows, which increase the level of investment and capital stock. It also promotes the transfer of technological know-how from abroad. As such, immigration inflow directly or indirectly affects both the quantity and quality of various factors of production and their inter-regional and inter-temporal distribution within a domestic economy. It can also enhance the mobility of these production factors and the level and degree of competition in local factor markets. Immigration can thus increase both potential and actual output and affect economic growth in both the short and long term. The majority of related literature indicates a consensus among researchers and policy-makers on the long-term net positive effects of immigration on economic growth. The short-term impact, which can be influenced by a variety of factors, however, is a matter of contention that therefore needs to be settled through empirical examinations such as the present study.

This paper is organized as follows: Section 2 highlights the key development challenge facing PEI in light of an earlier study conducted by the author (Rankaduwa, 2004). Section 3 presents an overview of socioeconomic and demographic characteristics of immigrants to PEI based on another study by the author in collaboration with three other researchers (Akbari, *et al.*, 2007). The possible role of immigration in meeting PEI's key development challenge is also briefly discussed. The derivation of the model of immigration and economic growth is explained in Section 4, while the data used and methods of estimation are described in Section 5. Section 6 analyzes the results, and the last section states the conclusions.

2. Key Development Challenge Facing PEI

The motivation for the present study stemmed from the author's involvement in two earlier studies on the PEI economy on the relationship between productivity and the standard of living and the socioeconomic and demographic profiles of immigrants in PEI (i.e., Rankaduwa, 2004, and Akbari *et al.,* 2007, respectively).

Rankaduwa (2004) reviewed the relationship between standard of living and productivity in PEI relative to that in Canada and the United States using an accounting framework that viewed the level of standard of living as a product of the levels of productivity, employment ratio, participation ratio, and working age population ratio. All of these variables are important economic variables affecting overall economic performance and economic well-being of the populace. The study found a persistent standard of living gap in Prince Edward Island of about 33 percent relative to that in Canada as a whole although PEI's standard of living improved at a faster rate than the Canadian average over the period of 1981 to 2001. Relative to that in the United States (US), the gap was about 43 percent, which ranked PEI as the second lowest among the Canadian provinces and US states. The persistent gaps in productivity (both per worker and per hour), employment ratio, and participation ratio have been responsible for the corresponding persistent gap in PEI's standard of living relative to that in Canada for the periods considered.

The study also found that the level of per worker productivity in PEI was only about 75 percent of that at the national level. The per worker productivity gap in Prince Edward Island persisted above 25 percent throughout the period 1981-2001. Relative to that in the United States, the gap was about 37 percent, ranking PEI's productivity as the lowest among that of the Canadian provinces and the American states. The province's per hour productivity was only about 72 percent of the national average and ranked the lowest in the country. The productivity per hour relative to that in Canada increased over time, but a per hour productivity gap of 28 percent existed during the period 1987-2001. The study concluded that these productivity gaps have been the largest contributor to PEI's standard of living gap, thus highlighting that eliminating the productivity gap, and thereby promoting economic growth, has been the key development challenge facing the province. The study also concluded that the investment gap in research and development, a smaller proportion of workers with higher levels of education, and the gap in capital stock per worker relative to that in Canada as a whole were perhaps the most significant contributors to the lower productivity levels and standard of living relative to those in Canada and the United States.

The level of productivity refers in general to the level of real output produced per unit of an input used in a production function. Given a production function, the level of productivity of an input depends not only on the quantity and quality of the input but also on technology and the quality and quantities of other inputs used in the production function. Therefore, the average labour productivity depends not only on the quantity and quality of the labour input but also on those of other inputs, such as human capital, non-human capital, natural resources, entrepreneurship, managerial and organizational resources, and technology (through research and development, acquisition of patent rights and licences, or imitation). As mentioned earlier, immigrant inflow can be considered an inflow of a comprehensive factor of production as it is not merely an inflow of labour. As such, immigrant Inflow can provide resources that can directly or indirectly enhance productivity in various forms, such as skilled labour, human capital, capital inflow, technology transfer, and managerial and entrepreneurial capabilities. Prudent economic management of these resources, ensuring their efficient allocation and full employment, is necessary to realize increases in productivity and actual economic growth.

