CSLS

111 Sparks Street, Suite 500
Ottawa, Ontario K1P 5B5
613-233-8891, Fax 613-233-8250
csls@csls.ca

CENTRE FOR THE STUDY OF LIVING STANDARDS (CSLS)

THE LABOUR MARKET AND ECONOMIC PERFORMANCE OF CANADA'S FIRST NATIONS RESERVES: THE EFFECT OF EDUCATIONAL ATTAINMENT AND REMOTENESS

Andrew Sharpe and Simon Lapointe

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Abstract

The goal of this report is to investigate the relationship between educational attainment, remoteness, and labour market and economic performance at the reserve level for Aboriginal Canadians. The report uses reserve-level data on average earnings, GDP per capita, labour market indicators and distance to a service centre for 312 reserves. Using descriptive statistics, simple correlation and multiple regression analysis, the report draws conclusion on four important questions. First, the report finds that a higher level of educational attainment, on average, has a positive effect on the labour market performance of a reserve. Then, a positive link is found between educational attainment and economic performance (average earnings and GDP per capita). Also, the report finds evidence that remoteness of a reserve plays a role in its labour market and economic performance. Specifically, reserves situated near urban centres fare better than the ones in rural and remote areas and those not connected by road to a service centre. Finally, the report also analyses the role of governance on labour market and economic performance. It finds that better governance is correlated to better labour market, higher average earnings and higher GDP per capita.

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The Labour Market and Economic Performance of Canada's First Nations Reserves: The Effect of Educational Attainment and Remoteness

Executive Summary

The objective of this report is to provide information and economic analysis to Indian and Northern Affairs Canada (INAC) to help in the development of more effective policies to promote higher levels of educational attainment for Aboriginal Canadians. In order to achieve this objective, it is important to understand the nature and the magnitude of the relationship between educational attainment, remoteness of reserves, labour market indicators and economic outcomes of the Aboriginal population residing on Indian reserves. This study will seek to accomplish this by using reserve specific data to study the labour market and economic performance measures. In particular, the report answers the following questions:

1. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated, on average, with higher labour market participation and employment rate, as well as lower unemployment rate?

2. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated with greater average earnings for these individuals and greater GDP per capita for these reserves?

3. How does the remoteness of a reserve affect the relationship between educational attainment and labour market and economic outcomes on reserves?

4. How does the quality of reserve governance affect the economic and labour market performance of the reserve?

To provide answers, three analytical methods are used: descriptive statistics accompanied by charts, simple correlation analysis, and multiple regression analysis. The data are from the 2006 Census Aboriginal Population Profiles, by reserve. A total of 312 reserves had data available for every variable in this analysis. Data for remoteness are from INAC, in three categories: reserves near urban centres, rural and remote reserves (but connected to a service centre by road all year long) and special access reserves that are not connected by road to a service centre.

Descriptive Statistics

The statistics show that reserves located near urban centres fare on average better on labour market indicators and economic outcomes. These reserves have a higher participation rate and employment rate, as well as a lower unemployment rate. Educational attainment is also higher on those reserves. In particular, 49.7 per cent of the population aged 15 and over on reserves situated near urban centres has a certificate, diploma or degree, compared to 38.9 per cent of the population on rural and remote reserves and only 23.3 per cent on special access reserves.

The report also found that compared to the national average, reserves fared poorly on all the indicators. For example, only two reserves had unemployment rates lower than the national average of 6.6 per cent in 2006. The highest unemployment rate was 66.7 per cent, ten times the national average. The situation was not as dramatic when considering the participation and employment rates, but also for these two indicators, the vast majority of the reserves were under the national averages.

All reserves were found to have average earnings and GDP per capita under the national average. The lowest GDP per capita for a reserve was $2,047, or twenty times lower than the national average. The low GDP per capita estimates are not surprising, given the low average earnings and employment rates.

Unfortunately, the same observations can be made about educational attainment. Indeed, almost all reserves have a lower percentage of their populations that have a diploma, certificate or degree compared to the overall Canadian population. While 76.2 per cent of Canadians aged 15 and over have a diploma, certificate or degree, some reserves have less than 10 per cent of their population with some sort of completed education. Only one reserve had higher than average educational attainment, with 76.9 per cent of the population having a diploma, certificate or degree.

