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Some Estimates of Private and Social Benefits of Improving Educational Attainment Among Registered Indian Youth and Young Adults

Stewart Clatworthy

Introduction

Many studies conducted over the course of the past three decades have documented the large disparity between Aboriginal peoples and other Canadians with respect to educational attainment, labour market outcomes, incomes and income adequacy, health conditions, and a variety of other measures of socio-economic well-being. Most of this research has revealed clear statistical patterns between higher levels of educational attainment and higher levels of socio-economic well-being. Not surprisingly, promoting higher levels of educational attainment among Aboriginal populations has frequently been put forward as a critical step in the process of improving socio-economic conditions among Aboriginal individuals and communities.

A growing body of recent research, conducted among various population groups in several countries, has attempted to determine the extent to which observed statistical associations between education and various socio-economic outcomes reflect "causal" relationships (i.e. that additional education does produce improved socio-economic outcomes). Although more research on this issue is warranted, results to date clearly suggest that higher levels of education produce quite large returns to individuals, in terms of employment, labour market earnings, personal wealth, and other aspects of personal economic well-being (Card 1999, Riddell 2006, Oreopoulos 2006). Collectively, this research has also identified an extensive range of other non-personal or social benefits which are attributable to educational improvements.[1] These broader outcomes include:

- enhanced innovation, knowledge creation, and technological adoption.
- increased productivity and economic growth.
- increased government revenues through taxation.
- improved health and well-being of other family members, including child development (i.e. inter-generational effects).

- improved social cohesion, and enhanced levels of charitable giving, volunteer activity, and other forms of community involvement.
- reduced reliance on social assistance and other social supports and programs.
- reduced levels of criminal activity.

Purpose of the Study

Although statistical patterns between educational attainment and personal outcomes are well-documented, existing research which explores the benefits of educational improvements within the context of Aboriginal peoples in Canada remains quite sparse.[2] This study seeks to provide some preliminary estimates of the potential scale of select benefits (to individuals and to society) that might be realized through future improvements in the levels of education among one segment of Canada's Aboriginal population, Registered Indians. The specific benefits examined include:

- employment outcomes and employment earnings.
- taxation revenues associated with employment incomes.
- savings in government transfer payments to individuals.
- reductions in criminal activity and the costs of crime.

Approach and Data

Estimates of the potential impacts of improvements in education are derived using a series of projections designed to estimate the incremental changes in select outcomes (e.g. employment, employment earnings) that are expected to result from specific changes to the future level of educational attainment achieved by the Registered Indian population 15 or more years of age. The projections are configured using baseline data for the year 2001 and span a twenty-five-year period from 2002 to 2026. Impacts of assumed improvements in educational attainment or of assumed changes in the outcomes associated with specific levels of educational attainment (e.g. changes in the employment rate associated with individuals who finish high school) are estimated using a comparative approach.

A *baseline* projection scenario (referred to as *Growth and Aging*) is configured to examine various outcomes associated with the "hypothetical" context in which future levels of educational attainment achieved by Registered Indians (given their age, gender, location of residence [on- off-reserve], and province or region) remain unchanged from those observed in the baseline year, 2001.[3] This scenario is used to identify changes over time in the distribution of the population by education level, as well as changes in specific outcomes (e.g. the volume of employment) that would be expected to result solely from the growth and aging of the population. Other scenarios are then developed which systematically alter projection assumptions concerning future levels of educational attainment of the

population (or assumptions concerning the outcomes associated with individuals who acquire a specific level of education). By comparing the results of these other scenarios with those of the baseline scenario, estimates of the incremental impact on outcomes (e.g. the level of employment) associated with various (assumed) levels of improvement in educational attainment or (assumed) changes in other factors (e.g. improvements in the employment rates) are obtained. Assumptions associated with the various projection scenarios examined in this study are described in some detail in later sections of this report.

The future population estimates, required to support the outcome projections, derive from a recent series of population projections prepared by Clatworthy (2007) for Indian and Northern Affairs Canada (INAC) and Canada Mortgage and Housing Corporation (CMHC). These projections were constructed for the Registered Indian population, as identified by the 2001 Census of Canada, and provide annual estimates of the future population by age, gender, location (on- or off- reserve) and province or region of residence for the period spanning 2002 to 2026.[4]

Patterns of educational attainment of the Registered Indian population and statistical relationships between educational attainment and various outcomes derive from analyses of data from several sources, including the 1996 and 2001 Censuses of Canada, the Canadian Centre for Justice Statistics (CCJS) and Revenue Canada.

Custom tabulations from the 1996 and 2001 Censuses have been used to identify the baseline (2001) distribution of the Registered Indian population by level of educational attainment, as well as changes to this distribution between 1996 and 2001. Estimates of employment rates, average employment incomes, and average transfer payment incomes by level of educational attainment were also derived from analysis of 2001 Census data.

CCJS data from the 1996 snapshot of inmates and 1997 to 2001 data on "admissions to custody" have been used to estimate baseline (2001) incarceration rates of Registered Indians by age, gender, educational attainment, and region.[5] Additional CCJS data concerning federal and provincial custodial costs for 2001 have been used to estimate the average annual cost of maintenance for those held in custody. Estimates of other "non-custodial" costs of crime and justice (e.g. policing, court, and legal costs) prepared for this study rely upon data and analysis reported by Brantingham and Easton (1998).

Estimates of taxation impacts derive from the application of provincial/territorial marginal tax rates for 2001, as identified by Revenue Canada.

Educational Attainment and Employment Among Registered Indians

As noted previously, higher levels of employment and higher employment earnings represent two of the most widely researched and documented benefits

ascribed to additional education.[6] As a prelude to examining the potential impacts on employment and employment earnings of improvements in educational attainment, this section of the report provides a brief overview of the level of educational attainment of the Registered Indian population in 2001, as well as indicators of the employment levels and employment earnings associated with those who have achieved specific levels of educational attainment.

Levels of Educational Attainment in 2001

For the purposes of this study, educational attainment data collected by the Census has been configured to distinguish among three groups.[7] These groups include those with:

- Less than High School (including those who have not attained a high school diploma/certificate, or equivalent, and who also have not pursued post-secondary education)
- High School or Post-Secondary Non-University (including those who have graduated high school or pursued post-secondary education but have not attained a university degree)
- University Degree (including those who have attained one or more university degrees at the Bachelor's, Master's or Doctoral level)

Table 14.1 identifies the distribution of the Registered Indian population aged 15 or more years by level of educational attainment, age, and gender. Comparable data for the non-Aboriginal population are also contained in the table. As noted in many earlier studies, the table reveals that sizable gaps in educational attainment existed between Registered Indian and non-Aboriginal individuals, regardless of age and gender. In 2001, less than one-half (about 49%) of the Registered Indian population reported a high school certificate or higher level of education (i.e. some post-secondary education, including university degrees) compared to about 69% of the non-Aboriginal population (a gap of about 20 percentage points). Disparity in terms of educational attainment was greater among males than females and greater among youth (i.e. those 15 to 24 years) than older cohorts.

Table 14.1 also reveals that the proportion reporting high school or higher levels of education was highest among those aged 25 to 39 years, a characteristic common to both the Registered Indian and non-Aboriginal populations. This situation, of course, reflects the fact that many individuals continue to pursue education as young adults. Prior researchers (e.g. Hull, 2005) have observed that rates of school attendance among young adults (i.e. the population aged 25 to 39 years) tend to be considerably higher among Registered Indians than non-Aboriginals, as Registered Indians, who are more likely leave school during their youth, are also more likely to return to school later.

As illustrated in **Table 14.2**, educational attainment among Registered Indians was sharply lower for those living on-, as opposed to off-reserve, among both

Table 14.1: Distribution of Registered Indian and Non-Aboriginal Population Aged 15 or More Years by Level of Educational Attainment, Age, and Gender, Canada, 2001

Age Group	Registered Indian			Non-Aboriginal		
	Less than High School (%)	High School or Post-Secondary Non-University (%)	University Degree (%)	Less than High School (%)	High School or Post-Secondary Non-University (%)	University Degree (%)
Both Genders						
Total	51.4	44.7	3.9	30.8	53.5	15.7
15–24 years	69.4	29.9	0.7	41.7	52.7	5.7
25–39 years	38.0	56.8	5.1	15.7	60.3	24.0
40–64 years	45.8	48.7	5.5	26.5	55.9	17.5
65+ years	82.2	16.4	1.3	57.1	35.6	7.3
Males						
Total	54.3	43.0	2.7	31.0	52.6	16.4
15–24 years	72.4	27.2	0.4	44.5	51.3	4.2
25–39 years	41.2	55.3	3.4	17.6	60.1	22.4
40–64 years	48.1	47.9	4.0	26.5	54.1	19.4
65+ years	81.8	16.5	1.7	53.9	35.4	10.7
Females						
Total	49.0	46.2	4.9	30.7	54.2	15.1
15–24 years	66.5	32.6	0.9	38.7	54.2	7.1
25–39 years	35.3	58.1	6.6	13.9	60.6	25.5
40–64 years	43.9	49.3	6.8	26.6	57.7	15.7
65+ years	82.6	16.4	1.0	59.5	35.8	4.7

Source: Custom tabulations from the 2001 Census of Canada

males and females and all age groups. Individuals reporting high school or higher levels of education formed about 41% of the population on-reserve and about 55% of the population living off-reserve. Registered Indian females reported higher levels of education than males both on- and off-reserve.

Recent Changes in Educational Attainment

Hull's (2005) recent study of educational attainment and labour market outcomes provides a detailed descriptive analysis of changes in levels of educational attainment among Registered Indians between 1996 and 2001.[8] His analysis reveals that although some improvements in the overall educational attainment of Registered Indians appears to have occurred during this time frame, larger education improvements were realized by non-Aboriginals resulting in an increase in the education gap between the two populations.

Table 14.2: Distribution of Registered Indian Population Aged 15 or More Years by Level of Education Attainment, Age, Gender and Location of Residence, Canada, 2001

Age Group	On-reserve			Off-reserve		
	Less than High School (%)	High School or Post-Secondary Non-University (%)	University Degree (%)	Less than High School (%)	High School or Post-Secondary Non-University (%)	University Degree (%)
Both Genders						
Total	58.9	38.8	2.3	44.7	50.0	5.3
15–24 years	75.9	23.9	0.3	62.9	35.9	1.1
25–39 years	46.1	51.3	2.6	31.3	61.5	7.2
40–64 years	51.4	44.5	4.1	41.0	52.2	6.8
65+ years	86.4	12.8	0.8	76.8	21.2	2.0
Males						
Total	61.2	37.4	1.4	47.0	48.8	4.1
15–24 years	78.0	21.9	0.2	66.3	32.9	0.8
25–39 years	49.2	49.3	1.5	33.6	61.1	5.3
40–64 years	53.6	44.0	2.5	42.2	52.1	5.7
65+ years	86.6	12.9	0.5	73.9	22.5	3.7
Females						
Total	56.5	40.2	3.2	43.0	50.8	6.2
15–24 years	73.7	25.9	0.3	59.9	38.7	1.5
25–39 years	43.0	53.2	3.7	29.6	61.8	8.7
40–64 years	49.1	45.1	5.8	40.2	52.2	7.5
65+ years	86.4	12.5	1.1	78.6	20.4	1.0

Source: Custom tabulations from the 2001 Census of Canada

With respect to structuring assumptions for the outcome projection models developed for this study, a particular focus has been placed on changes in educational attainment for the population aged 15 to 39 years. This focus results from the view that the vast majority of future improvements to the education level of the Registered Indian population are likely to result from the achievement of higher levels of attainment by the current and future populations of youth and young adults. This view is supported by recent analyses of school attendance rates across age groups.[9]

Data from the 1996 and 2001 censuses reveal relatively small improvements in educational attainment for the Registered Indian population aged 15 to 39 years. The proportion of this age group that reported high school or higher levels of education increased from about 46.6% to 48.7% during the five-year period (an average annual rate of increase in the proportion of about 0.9%). By way of comparison, the proportion of the non-Aboriginal population reporting high

school or higher levels of education was about 74.4% in 2001, roughly 26 percentage points higher than that of the same Registered Indian cohort. Assuming that future improvements in education among the 15 to 39 years cohort continue at the pace observed for the 1996 to 2001 period, the proportion of Registered Indians in this age group that achieved high school or higher levels of education would approach about 61% within twenty-five years.