Figure 2: Provincial and Regional GDP per Capita and Productivity Levels Relative to Canada's, 1981-2001
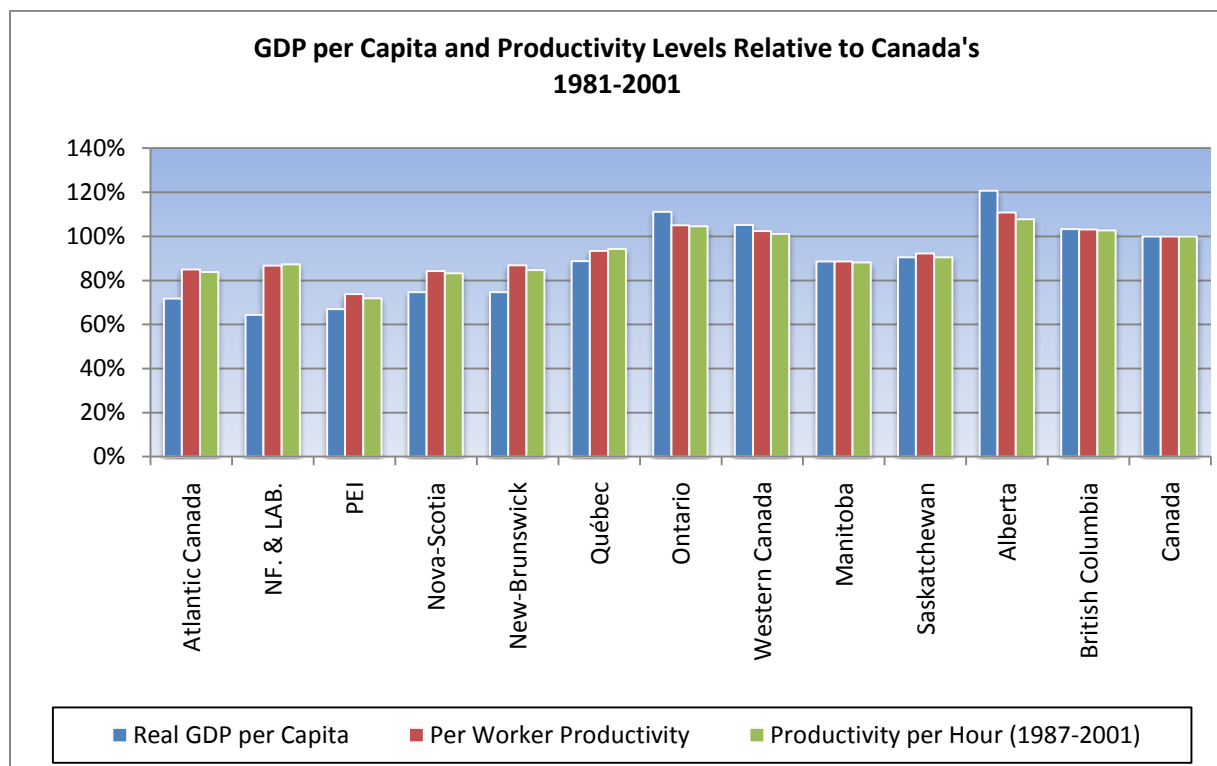
Source: Statistics Canada and Rankaduwa (2004).