Correlation Analysis

The second step of the analysis was to calculate and evaluate the correlation coefficient between different sets of labour market, education and remoteness variables. These simple correlation coefficients do not account for the effect of other variables on the relationship, and should therefore be interpreted with caution. However, they provide some general idea of the relation between two variables.

There was a positive relationship between educational attainment and economic outcomes. This relationship is widely documented in the economics literature, and is confirmed in this data set. The correlation coefficient between the percentage of the population with a diploma, certificate or degree, and average earnings is 0.30, while it is 0.48 with GDP per capita. The report also found a positive relationship between educational attainment and the employment rate (0.57), and the participation rate (0.58). The correlation coefficient was negative between education and the unemployment rate (-0.23).

The remoteness of the reserve was negatively correlated to economic outcomes, labour market indicators and educational attainment. The relationship was stronger for education. The correlation coefficient was -0.56 between the percentage of population with a certificate, diploma or degree, and the remoteness index. The relation was weaker with the participation rate (-0.21), employment rate (-0.19) and unemployment rate (0.04). The association with the average earnings (-0.09) and GDP per capita (-0.13) was also quite weak.

Multiple Regression Analysis

The report used the reserve-level data to estimate regression models. The advantage of this methodology is the *ceteris paribus* interpretation of the coefficients estimated. Indeed, the regression coefficients can be interpreted as the effect of a specific independent variable on the dependent variable, when holding the effect of all other independent variables constant. Two rounds of regressions were estimated: the first, with the full sample, and the second with a smaller sub-sample, but including data on governance.

In the first set of models, five dependent variables were used: participation rate, employment rate, unemployment rate, average earnings and GDP per capita. The independent variables varied depending on the specific model estimated, but included the percentage of the population with high school diploma as their highest educational attainment, the percentage of population with a university diploma, certificate or degree, three indicator (dummy) variables for Remoteness Index values 2 and 3 (reserves located near urban centres were considered as the base case), and nine provincial indicator variables (Alberta was considered as the base case). Regressions were estimated with and without the provincial variables. It was found that the provincial variables were relevant and should be included.

The two educational variables had significant effects on all the dependent variables used. In particular, increasing the percentage of population with high school only by one point would increase the participation rate by 0.55 percentage points. University education has a similar effect on the participation rate (0.57 points). The results on the employment rate showed a stronger relationship. Indeed, an increase of one point in the percentage of the population with a university certificate, diploma or degree would translate into a 0.91 points increase in the employment rate. The result for high school education was almost the same as with the participation rate (0.53 points). It was also found that education had a negative effect on the unemployment rate, which was expected. An increase of one point in the percentage of the population with completed university education would decrease the unemployment rate by 0.94 points. For high school education only, the effect is weaker, at 0.22 points.

These estimates may seem small, but considering the low starting point of most Aboriginal reserves in terms of educational attainment, the small increases could translate into large gains for the reserve population. On average, 2.9 per cent of the reserve population aged 15 and over had a completed university education in 2006, compared to 18.1 per cent of the overall Canadian population aged 15 and over. If the reserve population would reach the current average level of university education of Canadians, it would translate into a 13.8 points increase in the employment rate, a 8.7 points increase in the participation rate and a 14.3 points decrease in the unemployment rate. Obviously, the numbers provided in this analysis are only indicative, but it shows the importance for Aboriginal Canadians to increase their educational attainment.

Educational attainment was also found to have a significantly positive effect on average earnings and GDP per capita. Again, the effect was larger for university education than for high school education only. In particular, an increase of one point in the percentage with completed university education would increase average earnings on the reserve by $383 per year, while a similar increase in the percentage with high school only would increase average earnings by $126. If the on-reserve Aboriginal population would reach the university attainment level of the average Canadian, the effect on average earnings on reserve would be an increase of $5,821. The effect on GDP per capita was found to be larger than for average earnings. The estimated coefficient for university education was $566, while it was $216 for high school education. The potential growth resulting from closing the gap in university education for the Aboriginal population alone represents $8,610 in GDP per capita on reserves.

The results on remoteness were not as strong. Only two of the estimated coefficients were statistically significant, out of the ten total coefficients estimated. In the regression with employment rate as the dependent variable, the indicator variable for rural and remote reserves had a significant and negative coefficient. However, the effect is somewhat small at -2.24. This implies that the impact on the employment rate of being a rural or remote reserve (connected to a service centre by road) is, holding all other variables constant, an employment rate 2.24 points lower than reserves near an urban centre. In this

regression, the coefficient on the other remoteness variable (special access reserves) was not statistically significant. For the model with unemployment as the dependent variable, the impact of being remote or rural on unemployment was positive (2.26) as expected.