In addition to the baseline scenario, in which educational attainment levels of the Registered Indian population remain constant (given age, gender, location of residence, and province or region), the projection models developed for this study explore two additional scenarios in which levels of educational attainment gradually improve among cohorts aged 15 to 39 years over the course the projection period. The level of education improvement in the initial scenario (referred to as *Education Gap Reduced by One-Half*) extrapolates the trend observed for this age group during the 1996 to 2001 period, such that the proportion of this segment of the population that has achieved high school or higher levels of education increases (at a constant rate) to about 61% by 2026.[10] If no further improvements in non-Aboriginal education levels occurred during the period, this scenario would reduce the current Aboriginal/non-Aboriginal education gap for this age group by about one-half.[11]

A second, and much more ambitious, scenario assumes that levels of educational attainment among Registered Indians aged 15 to 39 years increase (at a constant rate) over the course of the twenty-five-year period to reach the same levels as those reported by the non-Aboriginal population in 2001. Under this scenario (referred to as *Education Gap Fully Closed*), the proportion of the Registered Indian population (aged 15–39 years) with high school or higher levels of education would rise by about 26 percentage points to 75% by 2026.

Under all of the scenarios, future improvements in education are assumed to occur only among cohorts comprising the population aged 15–39 years. Among individuals forming older age cohorts, levels of educational attainment are assumed to remain unchanged over the course of their remaining lifespan.

Employment Rates by Level of Education in 2001

The projection models estimate future volumes of employment by applying assumed employment rates to estimates of the future population by level of educational attainment, age, gender, location of residence (on- or off-reserve) and province or region. Employment rates for these various segments of the Registered Indian population were calculated from 2001 Census data.[12]

National level estimates of 2001 employment rates by education, age, and gender are provided for the Registered Indian populations living on- and off-reserve in **Table 14.3**. The table also provides comparable rates for the non-Aboriginal population. The table reveals several previously documented patterns. First, rates of employment are considerably higher among Registered Indians who

Table 14.3: Employment Rate of Registered Indian and Non-Aboriginal Population Aged 15 or More Years by Level of Educational Attainment, Age, Gender, and Location of Residence, Canada, 2001

Age Group	Employment Rate (%)					
	Males			Females		
	Less than High School	High School or Post-Secondary Non-University	University Degree	Less than High School	High School or Post-Secondary Non-University	University Degree
Registered Indians On-reserve						
15–24	13.8	39.4	37.5	11.5	38.1	68.8
25–39	38.1	58.8	84.7	32.5	60.7	83.9
40–64	36.7	60.7	80.8	28.3	63.2	82.9
65+	6.9	17.6	28.6	4.0	17.8	28.6
Total	26.2	55.1	80.7	20.9	56.3	82.1
Registered Indians Off-reserve						
15–24	25.4	58.6	60.0	21.0	49.5	72.6
25–39	53.2	71.7	86.6	34.8	60.1	79.0
40–64	43.5	64.6	83.3	29.3	56.7	77.3
65+	6.9	17.1	22.2	3.9	11.6	18.6
Total	37.2	66.6	81.8	25.8	56.3	77.5
Non-Aboriginal (All Locations)						
15–24	42.8	68.9	67.3	37.5	67.7	72.0
25–39	76.8	87.6	88.7	56.4	76.0	81.2
40–64	66.6	81.1	84.5	46.7	69.8	77.3
65+	10.0	14.1	22.2	3.1	6.2	11.6
Total	48.6	74.6	79.5	31.7	64.2	74.1

Source: Custom tabulations from the 2001 Census of Canada

have achieved higher levels of education, regardless of age, gender and location of residence. Among Registered Indian males living on-reserve, for example, those who had attained high school diplomas or completed some post-secondary education (but without university degrees) reported employment rates about 2.1 times higher that those who had not completed high school. Those with university degrees were roughly 3.1 times more likely to be employed than those who had not completed high school. Employment rate differentials by education were of similar magnitude among females on-reserve and among both gender groups off-reserve.

Gender differentials in Registered Indian employment rates were not pronounced on-reserve. In the off-reserve context, however, employment rates

of Registered Indian males exceeded those of females among nearly all age and education groups.

Table 14.3 also reveals that sizable employment rate differentials between Registered Indians (both on- and off-reserve) and non-Aboriginals also existed in 2001. Employment rate differentials between Registered Indians and non-Aboriginals, however, were strongly patterned over age and education groups. Quite large gaps in employment rates existed among younger cohorts and among those with lower levels of educational attainment. Disparity in employment rates was substantially lower among those who had achieved high school or higher levels of education. Among those with university degrees, employment rate differences between the Registered Indian and non-Aboriginal populations were very small (and for some groups in the opposite direction).

Although economic theory suggests that overall employment levels could be enhanced by improvements in education, employment levels are also greatly affected by a number of factors (e.g. commodity prices, levels of international demand) which influence the strength of national and regional economies, as well as other factors that affect the quantity of labour required as inputs to production (e.g. technology). As such, forecasting future employment levels and employment rates is extremely difficult. Recent trends in changes in employment rates do not provide a reasonable basis for forecasting future rates.

The employment projections developed for this study have been configured to examine three scenarios concerning the future employment rates of Registered Indians. The initial scenario assumes that the employment rates of Registered Indians remain constant at levels observed for 2001, given level of education, age, gender, location of residence and province/region (*Employment Rates Constant*). A second scenario assumes that future employment rates of Registered Indians improve at a constant rate throughout the projection period to the extent that the observed 2001 employment rate gaps between Registered Indians and non-Aboriginals are reduced by one-half (*Employment Rate Gap Reduced by One-Half*). These improvements are assumed to occur both on- and off-reserve in all provinces or regions, and among all education, age, and gender groups. A third scenario assumes that future employment rates of Registered Indians (given education, age, gender, location and province/region) converge to the levels observed for the non-Aboriginal population in 2001 (*Employment Rate Gap Fully Closed*).

The three employment rate scenarios, when combined with the three scenarios concerning future education levels of the population, result in nine possible projection models. For the purposes of this study, five specific projection models were constructed to present the range of employment outcomes associated with altering the educational attainment and employment rate assumptions.

Assumptions associated with these projection models are identified in **Table 14.4**. Model 1 represents the baseline *Growth and Aging* scenario discussed previously. Models 2 and 3 allow one to estimate the incremental impacts on employ-

Table 14.4: Employment Projection Scenarios

Model Assumptions		Educational Attainment		
		Constant	Gap Reduced by One-Half	Gap Fully Closed
Employment Rate	Constant	Model 1 *Growth and Aging*	Model 2	Model 3
	Gap Reduced by One-Half		Model 4	
	Gap Fully Closed			Model 5

ment that would result solely from specific levels of improvement in educational attainment. Models 4 and 5 allow one to estimate the incremental impact on employment that would result from not only specific improvements in levels of educational attainment but also specific improvements in employment rates.

Employment Projection Results

As noted in many prior studies, the Registered Indian population is characterized by having high fertility rates and a "youthful" demographic structure. These attributes of the population imply that substantial levels of population growth can be expected to occur over the course of the projection period. Much of this growth is expected to occur among the population aged 15 or more years, a population commonly used to describe the labour force age group. **Table 14.5**, which provides a summary of the projected changes in the size of the Registered Indian population aged 15 or more years, reveals several important dimensions of the growth and compositional changes which are expected to occur among the labour force age group over the course of the 2002 to 2026 time period. During this period, the size of the Registered Indian labour force age group is expected to increase by about 284,580 individuals, representing an increase of about 68.5% at the national level. Although significant levels of growth are projected to occur both on- and off-reserve, more than two-thirds (about 67.7%) of this growth is forecast to occur on-reserve.

Quite pronounced differences in growth of the Registered Indian labour force age group are also expected among provinces or regions. Growth is expected to occur much more rapidly in the Prairie region, which is expected to account for a majority (about 54.5%) of national growth in the labour force age group during the period.

Table 14.5: Registered Indian Population Aged 15 or More Years by Location of Residence and Province/Region, Canada, 2001 and 2026 (projected)

Province/Region	Population Aged 15 or More Years			
	2001	2026	Change	%
	On-reserve			
Atlantic Region	10,285	19,705	9,420	91.6
Quebec	31,333	56,915	25,582	81.6
Ontario	39,192	70,381	31,189	79.6
Manitoba	34,181	66,321	32,140	94.0
Saskatchewan	28,942	65,760	36,818	127.2
Alberta	27,109	51,497	24,388	90.0
British Columbia	34,927	62,546	27,619	79.1
Northern Canada	8,748	14,362	5,614	64.2
National Total	214,717	407,487	192,770	89.8
Province/Region	Off-reserve			
Atlantic Region	8,846	10,665	1,819	20.6
Quebec	13,303	14,450	1,147	8.6
Ontario	52,365	68,751	16,386	31.3
Manitoba	24,895	43,448	18,553	74.5
Saskatchewan	23,689	43,497	19,808	83.6
Alberta	29,690	53,277	23,587	79.4
British Columbia	43,400	52,431	9,031	20.8
Northern Canada	4,329	5,807	1,478	34.1
National Total	200,517	292,326	91,809	45.8
Province/Region	Total (On- and Off-reserve)			
Atlantic Region	19,131	30,370	11,239	58.7
Quebec	44,636	71,365	26,729	59.9
Ontario	91,557	139,132	47,575	52.0
Manitoba	59,076	109,769	50,693	85.8
Saskatchewan	52,631	109,257	56,626	107.6
Alberta	56,799	104,774	47,975	84.5
British Columbia	78,327	114,977	36,650	46.8
Northern Canada	13,077	20,169	7,092	54.2
National Total	**415,234**	**699,813**	**284,579**	**68.5**

Source: Custom tabulations from the 2001 Census and Clatworthy (2007).

The age structure of the Registered Indian labour force age group is also projected to undergo significant changes during the period. As revealed in **Table 14.6**, a large majority of the projected growth over the twenty-five-year period is expected to occur among older segments of the labour force age group. The population of youth and young adults (i.e. those 15 to 39 years), which formed about 61% of the labour force age group in 2001, is expected to account for only about 35% of growth during the projection period.

Table 14.6: Projected Growth of the Registered Indian Population Aged 15 or More Years by Age Group, Canada, 2001–2026 (Projected)

Age Group	Growth 2001-26	% of Growth
15–24 years	30,731	10.8
25–39 years	67,960	23.9
40–64 years	118,017	41.5
65 or more years	67,871	23.8
Total 15 or more years	284,579	100.0

Source: Custom tabulations from the 2001 Census and Clatworthy (2007).