3. An Overview of PEI Immigration

Akbari *et al.*, (2007), analyzed the socioeconomic and demographic profiles of immigrants in PEI during the period 1981-2005. The study focused particularly on the labour market performance of both new immigrants who arrived in Canada within the five years prior to a census date and the resident immigrant population as a whole. Findings indicated that PEI attracts only a very small percentage of Canada's annual immigrant inflow. In fact, during the 1980s and 1990s, PEI attracted less than one-tenth of one percent of annual immigrant inflow to Canada. Since 2003, however, this share has increased slightly, reaching 0.12 percent in 2004, 0.11 percent in 2005, and 0.42 in 2006. Although the proportion of PEI's immigrant population fell steadily, the contribution of immigrant inflow to the growth of population increased over time. At the time of arrival, new immigrants were younger than the resident non-immigrant population, and this age difference has increased over time. In terms of the composition of immigrant inflow, family class immigrants comprise the largest category, accounting for 57 percent in 2005. The other two categories, namely refugees and skilled immigrants, accounted for 24 percent and 19 percent, respectively, in the same year. The proportion of skilled immigrants decreased over time during the period 1981-2005, with the annual average share of skilled immigrants decreasing from 28 percent during 1981-85 to 17 percent during 2001-05. As a proportion of principal applicants, the share of business immigrants also decreased, with the average annual share being only about 3 percent of total principal applicants during the period 2001-05. This number amounted to about 10 percent for the 1980s and 13 percent for the 1990s.

Inflow of immigrants constitutes a relatively faster way of increasing the stock of human capital in a region. The

immigrants who arrived in PEI during the period 1981-2001 compared favourably with the non-immigrant population in terms of human capital, as indicated by their relatively higher levels of education. At the time of the 2001 census, about 48 percent of non-immigrants in PEI had acquired high school or less education, compared to 42 percent of new immigrants who arrived in PEI over the period 1996-2001. The percentage of new immigrants holding a degree increased from 18 percent in 1986 to 29 percent in 2001. The proportion of new immigrants with a university degree further increased to 42 percent in 2006, while the proportion of immigrants with high school or less education further decreased to 30 percent in 2006.

Immigration inflow can help solve skill shortages in domestic labour markets. The study's findings indicated that the inflows of medium- and low-skilled immigrants have shown declining trends since 1989. Since the late 1980s, the inflow of highly skilled immigrants also displayed a declining trend but has been completely reversed since 2003. Between 2001 and 2005, however, the proportion of highly skilled immigrants increased from 52 percent to 72 percent, while the proportion of low-skilled immigrants decreased from 10 to 8 percent.

Figure 3: Immigrant Inflows in PEI by Major Skill Classification, 1981-2005

Immigrants Destined for the Prince Edward Island Labour Force by Major Skill Classification, 1981-2005
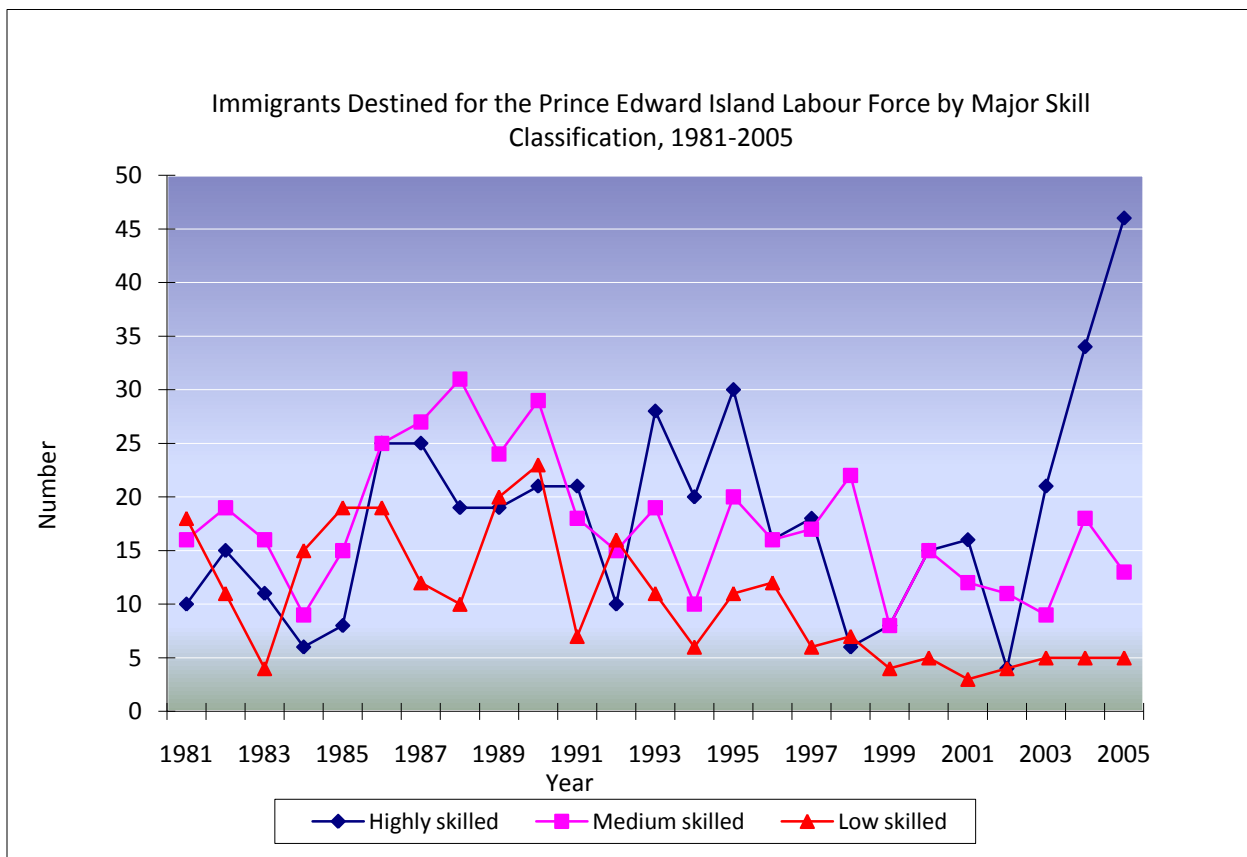
Source: Permanent Resident Data System (PRDS - microdata), CIC, and Akbari *et al* (2007)

The study further uncovered that the labour market outcomes of the resident immigrant population compare somewhat more favourably with those of PEI's non-immigrant population. Resident immigrants in general are less likely to be unemployed and earn higher labour incomes on average. In contrast, recent immigrants are more likely to be in the labour force, be unemployed, and have lower earned incomes on average, perhaps partly due to a lack of

recognition of educational credentials.   Judging by the experiences of recent immigrants, one can conclude that immigrants' potential contribution to the PEI economy is not being fully realized.

In general, the findings of Akbari *et al.* (2007) highlighted some characteristics of immigrant inflow that might affect the economic growth performance of the island economy positively or negatively. For example, some findings on labour market outcomes of immigrants suggested that the growth potential of immigrant inflow has not been sufficiently realized. Therefore, whether the net contribution of immigrant inflow on economic growth has been positive or negative, needs to be scientifically verified by analyzing empirical data. An econometric model that permits such an empirical verification is developed in the next section.

4. A Model of Immigration Inflow and Economic Growth

The model of economic growth used in this study is developed within the framework of an aggregate production function given by the following equations (see, for example, Ram, 1987 and Rankaduwa, 1999).

$$Y= y (K, L, H, G, X) \hspace{4cm} (1)$$

Where, Y = aggregate output level,
$\hspace{1.5cm} K$= private capital stock,
$\hspace{1.5cm} L$ = level of labour,
$\hspace{1.5cm} H$= immigration inflow,
$\hspace{1.5cm} G$= level of government (public) investment,
and $\hspace{1cm} X$= level of exports.

Private capital stock and labour are two conventional primary input variables often found in models of production function in the economic literature. In this model, however, levels of exports, government investment spending, and inflow of immigrants have also been incorporated as inputs. These are included in the production function as inputs based on the assumption that their growth increases the total factor productivity by enhancing the efficiency of resource allocation, capacity utilization, economies of scale, and technical progress. The inflow of immigration accounts not only for labour but also for the human capital that the immigrants bring with them.