Table 14.7: Registered Indian Population Aged 15 or More Years Residing On- and Off-reserve Showing Distribution by Age Group, Canada, 2001–2026 (Projected)

Age Group	Year					
	2001	2006	2011	2016	2021	2026
On-reserve						
Total 15 or more years	214,717	255,937	298,498	334,739	371,073	407,487
% 15–24 years	27.2	29.7	29.4	26.1	23.0	22.0
% 25–39 years	34.0	29.6	28.6	30.6	32.7	31.5
% 40–64 years	31.3	33.0	33.8	34.1	33.7	34.0
% 65 or more years	7.5	7.7	8.3	9.3	10.6	12.6
Off-reserve						
Total 15 or more years	200,517	225,555	249,704	267,959	281,492	292,326
% 15–24 years	24.9	24.5	24.2	21.9	18.7	16.9
% 25–39 years	37.2	32.6	29.7	29.5	30.6	29.9
% 40–64 years	32.5	36.5	38.5	39.1	38.8	38.3
% 65 or more years	5.4	6.4	7.6	9.5	12.0	14.9
Total (On- and Off-reserve)						
Total 15 or more years	415,234	481,492	548,202	602,698	652,565	699,813
% 15–24 years	26.1	27.3	27.0	24.2	21.2	19.9
% 25–39 years	35.5	31.0	29.1	30.1	31.8	30.8
% 40–64 years	31.9	34.6	35.9	36.3	35.9	35.8
% 65 or more years	6.5	7.1	8.0	9.4	11.2	13.5

Source: Custom tabulations from the 2001 Census and Clatworthy (2007).

More detailed information concerning projected changes in the age structure of the labour force age group over the projection period is presented in **Table 14.7**. As indicated in the table, shifts in the age composition toward older age cohorts are expected to occur both on- and off-reserve. These shifts are forecast to be more pronounced off-reserve. One important implication of this shift to older cohorts is that the contribution of education improvements among youth and young adults to educational attainment levels of the labour force age group are likely to diminish over time, as those achieving higher levels of attainment form a declining segment of the labour force age population.

Effects of Growth and Aging

As discussed previously, levels of educational attainment and employment rates are significantly higher among cohorts aged 25 to 64 years, a group commonly viewed as the *prime* labour force age group. One of the consequences of the structure of education and employment over age groups is that the processes of population "growth and aging" can (in the absence of changes in other factors) contribute to shifts in the education composition of the labour force age group, as well as changes in employment volumes (i.e. the number employed). The extent of the effects on educational attainment and employment can be estimated from the results of Model 1, a model in which educational attainment levels and employment rates are assumed to remain constant (given age, gender, location and province or region).

Impacts on Educational Attainment

Projection results for this model reveal that growth and aging would result in relatively small improvements in the level of educational attainment of the Registered Indian labour force age group over the period. The proportion of the population aged 15 or more years reporting high school or higher levels of education would rise from 48.6% in 2001 to about 52.3% by 2026. The share reporting university degrees would increase from about 3.9% in 2001 to about 4.1% by 2026. In other words, maintaining current levels of educational attainment among Registered Indian youth and young adults would have a relatively small impact on the educational profile of the labour force age group in 2026.

Impacts on Employment

Projected employment under the Model 1 scenario is presented in **Figure 14.1**. Growth and aging of the population would result in an increase in the number of Registered Indians employed from about 176,200 in 2001 to about 286,800 by 2026 (an increase of 110,600 individuals or roughly 63%). Employment on-reserve under this scenario is projected to rise from about 77,000 (in 2001) to about 146,500 (in 2026), an increase of roughly 90%.[13] Off-reserve employment during the period would rise by roughly 41% from about 93,600 to about 131,400.

Impacts of Improving Education Outcomes

Results from projection Models 2 and 3 provide the basis for estimating the incremental impacts of hypothetical improvements in educational attainment among youth and young adults on Registered Indian employment. As expected, the levels of educational attainment of the Registered Indian labour force age group would improve significantly under both of these scenarios over the course of the projection period. As revealed in **Table 14.8**, the proportion of the population attaining high school or higher levels of education under the Model 2 scenario would rise from 48.6% in 2001 to 61.7% and the share attaining at least one university degree would rise to about 10.2% (about 6.3 percentage points above the share in 2001).

Figure 14.1: Registered Indian Employment Under Model 1 ("Growth and Aging") Scenario by Location of Residence, Canada, 2001-2026 (Projected)
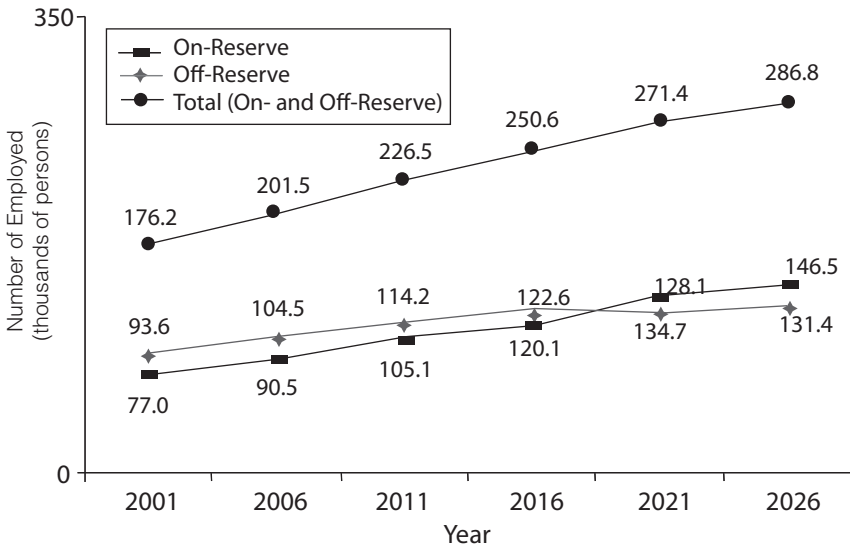
Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007)

Under the Model 3 scenario, the proportion of the labour force age population attaining high school or higher levels of education would rise to about 68.6%. Those with university degrees would form about 18% of the labour force age group in 2026.

Improvements in educational attainment among the population of youth and young adults would result in significant incremental employment assuming current employment rates remain unchanged. As revealed in **Table 14.9**, a one-half reduction in the current Registered Indian/non-Aboriginal education gap among youth and young adults over the projection period (Model 2) is projected to result in additional employment of 29,300 Registered Indians in year 2026. This represents an incremental impact (resulting entirely from education improvements) of about 16.6% over the employment level in 2001. Eliminating the current Registered Indian/non-Aboriginal education gap among youth and young adults during the period (Model 3) would produce incremental employment (associated with education improvements) of about 49,400 Registered Indians in year 2026, an increase of about 28.0% over the employment level in 2001. About three-quarters of the projected incremental employment resulting from education improvements would occur among on-reserve residents.

As noted previously, future Registered Indian population growth is projected to occur most rapidly in the Prairie region. As revealed in **Table 14.10**, the projected employment impacts associated with improving educational attainment among Registered Indian youth and young adults are also expected to be most pronounced in this region. About 53% of the incremental employment growth associated

Table 14.8: Distribution of the Registered Indian Population Aged 15 or More Years Attaining High School or Higher Levels of Education by Projection Scenario, Canada, 2001 and 2026 (Projected)

Projection Model	Educational Attainment	
	High School or Higher (including University Degree) (%)	University Degree (%)
Baseline (2001)	48.6	3.9
Projection Model	**2026**	
Model 1—*Growth and Aging*	52.3	4.0
Model 2—*Education Gap Reduced by One-Half*	61.7	10.2
Model 3—*Education Gap Fully Closed*	68.6	18.0

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

Table 14.9: Incremental Registered Indian Employment Resulting From Assumed Improvements in Educational Attainment Among Youth and Young Adults by Location of Residence, Canada, 2002–2026 (Projected)

Projected Employment Impact 2002-2026	Model 1—*Growth and Aging*	Model 2—*Education Gap Reduced by One Half*	Model 3—*Education Gap Fully Closed*
On-reserve			
Incremental Employment (×1000)	69.5	21.9	36.1
% Increase in Employment (over 2001)	*90.3*	*28.5*	*46.9*
Off-reserve			
Incremental Employment (×1000)	37.9	6.6	12.1
% Increase in Employment (over 2001)	*40.5*	*7.1*	*12.9*
National Total			
Incremental Employment (×1000)	110.6	29.3	49.4
% Increase in Employment (over 2001)	*62.8*	*16.6*	*28.0*

Note: The incremental employment estimates reported for Models 2 and 3 reflect growth that results only from assumed changes in educational attainment among youth and young adults. This growth is in addition to that projected under Model 1 (i.e. **growth and aging** scenario).

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

with improvements in education is projected to occur in the Prairie provinces. The projected impacts of education improvements are especially pronounced in Manitoba and Saskatchewan.

Table 14.10: Incremental Registered Indian Employment Resulting From Assumed Improvements in Educational Attainment Among Youth and Young Adults by Province/Region, Canada, 2002–2026 (Projected)

Projected Employment Impact 2002-2026	Model 1— *Growth and Aging*	Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*
Atlantic Region			
Incremental Employment (×1000)	3.6	0.6	1.1
% Increase in Employment (over 2001)	*46.7*	*7.8*	*14.5*
Quebec			
Incremental Employment (×1000)	10.5	4.3	7.0
% Increase in Employment (over 2001)	*54.4*	*22.6*	*36.5*
Ontario			
Incremental Employment (×1000)	19.0	4.1	7.1
% Increase in Employment (over 2001)	*41.6*	*9.1*	*15.6*
Manitoba			
Incremental Employment (×1000)	19.5	6.0	10.0
% Increase in Employment (over 2001)	*88.8*	*27.1*	*45.6*
Saskatchewan			
Incremental Employment (×1000)	20.6	5.2	8.6
% Increase in Employment (over 2001)	*118.5*	*29.7*	*49.6*
Alberta			
Incremental Employment (×1000)	20.8	4.5	7.6
% Increase in Employment (over 2001)	*82.6*	*17.9*	*30.2*
British Columbia			
Incremental Employment (×1000)	13.5	3.9	6.8
% Increase in Employment (over 2001)	*40.2*	*11.5*	*20.1*
Northern Canada			
Incremental Employment (×1000)	3.3	0.7	1.1
% Increase in Employment (over 2001)	*57.3*	*12.6*	*20.0*
National Total			
Incremental Employment (×1000)	110.6	29.3	49.4
% Increase in Employment (over 2001)	*62.8*	*16.6*	*28.0*

Note: The incremental employment estimates reported for Models 2 and 3 reflect growth that results only from assumed changes in educational attainment among youth and young adults. This growth is in addition to that projected under Model 1 (i.e. **growth and aging** scenario).