The total derivative of equation 1 is given by equation 2 below:

$$dY=(\partial Y/\partial K)dK+ (\partial Y/\partial L)dL+(\partial Y/\partial H)dH + (\partial Y/\partial G)dG + (\partial Y/\partial X)dX \hspace{2cm} (2)$$

This equation can also be written as

$$dY = (\partial Y/\partial K)dK+(\partial Y/\partial L)(L/L)\ dL+ (\partial Y/\partial H)(H/H)dH+ (\partial Y/\partial G)(G/G)dG$$
$$+(\partial Y/\partial X)(X/X)dX \hspace{4cm} (3)$$

By dividing both sides of equation 3 by Y and rearranging the terms, one can derive the following growth equation:

$$dY/Y = (\partial Y/\partial K)dK\ /Y+[\ (\partial Y/\partial L)(L/Y)]\ dL/L+[(\partial Y/\partial H)(H/Y)]dH/H$$
$$+[(\partial Y/\partial G)(G/Y)]dG/G + (\partial Y/\partial X)(X/Y)dX\ /Y \hspace{3cm} (4)$$

Adding a constant term, a_0, and an error term, U, an econometric formulation can be derived as follows:

$dY/Y = a_0 + a_1\,dK/Y + a_2\,dL/L + a_3\,dH/H + a_4\,dG/G + a_5\,dX/X + U$ (5)

where $a_1 = (\partial Y/\partial K)$, $a_2 = [(\partial Y/\partial L)(L/Y)]$, $a_3 = [(\partial Y/\partial H)(H/Y)]$, $a_4 = [(\partial Y/\partial G)(G/Y)]$, and
$a_5 = [(\partial Y/\partial X)(X/Y)]$.

This model relates economic growth rate *(dY/Y)* to the private investment output ratio *(dK/Y)*, and the growth rate of labour *(dL/L)*, of immigrant inflow (*dH/H*), of government spending *(dG/G)*, and of exports *(dX/X)*. U is the stochastic error term. Coefficient a_1 is the marginal productivity of capital (MPK). Coefficients a_2, a_3, a_4, and a_5 are the output elasticities with respect to labour, immigration inflow, government investment spending, and exports, respectively.

5. Method of Estimation and Data

The model developed in the preceding section is estimated using the method of Ordinary Least Squares (OLS) and annual time series data for the period 1981-2005.

The growth rate of real GDP, measured at 2002 prices, is used as the economic growth rate. In the absence of reliable data on capital stock, the model is developed to use investment-output ratio rather than the growth rate of capital stock. The growth rate of population, a popular proxy widely used in the related literature, is used in place of the growth rate of the labour force. It may be more appropriate to use the growth rate of population than of labour force in an aggregate production function model for a less-industrialized province such as PEI, where the sector of rural agriculture plays an important part of economic performance. The use of population growth also makes it possible to estimate a measure of the impact of decelerating population growth on the province's output growth. Accordingly, the estimate of a_2 can be interpreted more accurately as a measure of the population elasticity of output. Sources of these data are Statistics Canada (CANSIM data files) and Citizenship and Immigration Canada (Permanent Resident Data System, microdata).

Recent research in time series analysis emphasizes the importance of investigating stationarity and co-integration properties among time series data before estimating econometric models using them. These investigations are necessary to ensure that the model estimation does not yield spurious results. Accordingly, Phillips-Perron unit root tests were applied to all of the data series used in the present study, with the results reported in Table 1 that confirm the stationarity of the data series used. These results indicate that all of the data series are integrated of order zero (i.e., I(0)) hence, the model estimation will not yield spurious results.

Table 1: Results of Phillips-Perron Unit Root Tests on Variables Used in the Model		
Variable	F- test (1) $a_0 + a_1 + a_2 = 0$	F-test(2) $a_1 + a_2 = 0$
Economic Growth Rate *dY/Y*	9.1350	13.702

Investment-Output Ratio dK/Y	4.5384	6.2712
Growth Rate of Labour dL/L	3.8535	5.6946
Growth Rate of Immigration Inflow dH/H	8.0849	12.113
Growth Rate of Govt. Investment dG/G	7.5911	11.254
Growth Rate of Exports dX/X	14.441	21.489

Notes: The equation estimated for these tests is given below:

$$\Delta y_t = a_0 + a_1 y_{t-1} + a_2 t + \sum_{j=1}^{p} \gamma \Delta y_{t-j} + e_{t-1}$$

Asymptotic critical values for the F tests (1) and (2) at 10% level of significance using the above equation are 4.03 and 5.34, respectively.

In estimating the model, the Cochrane-Orcutt procedure is followed to correct for the problem of first order serial correlation. The Standard Chow test for structural breaks and simple dummy variable techniques are applied to detect and accommodate for structural breaks. In this exercise, we discovered structural breaks in 1990 and 1999. Taking them into account, the period considered in the present study can easily be divided into three sub-periods: 1982-1989, 1990-1998 and 1999-2005.

6. Analysis of Results

At the stage of estimation, the model given by equation 10 was modified to account for the detected structural breaks in 1990 and 1999. The estimated results from the modified model, which are obtained after correcting for first order serial correlation, are presented in Table 2. All the estimated coefficients are significant at the 5 percent level of significance or better, with most being significant at a one percent level of significance. Table 2 entries show that the 1990 structural break is characterized by decreases in the intercept and the coefficients of the growth rates of labour, government investment, and exports. These changes are indicated by the estimated coefficients of D90, D90*dL/L D90*dG/G, and D*dX/X, respectively. The structural instability in 1990 is also characterized by increases both in the marginal product of capital and immigration elasticity of output, which are indicated by the coefficients of D90*dK/Y and D90*dH/H. The structural instability detected in 1999 is characterized by an increase in the labour elasticity and a decrease in the export elasticity, as indicated by the estimated coefficients of D99* dL/L, and D99* dX/X. The structural instability in 1999 may be largely due to the opening up of the fixed link between PEI and New Brunswick. The coefficient of D90 indicates that during the second and third sub-periods, the average growth rate that is independent of the variables included in the model has been significantly lower than that of the first sub-period. These results also indicate that the marginal product of capital and the immigration elasticity of output have increased while the elasticity of output with respect to government investment spending decreased in 1990.

Table 2: Estimated Results for the Modified Growth Equation				
Variable Name	Estimated Coefficient	Standard Error	T-Ratio (9 df)	

dK/Y	-0.66417	0.1374	4.833	R²= 0.99
dL/L	4.0358	0.9292	4.343	R² (Adj)=0.97
dH/H	-0.11053	0.00828	-13.35	DW=1.9070
dG/G	0.089971	0.03311	2.718	
dX/X	0.48110	0.1035	4.650	
D90	-0.11190	0.01129	-9.910	
D90* dK/Y	1.2042	0.1431	8.413	
D90* dL/L	-3.7325	0.9462	-3.945	
D90* dH/H	0.11572	0.01673	6.918	
D90* dG/G	-0.17721	0.03361	-5.272	
D90* dX/X	-0.28747	0.1079	-2.663	
D99* dL/L	6.5643	1.657	3.962	
D99* dX/X	-0.69881	0.2123	-3.292	
Constant	0.057095	0.008236	6.932	
Notes: * significant at 5% level.				
** significant at 10% level				