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

Impacts of Improving Employment Rates

The report's previous discussion of employment rates noted that with the exception of those who had attained university degrees, rates of employment among Registered Indians lag behind those of non-Aboriginals. While improvements in education are expected to result in improvements in Registered Indian employment rates (as those who attain higher levels of education enjoy higher levels of

Table 14.11: Incremental Registered Indian Employment Resulting From Assumed Improvements in Educational Attainment, Among Youth and Young Adults, and Employment Rates Canada, 2002–2026 (Projected)

Projected Employment Impact 2002-2026	Model 1— *Growth and Aging*	Model 4— *Education and Employment Rate Gaps Reduced by One Half*	Model 5— *Education and Employment Rate Gaps Fully Closed*
On Reserve			
Incremental Employment (×1000)	69.5	62.2	109.9
% Increase in Employment (over 2001)	*90.3*	*80.9*	*142.7*
Off Reserve			
Incremental Employment (×1000)	37.9	28.8	53.3
% Increase in Employment (over 2001)	*40.5*	*30.8*	*56.9*
National Total			
Incremental Employment (×1000)	110.6	94.3	169.0
% Increase in Employment (over 2001)	*62.8*	*53.5*	*95.9*

Note: The incremental employment estimates reported for Models 4 and 5 reflect growth that results from both assumed changes in educational attainment among youth and young adults and assumed changes in Registered Indian employment rates. This growth is in addition to that projected under Model 1 (i.e. "growth and aging" scenario). Estimates prepared for on- and off-reserve geographies exclude estimates for Northern Canada. National total estimates include Northern Canada.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

employment), considerable incremental increases in Registered Indian employment could also be achieved through reducing the existing employment rate gap between Registered Indians and non-Aboriginals. Projection Models 4 and 5 have been constructed to illustrate the approximate scale of additional employment impacts that could result from improving employment rates.[14] Projection results associated with these models are presented in **Table 14.11**.

Model 4, which assumes that Registered Indian/non-Aboriginal gaps in both educational attainment (among youth and young adults) and employment rates are reduced by one-half over the projection period, estimates an incremental increase in Registered Indian employment at the national level of about 94,300 by 2026 (an incremental gain of roughly 54% over the number employed in 2001). Approximately 69% of the projected employment increase (65,000 individuals) results from the assumed increase in Registered Indian employment rates.[15]

Substantially larger impacts on Registered Indian employment would result from totally eliminating the gaps in employment rates between Registered Indians and non-Aboriginals. Model 5 assumes that Registered Indian employment rates and the levels of education attained by youth and young adults converge over the projection period to match those observed in 2001 for the non-Aboriginal population. The model yields an incremental increase in Registered Indian employment of about 169,000 in 2026. This represents an incremental employment gain

of about 96% over 2001 employment estimates. Roughly 71% of the projected increase (119,600 employed individuals) is associated with the model's assumptions concerning improvements in employment rates.[16]

The employment impacts associated with improvements in employment rates (under either Model 4 or 5) would be largest on-reserve. Results from both models suggest that about 62% of the incremental employment gains resulting from assumed improvements in Registered Indian employment rates would accrue to residents on-reserve.

It should be emphasized that the improvements in Registered Indian employment rates on-reserve assumed in Models 4 and 5 would require substantial levels of economic development and job creation over the projection period either on-reserve or in surrounding off-reserve regions accessible to reserve residents. Annual job creation requirements needed to support the assumed levels of improvement in employment rates on-reserve range between 5,270 (Model 4) and 7,180 (Model 5), roughly 1.9 to 2.6 times higher than recent (1996–2001) levels of employment growth on-reserve.[17]

Employment Income Projection Results

The employment projections discussed above have been extended to provide estimates of total employment income. Average employment incomes in 2000 were calculated from the 2001 census for population sub-groups distinguished by level of educational attainment, age, gender, location of residence, and province or region. These estimates were adjusted upward by 3.1% to approximate employment income levels in 2001, the baseline year for the projections.

As revealed in **Table 14.12**, quite large differentials in average employment earnings existed between Registered Indians and non-Aboriginals in 2001, regardless of educational attainment level and gender. Average employment earnings among both Registered Indians and non-Aboriginals were substantially higher among those with higher levels of education. Ratios comparing average employment incomes among education groups (e.g. those with high school or some post-secondary versus those with less than high school) did not differ greatly between Registered Indians and non-Aboriginals. This suggests that in proportionate terms, the employment earnings benefits associated with additional education may be of similar magnitude for both populations.[18]

The average employment earnings estimates calculated for the population reporting employment at the time of the Census, were applied directly to the projected employment estimates to calculate the total employment earnings of the *employed* population. Earnings estimates for the employed population were then adjusted (upwards) to account for the additional employment earnings of the non-employed population. This latter population includes individuals who are temporarily unemployed, as well as others who may work on a seasonal or periodic

Table 14.12: Estimated Average Earnings of Employed Registered Indians and Non-Aboriginals by Level of Educational Attainment and Gender, Canada, 2001

Educational attainment	Average Employment Earnings ($2001)		
	Male	Female	Total
Registered Indian			
Less than High School	17,573	12,019	15,255
High School or Post-Secondary Non-University	24,980	18,230	21,632
University Degree	35,633	26,626	29,744
Non-Aboriginal			
Less than High School	23,970	14,911	20,242
High School or Post-Secondary Non-University	33,785	21,746	27,973
University Degree	48,489	32,851	40,624
Registered Indian/Non-Aboriginal Gap			
Less than High School	6,396	2,892	4,987
High School or Post-Secondary Non-University	8,805	3,516	6,341
University Degree	12,856	6,225	10,880

Note: Estimates of employment earning reported for 2000 have been adjusted to reflect the baseline year 2001.

Source: Custom tabulations from the 2001 Census of Canada.

basis. As configured for this study, the employment projections do not estimate employment associated with this latter population group.[19]

The study presents estimates of total employment earnings for the same five models developed for the employment projections. In the case of Models 1 to 3, future average earnings (given level of educational attainment, age, gender, location of residence and province or region) are assumed to remain constant over the course of the projection period. Model 4 makes a further assumption that the Registered Indian/non-Aboriginal gaps in average employment earnings are reduced by one-half over the course of the projection period. Model 5 explores the scenario where the average employment earnings of Registered Indians fully converge to the levels observed for the non-Aboriginal population in 2000.

All of the projected employment earnings estimates presented in this report are expressed in terms of 2001 constant dollars, unadjusted for future changes associated with real wage growth.[20]

Estimates of the total annual employment earnings of Registered Indians are summarized in **Table 14.13** for each of the five models developed for this study. The table also provides estimates of the incremental amount of employment earnings projected by these models. Incremental earnings have been measured in relation to those expected under the ***Growth and Aging*** scenario (Model 1).

Total employment earnings attributable to growth and aging of the population are projected to rise from about $5.05 billion annually in 2001 to about $8.34 billion annually in 2026. As revealed in the table, the incremental impacts on employment income associated with improvements in educational attainment among youth and young adults during the period (Models 2 and 3) are projected to be substantial. Assuming that the 2001 education gap between Registered Indian and non-Aboriginal youth and young adults could be reduced by one-half over the period (Model 2), annual total employment earnings of the Registered Indian population in 2026 would increase by an additional $1.35 billion. This represents an incremental increase of about 16.2% over that expected under the growth and aging model (Model 1). Elimination of the education gap among youth and young adults (Model 3) is projected to raise the annual total employment earnings of the Registered Indian population by about $2.3 billion by 2026, an incremental increase of roughly 27.5%.

Models 4 and 5, which also assume reductions in the gaps between Registered Indian and non-Aboriginal employment rates and gaps in average employment earnings, suggest that substantially larger incremental growth in total employment income would result if education improvements were to also be accompanied by improvements in these other dimensions of Registered Indian labour market outcomes. Model 5, for example, which assumes that Registered Indian employment rates and average earnings over the period converge to the 2001 levels observed for the non-Aboriginal population, projects total incremental employment earnings of about $9.25 billion annually in 2026.

Estimates of the cumulative increase in total employment earnings associated with improvements in education (as assumed under Models 2 and 3) are summarized by province or region in **Table 14.14**. Cumulative employment earnings for the 2002 to 2026 period under the growth and aging scenario (Model 1) are projected to total about $172.5 billion.[21] At the national level, cumulative incremental employment income resulting from reducing the education gap among youth and young adults by one-half (Model 2) is projected to total about $15.2 billion over the 2002 to 2026 time period. Fully closing the 2001 education gap among youth and young adults (Model 3) is projected to result in cumulative incremental earnings of about $27.1 billion over the period. Under both scenarios of education improvement, cumulative incremental impacts on employment earnings would be most pronounced in Manitoba and Saskatchewan.

As indicated in **Table 14.15**, the projected impacts of educational improvements on cumulative employment earnings are substantially larger (in both absolute and

Table 14.13: Total Employment Earnings of Registered Indian Population by Projection Model, Canada, 2001-2026 (Projected)

Year	Total Annual Employment Earnings (2001$ Millions)				
	Model 1— *Growth and Aging*	Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*	Model 4— *Education, Employment Rate and Employment Earnings Gaps Reduced by One-Half*	Model 5— *Education, Employment Rate and Employment Earnings Gaps Fully Closed*
2001	5,054.3	5,054.3	5,054.3	5,054.3	5,054.3
2006	5,789.9	5,968.6	6,136.9	6,279.6	7,634.6
2011	6,516.9	6,957.6	7,344.0	7,672.9	9,943.1
2016	7,257.7	7,888.7	8,404.1	9,098.1	12,313.8
2021	7,901.1	8,880.0	9,620.0	10,659.1	15,040.0
2026	8,342.2	9,690.7	10,640.0	12,066.8	17,594.1
Year	Incremental Annual Employment Earnings (2001$ Millions)				
2006	---	178.7	347.0	489.7	1,844.7
2011	---	440.8	827.1	1,156.1	3,426.3
2016	---	631.1	1,146.5	1,840.4	5,056.1
2021	---	979.0	1,719.0	2,758.0	7,139.0
2026	---	1,348.5	2,297.8	3,724.6	9,252.0

Note: As in the case of the employment projection models, Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates and average earnings are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007)

percentage terms) for the population living on-reserve. Roughly two-thirds of incremental earnings are projected to accrue to reserve residents.

Estimates of Income Taxation on Incremental Employment Earnings

To this point, the study has provided some estimates of the approximate impacts on employment and employment earnings that could result from improvements in educational attainment among Registered Indian youth and young adults over the 2002 to 2026 time period. The employment and employment earnings impacts presented previously are primarily private, in that the benefits accrue to individuals. However, a substantial body of research demonstrates that the benefits of educational improvements extend beyond individuals to the broader society. One obvious example, in this regard, relates to the additional income which flows to governments from taxation of higher employment incomes. Although other forms of tax revenue are likely to be positively impacted by the effects of education

Table 14.14: Cumulative Incremental Employment Earnings of Registered Indian Population by Province/Region and Projection Model, Canada, 2002–2026 (Projected)

Province/Region	Model 1—*Growth and Aging* 2002–2026 Cumulative Employment Earnings (2001$ Millions)	2002–2026 Cumulative Incremental Employment Earnings (2001$ Millions)	
		Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*
Atlantic Region	6,707.0	273.1	526.7
% Increase over Model 1	---	*4.1*	*7.9*
Quebec	16,376.7	1,815.6	3,123.3
% Increase over Model 1	---	*11.1*	*19.1*
Ontario	46,689.7	2,846.9	5,149.6
% Increase over Model 1	---	*6.1*	*11.0*
Manitoba	20,445.9	3,191.3	5,751.8
% Increase over Model 1	---	*15.6*	*28.1*
Saskatchewan	17,832.0	2,417.8	4,277.0
% Increase over Model 1	---	*13.6*	*24.0*
Alberta	25,768.8	1,862.3	3,266.4
% Increase over Model 1	---	*7.2*	*12.7*
British Columbia	31,473.8	2,252.2	4,100.2
% Increase over Model 1	---	*7.2*	*13.0*
Northern Canada	7,168.9	534.0	896.3
% Increase over Model 1	---	*7.4*	*12.5*
National Total	172,462.7	15,193.1	27,091.3
% Increase over Model 1	---	*8.8*	*15.7*