The estimated output elasticities with respect to labour, immigration, government investment and exports are reported in Table 3. The estimates of marginal productivity of capital for the three sub-periods are also among the table entries. These numbers are calculated using the estimates presented in Table 2. Table 3 entries show that the estimated marginal productivity of capital was negative for the first sub-period and positive for the second and third sub-periods. Table 3 entries also indicate that output has been labour elastic (i.e., the output elasticity with respect to labour is greater than unity) in the first and the third sub-periods. We note that in all the three sub-periods, the labour elasticity is the largest among the estimated elasticities in this model, and it is significant at a one percent level of significance. This finding is directly related to the fact that most production sectors in the PEI economy are still highly labour intensive. What is more interesting is that the labour elasticity of output increased in the third sub-period to a level even greater than that in the first sub-period, which seems to indicate that the PEI economy's dependence on labour has been increased after the 1990s. The output elasticity with respect to immigration, which was negative during the first sub-period, has turned positive following the structural break in 1990. It remained the same for the second and third sub-periods. The output elasticity with respect to government investment turned negative in 1990 and remained so during the second and third sub-periods. The export elasticity of output decreased in 1990 and 1999, turning negative after 1998. The estimates show that output is inelastic with respect to immigration inflow, government investment, exports, and private investment.

Table 3: Estimated Elasticities and Marginal Product of Capital by Sub-period			
Estimated Coefficient	**1983-1989**	**1990-1998**	**1999-2005**
Marginal Product of Capital(a_1)	-0.66417	0.54003	0.54003
Labour Elasticity of Output(a_2)	4.0358	0.3033	6.8676

Immigration Elasticity of Output(a_3)	-0.11053	0.00519	0.00519
Govt. Investment Elasticity of Output(a_4)	0.089971	-0.087239	-0.087239
Export Elasticity Of Output(a_5)	0.48110	0.19363	-0.50518
Contant (a_0)	0.057095	-0.054805	-0.054805
Notes: Estimates in this table are calculated using Table 2			

The output elasticity with respect to any input is simply the product of the marginal productivity and the inverse of the average productivity (output per unit of input or output to input ratio) of that input. Table 4 presents the mean values of marginal and average productivities of inputs (output to input ratios), which are calculated using the estimated coefficients and actual data for the variables used. These values can shed light on the direction of changes in marginal and average productivities over the three sub-periods. Table 3 entries indicate that on average, the marginal productivity of labour decreased in the second sub-period and increased in the third sub-period. Nevertheless, the average productivity of labour increased over the three sub-periods. The marginal productivity of capital increased in the second sub-period and remained at that level in the third sub-period as well. The investment output ratio increased noticeably in the second and third sub-periods. Both the marginal and average productivities of immigration inflow increased over the three sub-periods, while the marginal and average productivities of both government investment and exports decreased continuously over the three sub-periods.

The high level of statistical significance of the growth rate of immigration inflow in the model is a clear indication of the importance of immigrant inflow as a determinant of output in the province. The estimated coefficient, which measures the immigration elasticity of output, is negative for the first sub-period and positive for the second and third sub-periods. In magnitude, the estimate is less than unity and very small, indicating that the output sensitivity to changes in immigration inflow has been low. This reflects that the immigration intensity of output in PEI is low; in other words, the total output in the province so far has not depended significantly on immigration as an input. This is neither surprising nor unexpected as the annual immigrant inflow has been very small. Nevertheless, the positive elasticity, albeit small, is evidence of the positive net contribution to output that immigrant inflow makes in the province.

Estimates /Variable	1983-1989	1990-1998	1999-2005
Table 4: Estimated Mean Productivities, Growth Rates and Investment Output Ratios for the Three Sub-periods			
Economic Growth Rate (dY/Y)	0.033495	0.025980	0.022994
Private Investment-Output Ratio (dK/Y)	0.11331	0.13182	0.15093
Growth Rate of Labour (dL/L)	0.0061707	0.0050933	0.0024609
Growth Rate of Immigration Inflow (dH/H)	-0.0061929	-0.016660	0.12663
Growth Rate of Govt. Investment (dG/G)	0.074471	0.017128	0.040778
Growth Rate of Exports (dX/X)	0.042836	0.045582	0.033816
Output-Input Ratios			
Output-Labour Ratio (Y/L)	0.019703	0.022796	0.027277
Output-Immigration Ratio (Y/H)	18.487	19.483	22.190
Output- Govt. Investment Ratio (Y/G)	31.723	30.006	27.250
Output-Exports Ratio (Y/X)	2.3886	2.1896	1.7918
Marginal Products of Inputs			
Marginal Product of Capital ($\partial Y/\partial K$)	-0.66417	0.54003	0.54003
Marginal Product of Labour ($\partial Y/\partial L$)	0.079519	0.0069140	0.18733
Marginal Product of Immigration ($\partial Y/\partial H$)	-2.0434	0.10112	0.11517
Marginal Product of Govt. Investment ($\partial Y/\partial G$)	2.8542	-2.6177	-2.3773
Marginal Product of Exports ($\partial Y/\partial X$)	1.1491	0.42397	-0.90517