Note: As in the case of the employment projection models, Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates and average earnings are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

improvements on employment earnings, this study considers only those impacts associated with incremental income tax revenue.[22]

Estimates of the approximate incremental income taxes on employment earnings resulting from education improvements have been constructed by applying the combined provincial/federal marginal tax rates (for 2001) to the amount of incremental employment earnings projected over the 2002 to 2026 time period. As the average employment income projected by the various models developed for this study ranges from about $19,000 to $26,000 (averaged across all sub-groups), marginal tax rates associated with this income range have been used.[23] These rates are assumed to apply to all incremental employment income projected by the various models and are further assumed to remain constant over the projection period.[24]

Table 14.15: Cumulative Incremental Employment Earnings of Registered Indian Population by Location of Residence and Projection Model, Canada, 2002–2026 (Projected)

Total Employment Earnings	Model 1—*Growth and Aging* 2002-2026 Cumulative Employment Earnings (2001$ Millions)	2002–2026 Cumulative Incremental Employment Earnings (2001$ Millions)	
		Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*
On-reserve			
Employment Earnings	70,788.7	9,675.2	16,919.0
% Increase over Model 1	---	*13.7*	*23.9*
Off-reserve			
Employment Earnings	94,505.2	4,983.8	9,276.0
% Increase over Model 1	---	*5.3*	*9.8*
National Total			
Employment Earnings	172,462.7	15,193.1	27,091.3
% Increase over Model 1	---	*8.8*	*15.7*

Note: As in the case of the employment projection models, Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates and average earnings are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001. Estimates for on- and off-reserve geographies exclude data for Northern Canada. Estimates for the national total also include data for Northern Canada.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

The issue of income taxation on employment earnings is complicated for Registered Indians living on-reserve. While Registered Indians working off-reserve are subject to income taxation in the same fashion as other Canadians, employment income among Registered Indians who both live and work on-reserve is exempt from taxation under Section 87 of the *Indian Act*. There appears to be no formal estimate of the proportion of the employment earnings of Registered Indians living on-reserve that is subject to income taxation. Given this situation, the employment income tax estimates prepared for this study have been based on two scenarios. One scenario assumes that 25% of the employment income earned by reserve residents will be subject to taxation. A second scenario assumes income taxation applies to 75% of the employment incomes of reserve residents.[25]

A summary of the results of the study's analysis of taxation on incremental employment income is presented in **Table 14.16**. Cumulative incremental taxes on employment incomes over the 2002 to 2026 time period associated with population growth and aging (Model 1) are estimated to total roughly $6.4 billion (assuming 25% taxable income on-reserve) to $9.2 billion (assuming 75% taxable income on-reserve). Cumulative taxes on incremental employment income that would result from reducing the Registered Indian/non-Aboriginal education gap

Table 14.16: Cumulative Incremental Increase in Taxes on Employment Income by Projection Model and Location of Residence, Canada, 2002–2026 (Projected)

Location	2002–2026 Cumulative Incremental Increase in Taxes on Employment Income (Millions 2001$)				
	Model 1— *Growth and Aging*	Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*	Model 4— *Education, Employment Rate and Employment Earnings Gaps Reduced by One-Half*	Model 5— *Education, Employment Rate and Employment Earnings Gaps Fully Closed*
On-reserve (25% Taxable)	1,391.1	608.5	1,581.4	1,054.7	4,337.7
% Increase (over Model 1)	---	43.7	113.7	75.8	311.8
On-reserve (75% Taxable)	4,173.2	1,825.6	4,744.2	3,164.2	13,013.0
% Increase (over Model 1)	---	43.7	113.7	75.8	311.8
Off-reserve	4,641.1	1,176.5	3,574.1	2,177.6	8,799.2
% Increase (over Model 1)	---	25.4	77.0	46.9	189.6
Total (On-reserve (25% Taxable))	6,415.3	1,896.7	3,419.7	5,538.9	14,130.4
% Increase (over Model 1)	---	29.6	53.3	86.3	220.3
Total (On-reserve (75% Taxable))	9,197.4	3,113.7	5,529.1	8,701.7	22,805.7
% Increase (over Model 1)	---	33.9	60.1	94.6	248.0

Note: As in the case of the employment projection models, Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates and average earnings are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001. Estimates for on- and off-reserve geographies exclude data for Northern Canada. Estimates for the national total also include data for northern Canada.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007)

by one-half among youth and young adults (Model 2) are projected to range between $1.9 billion (assuming 25% of income taxable on-reserve) and $3.1 billion (assuming 75% of income taxable on-reserve). Estimates of cumulative taxes on incremental employment income under the Model 3 scenario (elimination of education gaps among youth and young adults) range from $3.4 billion

(assuming 25% of income taxable on-reserve) to $5.5 billion (assuming 75% of income taxable on-reserve).[26]

Substantially larger amounts of income tax would result if educational improvements were to also be accompanied by reducing (Model 4) or eliminating (Model 5) existing Registered Indian/non-Aboriginal gaps in employment rates and average employment earnings. Cumulative incremental income taxes under these latter scenarios range from about $5.5 billion to $22.8 billion.

Impacts on Government Transfer Payments to Individuals

Several studies concerning the impacts of education on government transfer payments to individuals have observed that those with higher levels of education are less likely to rely on public transfers. This has been found to be the case, even when individuals are eligible for benefits. This latter observation suggests that the proportion of the population receiving transfers should be lower among individuals with higher levels of education.

Data from the 2001 Census for Registered Indians do reveal somewhat lower rates of receipt of transfer payments among higher education groups. Differences among education groups, however, were not pronounced, except when controlled for employment status. Among those who reported no employment income, only marginal differences in the proportion receiving transfer payments existed among education groups. Average transfer payment income also did not vary widely by education level among those without employment income. Among those with employment incomes, rates of receipt of transfer payments and the average size of transfers were generally lower and declined sharply with increasing education. This situation suggests that the effects of education improvements with respect to reducing reliance upon transfers result primarily from improved employment and employment earnings outcomes.[27]

Estimates of the effects of educational improvements on government transfer payments developed for this study include all income from government sources except for incomes from the Canada (and Quebec) Pension Plans and employment insurance. Although incomes from these sources are often viewed as government transfers, these programs (although administered by or on behalf of government) are designed to be fully funded by contributors (employees and employers) and can be viewed as revenue/expenditure neutral.

The procedure used to estimate the effects of education on government transfer income involved two stages. In the first stage, rates of receipt of transfer income, calculated from the 2001 Census for population subgroups distinguished by employment status, educational attainment, age, gender, location of residence, and province or region, were applied to the future population of these sub-groups as projected by the employment projection models. This stage produced estimates of the future population of transfer payment recipients for each subgroup. In a

Table 14.17: Cumulative Government Transfer Income and Reductions in Transfer Income Among Registered Indians by Location of Residence and Projection Model, Canada, 2002–2026 (Projected)

Location	Cumulative Incremental Transfer Income 2002-2026 (Millions 2001$) Model 1—Growth and Aging	Reduction in Cumulative Transfer Income 2002–2026 (Millions 2001$)			
		Model 2— *Education Gap Reduced by One-Half*	Model 3— *Education Gap Fully Closed*	Model 4— *Education, Employment Rate Gaps Reduced by One-Half*	Model 5— *Education, Employment Rate Gaps Fully Closed*
On-reserve	8,394.8	833.9	1,441.1	2,960.0	4,973.4
% Reduction Over Model 1	---	*9.9*	*17.2*	*35.3*	*59.2*
Off-reserve	5,646.0	375.1	693.2	1,931.1	3,240.4
% Reduction Over Model 1	---	*6.6*	*12.3*	*34.2*	*57.4*
National Total	14,183.9	1,244.4	2,191.3	5,019.3	8,430.3
% Reduction Over Model 1	---	*8.8*	*15.4*	*35.4*	*59.4*

Note: Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001. Estimates for on- and off-reserve geographies exclude data for Northern Canada. Estimates for the national total also include data for Northern Canada.

Source: Projections based on analysis of data from the 2001 Census and Clatworthy (2007)

second stage, estimates of average government transfer income, calculated from the 2001 Census for the same subgroups, were then applied to the projected population of recipients (generated in the first stage) to estimate the total amount of government transfers.[28] The projections assume that rates of receipt of transfers and average transfer incomes remain constant throughout the projection period (given employment status, educational attainment, age, gender, location of residence, and province or region). Transfer payment estimates were developed for each of the five employment projection models discussed previously.

Table 14.17 provides a summary of the cumulative incremental amount of government transfer income to Registered Indians over the 2002 to 2026 period projected to result from population growth and aging (Model 1) as well as estimates of the reduction in cumulative transfer income projected under the Models 2 to 5 scenarios. The estimates are also structured by location of residence.

At the national level, Model 1 projects the cumulative incremental amount of government transfer income for the 2002 to 2026 period to be roughly $14.2 billion, about 59% of which would accrue to residents on-reserve. Assuming that

the Registered Indian/non-Aboriginal education gap among youth and young adults in 2001 were to be reduced by one-half over the course of the projection period (Model 2), cumulative government transfers over the period would be reduced by about $1.2 billion (or about 9%). About 67% of this reduction is projected to occur among reserve residents. Convergence of the education levels of Registered Indian youth and young adults to the 2001 levels observed for their non-Aboriginal counterparts (Model 3) would lower cumulative transfer income for the period by roughly $2.2 billion (about 15%). About 66% of this reduction is projected to occur among reserve residents.

As revealed by the projection results for Models 4 and 5, much larger reductions in transfer income would be expected if improvements in the employment rates of Registered Indians were also to occur during the period. Reducing the 2001 employment rate gap between Registered Indians and non-Aboriginals by one-half (Model 4) is projected to result in a reduction in cumulative transfer income of about $5 billion (35%). Elimination of the employment rate gap (Model 5) is projected to lower cumulative government transfer income by about $8.4 billion (or about 59%).

As revealed in **Table 14.18**, the effects of education improvements among Registered Indian youth and young adults in terms of reducing transfer income (Models 2 and 3) are projected to be largest (in percentage terms) in Northern Canada, Manitoba, Quebec, and British Columbia. Impacts on transfer income associated with improvements in Registered Indian employment rates (Models 4 and 5) are projected to be most significant in Northern Canada, Manitoba and Saskatchewan.

Impacts on Crime and the Cost of Crime

Sociologists and criminologists have identified powerful correlations between several socio-economic (e.g. income, poverty, education, literacy, employment), psychological (e.g. mental health) and demographic (e.g. age and gender) factors and involvement in criminal activity. Many of these same factors have also been shown to correlate strongly with recidivism (see Karpowitz and Kenner 2004). Several recent studies have focussed on the role of education as a causal factor in reducing criminal activity. Some of the most important works in this regard include those of Grogger (1998), Lochner (2004), Lochner and Moretti (2004), and Groot and van den Brink (2008). This research finds that higher levels of schooling, especially high school graduation, results in lower rates of incarceration, fewer criminal arrests and a reduction in self-declared reporting of participation in criminal activity.[29] Based on their findings, Lochner and Moretti (2004) conclude that reduction in criminal activity may constitute the largest component of the returns to society attributable to education.[30]

For many years, Canadian data have revealed extremely high rates of criminal activity and involvement with the justice system among Aboriginal peoples. In

Table 14.18: Cumulative Government Transfer Income and Reductions in Transfer Income Among Registered Indians by Province/Region and Projection Model, Canada, 2002–2026 (Projected)

Location	Cumulative Incremental Transfer Income 2002–2026 (Millions 2001$) Model 1—*Growth and Aging*	Reduction in Cumulative Transfer Income 2002–26 (Millions 2001$)			
		Model 2—*Education Gap Reduced by One-Half*	Model 3—*Education Gap Fully Closed*	Model 4—*Education and Employment Rate Gaps Reduced by One-Half*	Model 5—*Education and Employment Rate Gaps Fully Closed*
Atlantic Region	473.1	15.5	30.1	125.5	205.0
% Reduction Over Model 1	---	*3.3*	*6.4*	*26.5*	*43.3*
Quebec	1,679.1	171.6	287.7	532.5	826.8
% Reduction Over Model 1	---	*10.2*	*17.1*	*31.7*	*49.2*
Ontario	2,750.5	198.1	351.3	812.5	1,321.6
% Reduction Over Model 1	---	*7.2*	*12.8*	*29.5*	*48.0*
Manitoba	2,329.3	244.1	441.7	957.0	1,645.1
% Reduction Over Model 1	---	*10.5*	*19.0*	*41.1*	*70.6*
Saskatchewan	2,458.6	191.2	335.9	977.5	1,727.7
% Reduction Over Model 1	---	*7.8*	*13.7*	*39.8*	*70.3*
Alberta	2,186.4	179.8	312.9	750.4	1,260.6
% Reduction Over Model 1	---	*8.2*	*14.3*	*34.3*	*57.7*
British Columbia	2,163.8	208.7	374.8	735.7	1,226.9
% Reduction Over Model 1	---	*9.6*	*17.3*	*34.0*	*56.7*
Northern Canada	143.0	35.4	57.0	128.2	216.6
% Reduction Over Model 1	---	*24.8*	*39.8*	*89.6*	*151.4*
National Total	14,183.9	1,244.4	2,191.3	5,019.3	8,430.3
% Reduction Over Model 1	---	*8.8*	*15.4*	*35.4*	*59.4*

Note: Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Employment rates are assumed to remain constant (given educational attainment, age, gender, location, and province or region) at levels observed for 2001.

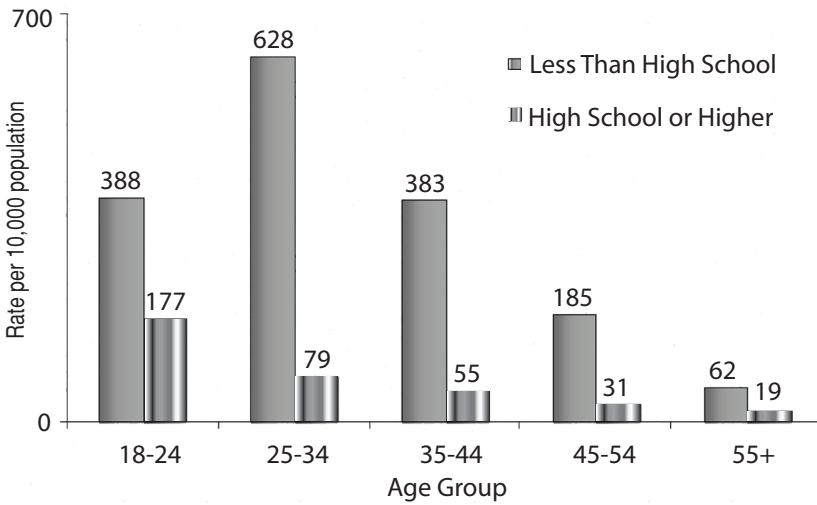**Source**: Projections based on analysis of data from the 2001 Census and Clatworthy (2007).

light of recent research findings, the achievement of higher levels of education among Registered Indians appears to have the potential to contribute to significant reductions in criminal activity and the personal and social costs of crime.

Some preliminary and approximate estimates of the effects of education improvement among Registered Indians on crime and the costs of crime have been developed for this study. The study's focus is restricted to the adult population (i.e. those 18 or more years of age). The estimation procedure involved three stages. In the initial stage, incarceration rates (for 2001) developed for subgroups of the Registered Indian population (distinguished by level of education, age, gender, and province or region) were applied to the populations of these subgroups as projected by Models 1, 2 and 3, resulting in estimates of the projected number of Registered Indian inmates annually over the 2002 to 2026 time period.[31] In a second stage, estimates of the average annual custodial cost per inmate (developed from data published by the CCJS for fiscal year 2000/01) were applied to the projected inmate counts to develop annual estimates of total custodial costs. In a third stage, a ratio measuring the estimated total costs of crime (also including the direct pecuniary costs to victims, policing and security, and court and legal costs) in relation to custodial costs, was then applied to the projected annual custodial costs to produce estimates of annual total costs of crime. The ratio of total costs to custodial costs was developed at the national level using research and data published by Brantingham and Easton (1998).[32] The projections assume that future rates of incarceration (given educational attainment, age, gender, and province or region), average custodial costs, and the ratio of total costs to custodial costs remain constant throughout the projection period.[33]

While data from the 1996 snapshot of inmates do allow one to construct incarceration rates by level of education, age, gender, and region for the Aboriginal and non-Aboriginal populations, these data do not distinguish Aboriginal inmates on the basis of Aboriginal identity or Indian registration status. More recent data (which lacks education information) on individuals admitted into custody, however, is available for Aboriginal identity groups and was used to estimate the Registered Indian proportion of all Aboriginal inmates and incarceration rates. The general procedure used for constructing these estimates is described briefly below.

Annual data concerning the average number of individuals in custody reveals an overall decline from the time of the 1996 snapshot, from about 37,540 to about 31,500 in 2001. At that time, Aboriginal inmates formed about 19.1% of the total inmate population (up from about 16.4% in 1996) and were estimated to number 6,158. By applying the Registered Indian proportion developed from the "admissions to custody" data, the number of Registered Indians in custody in 2001 was estimated to be 4,171. Estimates of 2001 Registered Indian inmate counts by education, age, gender, and region were then developed using the distribution (across these variables) identified for all Aboriginal inmates from the 1996 snapshot data. Registered Indian incarceration rates for 2001 were constructed

Figure 14.2: Estimated Rate of Incarceration Among Registered Indian Males by Age Group and Educational Attainment, Canada, 2001

Source: Based on analysis of data from the 1996 *One-Day Snapshot of Inmates in Canada's Adult Correctional Facilities*, CCJS data on inmates and admissions to remand (1996–2001) and the 2001 Census of Canada.

Figure 14.3: Estimated Rate of Incarceration Among Registered Indian Females by Age Group and Educational Attainment, Canada, 2001
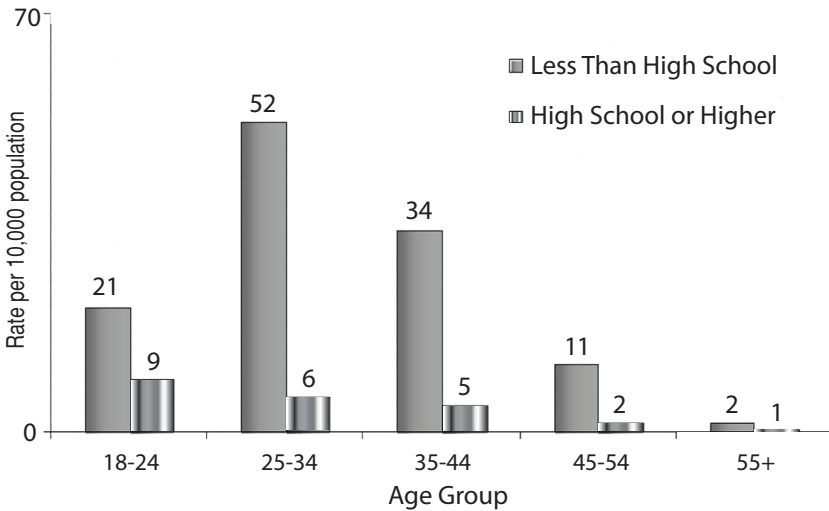
Source: Based on analysis of data from the 1996 *One-Day Snapshot of Inmates in Canada's Adult Correctional Facilities*, CCJS data on inmates and admissions to remand (1996–2001) and the 2001 Census of Canada.

based on these inmate counts and additional population data derived from the adjusted 2001 Census. As a number of assumptions were required in the development of the incarceration rate estimates, they should be viewed as approximations.

The estimated rates of incarceration (per 10,000 population) by age and education group are presented in **Figures 14.2** and **14.3**, for males and females, respectively. Among both gender groups, incarceration rates were highest among young adults (25–34 years) and declined steadily among older age cohorts. The relationship between education and incarceration rates is pronounced for both males and females. Among males, incarceration rates for those who had not completed high school were (depending upon age) between two and eight times higher than those who had completed high school. Differentials of similar scale were also identified for Registered Indian females.

Registered Indian incarceration rates were also found to vary widely by province or region. As illustrated in **Figure 14.4** (for males), incarceration rates were substantially higher among Registered Indians in the Prairie region and Northern Canada. Pronounced differentials in incarceration rates by level of educational attainment, however, were identified for all provinces or regions.

Projected Number of Registered Indian Inmates

Estimates of the number of Registered Indian inmates for the 2002 to 2026 time period are presented in **Figure 14.5** for Models 1, 2 and 3. Assuming incarceration rates remain unchanged (when controlled for educational attainment, age, gender, and province or region), growth and aging of the Registered Indian population (Model 1) is projected to result in an increase in the average annual number of Registered Indian inmates from 4,171 (in 2001) to 7,009 by 2026 (a 68% increase). Reducing the 2001 Registered Indian/non-Aboriginal gap in educational attainment among youth and young adults by one-half (Model 2) is projected to lower the estimated 2026 inmate population by 1,216 individuals (about 17% lower than the number estimated under the population **growth and aging** scenario). Convergence of the levels of educational attainment of Registered Indian youth and young adults over the period to the 2001 levels of their non-Aboriginal counterparts (Model 3) would reduce the projected number of inmates in 2026 by 2,066 individuals (a reduction of roughly 29%).

As revealed in **Table 14.19**, improvements in educational attainment among Registered Indian youth and young adults are projected to result in lower numbers of inmates in all provinces or regions. In absolute terms, these reductions would be largest in the Prairie region. In relation to the projected size of the inmate population under the population growth and aging scenario, reductions associated with education are projected to be most significant in Northern Canada, Quebec, and Alberta.

Figure 14.4: Estimated Rate of Incarceration Among Registered Indian Males by Educational Attainment and Province/Region, Canada, 2001
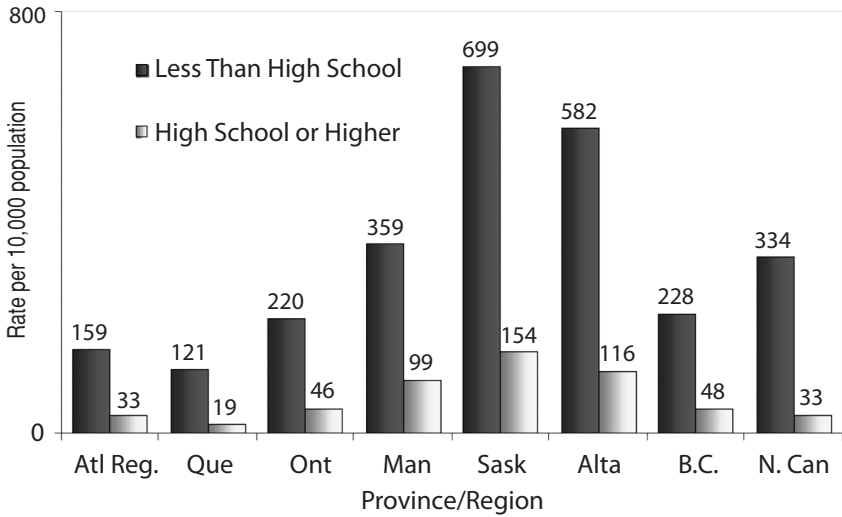
Source: Based on analysis of data from the 1996 *One-Day Snapshot of Inmates in Canada's Adult Correctional Facilities*, CCJS data on inmates and admissions to remand (1996–2001), and the 2001 Census of Canada.