The low value of immigration elasticity of output is directly related to the fact that the marginal productivity of immigration is low, which can also be linked to the small size of annual immigration inflow. However, given that highly educated and skilled immigrants constitute a significant portion of immigrant inflow, the relatively low marginal productivity may rather indicate the labour market experiences of new immigrants, such as unemployment, underemployment, and other related problems, which prevent the realization of the full potential of immigration inflow. In labour markets where new immigrants face difficulties such as unemployment and delays in employment, negative or low marginal productivities are inevitable. Employment problems may arise due to the characteristics of immigrants, such as skill levels and their appropriateness, and also due to characteristics of the labour markets in the host economy, such as barriers to entry and various forms of discrimination. Akbari *et al.*'s (2007) analysis of labour market performance of immigrants is sufficient to prove that the productive potential of immigrants has not been fully realized, thus indicating that the actual contribution of immigration can be increased substantially. The problems of skill shortages and the demographic characteristics of the local population make it logical to increase the role of immigration in total production and productivity for both short- and long term economic growth. However, these can be done effectively only through a carefully crafted immigration policy and strategies that form an integral component of a comprehensive growth strategy.

7. Concluding Remarks

A persistent standard of living gap, caused mainly by a persistent gap in labour productivity relative to that in Canada as a whole, characterizes the broader problem of economic development in Prince Edward Island. The key development challenge for the province, then, is to find ways to enhance productivity and overall economic growth performance. Promotion of immigration, pursued by authorities primarily as a solution to a number of demographic and socioeconomic problems, such as declining population, depopulation in rural areas, and skill shortages in labour markets, is also expected to play a crucial role in tackling this challenge. Socioeconomic and demographic characteristics of immigrants and their labour market experiences in PEI, however, suggest that the productive potential of immigrant inflow has not been fully realized. The present study investigates the empirical evidence of the role of immigration inflow in PEI's economic growth using an econometric model formulated within the framework of an aggregate production function. The model relates economic growth rate to the private investment output ratio and growth rates of labour, government investment, exports, and immigration inflow.

The present study finds that all the variables included in the model, including the growth rate of immigration inflow, are significant determinants of the economic growth rate in PEI. The estimated immigration elasticity of output is very small, reflecting that the dependence of aggregate output on immigration inflow also has been very small. Though small, however, the marginal productivity of immigration inflow has increased over time and remains positive. As such, promotion of immigration inflow can also be relied on to play a crucial role in increasing economic growth potential in the province, thereby raising levels of productivity and overall standard of living. A carefully crafted immigration policy and strategies that form an integral component of a comprehensive growth strategy are necessary to realize the growth potential and maximize the net benefits of immigration.

The present study focuses only on the short-term impact of immigration inflow on economic growth. An assessment of total impact is incomplete, however, without also taking into account the long-term impact of immigration. The economic impact of immigrants extends far beyond a time horizon of one year through their contribution to present and future improvements in, among other things, the labour force, human capital, private investment, technology and

government finances. To be effective, any comprehensive growth strategy and immigration strategy within it must be formulated with full recognition of both the long- and short-term productive potential of immigration and all the economic and non economic factors that may intervene in fully realizing that potential.

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