Figure 14.5: Number of Registered Indian Inmates by Projection Model, Canada, 2001–2026 (Projected)
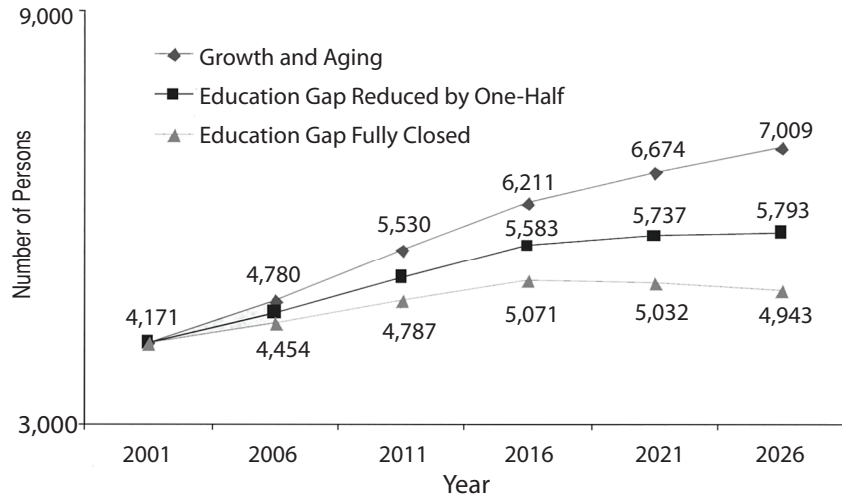
Note: Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Incarceration rates are assumed to remain constant (given educational attainment, age, gender, and province or region) at levels estimated for 2001.

Source: Projections based on analysis of data from the 2001 Census, CCJS data for 1996 and 2001, and Clatworthy (2007).

Table 14.19: Number of Registered Indian Inmates by Projection Model and Province/Region, Canada, 2026 (Projected)

Province/Region	Projected Registered Indian Inmates (2026)		
	Model 1—*Growth and Aging*	Model 2—*Education Gap Reduced by One Half*	Model 3—*Education Gap Fully Closed*
Atlantic Region	104	98	93
% Reduction	---	*5.8*	*10.6*
Quebec	233	175	138
% Reduction	---	*24.9*	*40.8*
Ontario	730	602	517
% Reduction	---	*17.5*	*29.2*
Manitoba	1,220	1,017	869
% Reduction	---	*16.6*	*28.8*
Saskatchewan	2,246	1,923	1,680
% Reduction	---	*14.4*	*25.2*
Alberta	1,686	1,352	1,124
% Reduction	---	*19.8*	*33.3*
British Columbia	613	511	440
% Reduction	---	*16.6*	*28.2*
Northern Canada	178	113	80
% Reduction	---	*36.5*	*55.1*
National Total	7,009	5,793	4,943
% Reduction	---	*17.3*	*29.5*

Note: Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Incarceration rates are assumed to remain constant (given education attainment, age, gender, and province or region) at levels estimated for 2001.

Source: Projections based on analysis of data from the 2001 Census, CCJS data for 1996, and Clatworthy (2007).

Table 14.20: Estimated Cumulative Costs of Registered Indian Criminal Activity by Projection Model and Province/Region, Canada, 2002-2026 (Projected)

Province/Region	Projected Cumulative Incremental Costs of Criminal Activity (2002-2026) Model 1—*Growth and Aging* (Millions 2001$)	Estimated Reduction in Cumulative Incremental Costs (2002–2026) (Millions 2001$)	
		Model 2— *Education Gap Reduced by One Half*	Model 3— *Education Gap Fully Closed*
Atlantic Region	215.5	37.3	71.0
% Reduction	---	*17.3*	*32.9*
Quebec	474.5	322.0	561.5
% Reduction	---	*67.9*	*118.3*
Ontario	1,491.0	844.4	1,486.6
% Reduction	---	*56.6*	*99.7*
Manitoba	3,677.5	1,092.8	1,994.0
% Reduction	---	*29.7*	*54.2*
Saskatchewan	7,794.1	1,769.6	3,212.7
% Reduction	---	*22.7*	*41.2*
Alberta	4,428.8	1,687.1	2,975.9
% Reduction	---	*38.1*	*67.2*
British Columbia	1,050.2	719.4	1,283.5
% Reduction	---	*68.5*	*122.2*
Northern Canada	638.6	539.3	880.8
% Reduction	---	*84.4*	*137.9*
National Total	19,770.3	7,011.7	12,465.9
% Reduction	---	*35.5*	*63.1*

Note: Models 2 and 3 assume changes only to the levels of educational attainment of Registered Indian youth and young adults. Incarceration rates are assumed to remain constant (given education attainment, age, gender, and province or region) at levels estimated for 2001.

Source: Projections based on analysis of data from the 2001 Census, CCJS data for 1996 and 2001, Brantingham and Easton (1998), and Clatworthy (2007).

Projected Total Costs of Criminal Activity[34]

In 2001, the total cost of criminal activity by the Registered Indian population was estimated in this study to total about $2.1 billion. About 55% of these costs were estimated to be incurred by government. A summary of the projected cumulative incremental costs associated with Registered Indian criminal activity for the 2002 to 2026 time period is provided in **Table 14.20** for each of the three projection models.

Assuming stable incarceration rates (given educational attainment, age, gender and province or region) and no increases in inflation-adjusted costs, population growth, and aging over the 2002 to 2026 period (Model 1) is projected to result

in cumulative costs associated with Registered Indian criminal activity totalling about $19.8 billion (in 2001 constant dollars). Very substantial reductions in cumulative costs for the period are projected to result from improvements in levels of education among Registered Indian youth and young adults. Closing the 2001 Registered Indian/non-Aboriginal education gap among youth and young adults by one-half (Model 2) is projected to result in a reduction of about $7.0 billion in the cumulative costs of criminal activity for the period. Eliminating the 2001 gap in educational attainment among youth and young adults (Model 3) is projected to lower the cumulative costs of criminal activity by about $12.5 billion. Significant reductions in cumulative costs resulting from education improvements were projected for all provinces or regions. In relative terms, these reductions were largest in Northern Canada, British Columbia, and Quebec. Absolute reductions in cumulative costs associated with education improvements were projected to be largest in the Prairie region.

Summary and Discussion

This study has used a series of projection models to develop estimates of the incremental effects of "hypothetical" improvements in the levels of educational attainment achieved by Registered Indian youth and young adults on several specific outcomes over the 2002 to 2026 time period. The outcomes explored included employment, employment earnings, revenues to government through taxation of employment incomes, government expenditures associated with transfer payments, and the private and social costs associated with criminal activity.

Key findings of the study, which are summarized in **Table 14.21**, suggest that improving educational attainment among Registered Indian youth and young adults has the potential to produce quite large returns to individuals in terms of higher levels of employment and larger employment earnings. In this regard, the projections suggest that improvements which served to close by one-half the education gap that existed in 2001 between Registered Indian youth and young adults and their non-Aboriginal counterparts would increase the volume of Registered Indian employment by about 29,300 individuals (a 26% incremental gain) by 2026. Educational improvements which served to increase the attainment levels of Registered Indian youth and young adults over the period to the same levels as those observed in 2001 for their non-Aboriginal counterparts, would produce incremental employment increases of about 49,400 individuals (or roughly 45%). Additional employment attributable to these education improvements would add between $15.2 and $27.1 billion to the employment earnings of the Registered Indian population over the period (in 2001 constant dollars).

While the estimated returns to individuals associated with achieving higher levels of educational attainment (i.e. higher levels of employment and employment earnings) are clearly substantial, the potential benefits to other individuals and to the broader society are also substantial. The monetary benefits from addi-

Table 14.21: Cumulative Incremental Impacts of Improvements in Educational Attainment Among Registered Indian Youth and Young Adults, Canada, 2002–2026

Incremental Change (2002–2026)	Model 1—*Growth and Aging*	Returns to Education	
		Model 2—*Education Gap Reduced by One Half*	Model 3—*Education Gap Fully Closed*
Private or Personal Returns			
Employment (×1000)	110.6	29.3	49.4
Cumulative Employment Earnings (2001$ Millions)	46,104.8	15,193.1	27,091.3
Social Returns			
Cumulative Increase in Taxes on Employment Income (2001$ Millions)	6,415.3 (*9,197.4*)	1,896.7 (*3,113.7*)	3,419.7 (*5,529.1*)
Cumulative Transfer Income (2001$ Millions)	14,183.9	-1,244.4	-2,191.3
Cumulative Costs of Criminal Activity (2001$ Millions)	19,770.3	-7,011.7	-12,465.9

Note: Estimates of taxes on employment income are presented for the context where 25% of earnings on-reserve are taxable. Estimates for the context where 75% of earnings on-reserve are taxable appear in parentheses.

Source: Projections based on analysis of data from the 2001 Census, CCJS data for 1996 and 2001, Brantingham and Easton (1998), and Clatworthy (2007).

tional taxes on employment earnings, reductions in government income transfers, and reductions in the private and public costs of criminal activity that are expected to result from the scale of improvements in education explored in this study, range between about $10.2 and $20.2 billion for the 2002 to 2026 time period. About 70% of these additional benefits are expected to accrue to governments through increased tax revenue and reduced expenditure requirements.

The study's estimates of the scale of benefits associated with improvements in educational attainment among Registered Indian youth and young adults should be viewed as quite conservative, as only a limited range of potential impacts has been examined. Existing social and economic research, for example, suggests that substantial additional benefits may also result from higher levels of educational attainment, including reductions in health care expenditures (Holzer et al 2007) and reduced needs for a wide range of social support services, such as remedial education and child and family services (Heckman and Masterov 2007). Higher levels of educational attainment would also be expected to contribute to meeting Canada's future labour needs, enhancing labour productivity growth, and

increasing national and regional economic output (Centre for the Study of Living Standards 2007).

Although limited in scope, the study's findings clearly suggest that the potential benefits associated with increasing educational attainment among Registered Indian youth and young adults are likely to greatly exceed the costs. From a public policy perspective, there appears to be a very strong rationale for increasing levels of investment in the education of Canada's Registered Indian population. Perhaps the more pressing question (and one that was not addressed in this study) relates to what needs to be undertaken by the various stakeholders, including First Nations peoples and communities, the federal and provincial governments, educational institutions, and the private sector, to achieve higher levels of educational attainment among Registered Indians, and close the gap with other Canadians.

Endnotes

1 Non-personal and social outcomes can be viewed as those which accrue to individuals or groups of individuals other than those who acquire additional education. These outcomes can be either positive or negative. Some recent reviews of research concerning the non-personal and social outcomes of education are provided by Wolfe and Haveman (2001) and Riddell (2006).

2 Hull (2005), using data from the 1996 and 2001 Censuses of Canada, provides an extensive descriptive analysis of the statistical patterns involving educational attainment and personal outcomes related to employment and labour market behaviour for Registered Indians and other Aboriginal peoples in Canada. Many similar analyses have been conducted using data from earlier Censuses and special surveys. Research conducted by George and Kuhn (1994), using micro-level data from the 1991 Census, appears to represent the only rigorous attempt to measure the employment income returns to education among Canada's Aboriginal peoples. A more recent study, prepared by the Centre for the Study of Living Standards (2007), provides some estimates of the potential benefits to individuals (in terms of labour market outcomes) and society (in terms of labour productivity and economic growth) of hypothetical improvements in the educational attainment of Aboriginal peoples in Canada.

3 The baseline scenario also assumes that relationships between educational attainment and outcomes remain unchanged over the course of the projection period. In the case of projections involving employment outcomes, the baseline model assumes that the employment rates of the population also remain constant over time, given age, gender, educational attainment, location of residence, and region.

4 For this study, provincial estimates are used except for the Atlantic provinces (which are aggregated to form an Atlantic region) and for Yukon, Northwest Territories and Nunavut (which are aggregated to form a Northern region). The 2001 Census population estimates used for the projections were adjusted to account for the populations residing on non-enumerated Indian reserves and for the populations missed due to survey undercoverage.

5 The 1996 CCJS snapshot of inmates continues to represent the only comprehensive source of information concerning the characteristics of Aboriginal people held in custody in Canada. CCJS has been working with provincial justice authorities to revise current reporting systems to provide a more extensive range of personal information concerning individuals taken into custody (including Aboriginal status). At this point in time, detailed data concerning personal characteristics are not yet available for several provinces or regions.

6 Three main economic theories presently exist to account for the benefits of education to labour market outcomes. Human capital theory posits that higher education leads to additional skills and productive capabilities which increase the individual's value to employers and hence their earnings. Market signaling theory views education as having no effect on productivity, per se. From this perspective, the importance of education results from its effect on a prospective employer's perceptions of the individual's abilities and potential productivity (i.e. education is viewed by employers as a signal of a potential employee's abilities). Thus higher wages accrue to those who are better educated. Job match theory posits that additional education provides individuals with more information about their own abilities, aptitudes and interests, thus better equipping them to search out, acquire, and remain in jobs which they regard to be appropriate (i.e. better job-worker matches). Appropriate job-worker matches benefit both workers and employers, increase productivity, and translate into higher wages.

7 Census data can support much more detailed breakdowns of the population by educational attainment (for example, see Hull 2005). As the projection models developed for this study also differentiate the population on the basis of age, gender, location of residence, province or region, and one or more outcomes (e.g. employment status), more refined education categories cannot be accommodated due to the population size. As configured for this study, the educational attainment variable distinguishes the population according to specific educational achievements (e.g. attainment of a high school diploma or the attainment of a university degree) which have been shown in prior research to greatly affect labour market and other outcomes.

8 Hull's research also provides comparable data and analysis for other Aboriginal groups (including non-Registered Indians, Métis, and Inuit) and for the non-Aboriginal population.

9 While it is recognized that education is not restricted by age, Hull's (2005) data for Registered

Indians revealed that full–time school attendance rates declined quite sharply among young adults and were very low among individuals 40 or more years of age. Part-time attendance rates tended to peak among those in their mid to late 20's and declined gradually among older cohorts. Among those 40 or more years of age, overall attendance rates were in the range of about 5%.

10 Although the discussion focuses on the population with high school or higher levels of education, the assumed rates of improvement were calculated separately for those with high school or some post-secondary (without a university degree) and those with university degrees. Rates of improvements were also calculated separately for all five-year cohorts comprising the 15 to 39 years age group. The proportion of the population attaining university degrees is assumed to increase more rapidly than the proportion reporting high school graduation only or post-secondary education (without a university degree). This assumption is consistent with Hull's (2005) observations concerning changes in educational attainment levels between 1996 and 2001.

11 It is recognized that further improvements in educational attainment are also likely to occur among the non-Aboriginal population over the period. The study's reference to reducing the "education gap by one-half" should not be interpreted to mean that the future gap in educational attainment between Registered Indians and non-Aboriginals will necessarily be reduced by this or any amount. Equal or greater improvements in education could be achieved by the non-Aboriginal population during this time period.

12 The employment rate measures the proportion of the total population that is employed. Employment rates calculated from Census data reflect the population's employment status during the one-week period prior to enumeration.

13 Future employment growth on-reserve can, of course, be constrained by job growth. The extent of on-reserve employment growth forecast under Model 1 (about 70,000 over the twenty-five-year period) is not inconsistent with recent trends in the volume of employment growth reported by reserve residents. Based on adjusted data from the 1996 and 2001 Censuses, the number of individuals employed on-reserve increased (on average) by roughly 2,710 annually. Assuming annual growth continued at this level over the projection period, an additional 67,845 individuals would be employed on-reserve in 2026.

14 Census data concerning the size of the employed population (at the time of the Census) and the size of population reporting employment incomes in the year preceding the Census reveal the latter population to be considerably larger than the former. The ratio of those reporting employment incomes in 2000 to those employed at the time of the census was 1.46. In addition, those who reported unemployment (i.e. not working but seeking work) accounted for only about one-half of those who reported employment income in 2000, but were not working at the time of Census. This situation implies that many Registered Indians are employed on a seasonal or periodic basis. Given this situation, significant improvements in Registered Indian employment rates could conceivably result from improving access to more stable and permanent jobs.

15 The estimate of 65,000 is obtained by comparing the results of Model 4 with those of Model 2. Both of these models use identical assumptions concerning the extent of improvements in educational attainment. Unlike Model 4, Model 2 assumes no improvements in future employment rates.

16 The projected employment impacts associated with assumed improvements in Registered Indian employment rates display a similar pattern over province/regions as those associated with improvements in educational attainment. A majority (about 61%) of the projected incremental employment resulting from improved employment rates would accrue to Registered Indians in the Prairie region.

17 The employment rate improvements assumed in Models 4 and 5 could, of course, be achieved through net out-migration to off-reserve areas. The additional employment needed by Registered Indians to achieve employment rates comparable to those observed in 2001 for the non-Aboriginal population represents only 3 to 4% of recent levels of national employment growth.

18 Some caution should be exercised in interpreting the differences in average employment incomes observed for Registered Indians and non-Aboriginals. These differentials may result from a number of factors: including differences in wage levels, occupations, age, length of employment, employment status (i.e. full-time vs part-time), and location of residence (on- or off-reserve). Data for workers employed on a full-year, full-time (FYFT) basis provide a better basis for

measuring wage differentials. In 2000, employment income gaps between Registered Indian and non-Aboriginal FYFT workers were larger than the gaps measured for all workers, especially among males.

19 Census data for 2001 revealed that the total Registered Indian population reporting employment income in 2000 was 46% larger than the population employed at the time of the Census. The adjustment for the "non-employed" population was carried out using ratios of the total employment earnings of all those who reported employment income in 2000 to the total employment earnings of those who were employed at the time of the census. At the national level this ratio was 1.208 for the total population. These ratios, constructed for population sub-groups differentiated by level of educational attainment, age, gender, location of residence, and province or region, were applied to the earnings projected for the employed population to construct estimates of the employment earnings for the total population.

20 The Institute for Policy Analysis at the University of Toronto has recently forecast future average real wage rates to rise at about 1.43% annually. Assuming this rate of increase, total employment earnings estimates presented in this study for 2026 could be adjusted upwards by about 43% to account for real wage growth expected during the 2002 to 2026 time period.

21 Cumulative incremental employment earnings are estimated to total about $46.1 billion over the time period.

22 Taxation of additional employment income represents only one dimension of the taxation impacts of education improvements. Higher employment incomes are also likely to result in increases in other forms of government taxation including, excise taxes, provincial sales taxes and federal consumption taxes. Among higher income earners, when combined with income taxes, these other forms of taxation result in marginal tax rates that exceed 50%.

23 Readers should note that the use of marginal tax rates for this income group does introduce some error in the income taxation estimates. In Canada, marginal tax rates vary widely depending upon income and are substantially higher among those with higher incomes. Efforts to account for marginal tax rate differentials would require additional assumptions concerning the distribution of incremental employment incomes by income group. This type of analysis was not attempted for this study.

24 As the employment income estimates projected in this study do not account for future impacts in real wage growth, no adjustments have been made to reflect possible changes over time in marginal tax rate thresholds. Federal tax thresholds are adjusted annually to reflect a portion of observed inflation. Most provinces also adjust thresholds periodically.

25 Analysis of Census data concerning the distribution of employment earnings by place of work for reserve residents may provide a stronger basis for estimating the share of earnings subject to income taxation. Such data were not available to this study.

26 Significant levels of incremental income tax are projected for all provinces or regions. Tax impacts are projected to be most pronounced in Quebec, British Columbia, Ontario, and Manitoba.

27 That rates of receipt of transfer income did not vary dramatically by level of education is not surprising, as some government transfers are quasi-universal (e.g. Alberta energy rebates) or available to large segments of the population. Relatively few transfers are targeted on the basis of education (such as bursaries, scholarships, and other forms of student support). Many transfers are geared to income, such that the amount of the transfer declines and eventually reaches zero only among those with higher incomes.

28 The estimates of average transfer incomes from the Census relate to the year 2000. These estimates were adjusted upward (in this case by 1.5%) to reflect inflation adjustments. Although not all transfers are adjusted annually (or by the same amount) most are adjusted at least periodically to offset the eroding effects of inflation on purchasing power.

29 Several economic theories exist which attempt to account for the effects of improved education on criminal activity. These theories suggest that higher education produces higher wage rates thus increasing the opportunity cost of crime; raises the individual's time preference rate and the extent to which future costs are discounted; and increases the amount of productive time that individuals are engaged in through employment or pursuit of further education.

30 Lochner and Moretti (2004) estimate that the benefits of education to society through reductions in criminal activity are in the range of 20 to 25% of the benefits that accrue to individuals. They

further estimate that a 1% increase in the rate of high school graduation among Americans would reduce the costs of crime in the US by about $1.4 billion annually.

31 As discussed later in this section of the report, the incarceration rates developed for this study have been developed to reflect the average number of inmates in custody at any time during the reference year (in this case 2001).

32 Estimates based on data compiled by Brantingham and Easton yielded a ratio of total costs to custodial costs of about 8.87. Their estimates of the total costs of crime should be viewed as quite conservative, as they are based only on crimes reported to police. Data from periodic surveys, such as the General Social Survey, suggest that a large portion of some types of crimes (e.g. break and enters) are never reported. As such, the true ratio may be considerably higher than that estimated for this study.

33 Although rates of incarceration in Canada reveal declines over the 1996 to 2005 time period, there appears to be little by way of published analyses concerning the factors underlying these declines. Some portion of the decline appears to result from the much greater use of conditional sentencing, especially for first-time offenders and those committing "minor" offences. Population aging is also likely to have been a major factor in this decline, as incarceration rates are strongly patterned over age (being highest among youth and young adults). As such, declines in Canada's youth population over the period would have the effect of reducing the aggregate incarceration rate. More recent data for the 2006/07 period reveal a small increase in the aggregate incarceration rate for Canada.

34 The cost estimates of criminal activity prepared for this study reflect only the costs associated with crimes reported to police. As noted earlier, survey-based data suggests that a large proportion of crimes are not reported to police. As such, the cost estimates prepared for this study should be viewed as quite conservative.

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