The coefficients of the remoteness variables in the models with participation rate, average earnings and GDP per capita regressions were found to be statistically insignificant. Therefore, no conclusions can be drawn on the effect of remoteness on these two indicators. It is important to note that these results do not necessarily indicate that remoteness has no effect on labour market and economic performance. The conclusion is that either there is no remoteness effect, or that there is, but that the statistical tests used in this report were not powerful enough to detect it.

The report also estimated additional models using a governance variable based on research done by the Frontier Centre for Public Policy. This governance index was available for 46 of the 312 reserves, in the provinces of Alberta, Saskatchewan and Manitoba. Governance was found to have a positive and statistically significant effect on the two economic outcome variables and the three labour market indicators (at the 5 and 10 per cent level of significance, depending on the variable). An increase of one point on the governance index would translate into a $188 increase in GDP per capita and a $122 increase in average earnings on reserves. The effect on the employment rate would be 0.54 points, while the coefficient on governance for the participation rate was 0.49 and -0.26 for the unemployment rate.

To summarize, the report found that educational attainment had strong effects on the two economic performance variables and the three labour market indicators. The economic and labour market outcomes of reserves differed by remoteness index, but it was impossible to draw strong statistical conclusions for this variable on all dependent variables. Finally, governance was found to have a significant effect on all five variables.

Further research would be necessary to investigate the relationship between the remoteness of a reserve and its economic performance. To do so, better data would be needed at the reserve level for all variables. In particular, the data could be expanded to include a greater number of reserves. Also, data on place of work and mobility should be included. Furthermore, the Governance Index, or a similar index, should be expanded to reserves out of the Prairies provinces.

The Labour Market and Economic Performance of Canada's First Nations Reserves: The Effect of Educational Attainment and Remoteness

I. Introduction[1]

The objective of this report is to provide information and economic analysis to Indian and Northern Affairs Canada (INAC) to help in the development of more effective policies to promote higher levels of educational attainment for Aboriginal Canadians. In order to achieve this objective, it is important to understand the nature and the magnitude of the relationship between remoteness of reserves, educational attainment, labour market indicators and economic outcomes of the Aboriginal population residing on Indian reserves. This study will seek to accomplish this by using reserve specific data to study the labour market and economic performance measures.

Building on earlier work from the CSLS on Aboriginal education and labour market and economic performance (Sharpe and Tsiroulnitchenko, 2010; Sharpe et al. 2010; Sharpe, Arsenault and Lapointe, 2007), the report will address the following questions:

1. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated, on average, with higher labour market participation and employment rate, as well as lower unemployment rate?

2. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated with greater average earnings for these individuals and greater GDP per capita for these reserves?

3. How does the remoteness of a reserve affect the relationship between educational attainment and labour market and economic outcomes on reserves?

4. How does the quality of reserve governance affect the economic and labour market performance of the reserve?

There may be a reduced incentive to complete secondary and post-secondary education for the Aboriginal population residing on reserves, especially if these individuals plan to remain on reserves, given the limited employment opportunities many or most reserves offer. This incentive could be directly related to the remoteness of the reserve. In addition, a number of barriers may impede the completion of secondary and post-secondary educational program on reserves. These barriers include: poor quality on-reserve educational facilities (reflecting both inadequate funding and poor governance structures); long distances to post-secondary educational institutions; inadequate financing for post-secondary education; low parental and community expectations related to the educational attainment of children; and limited parental resources to foster a home environment conducive to educational success.

The report is organized as follows: the next section provides a brief background on the relationship between educational attainment and labour market indicators and economic outcomes. Section 3 discusses the data sources that are used in the analysis. Section 4 discusses descriptive statistics on the reserve-level data. Section 5 provides a discussion on the degrees of correlation between educational attainment with labour market performance, economic outcomes and the remoteness of a reserve. Section 6 will discuss the results from the multiple regression analysis. Section 7 summarizes and concludes.

II. Background

Economic development has been typically tracked using measures of economic growth, primarily GDP. This report views economic development as an improvement in the capacity of a community to achieve and sustain, without the need for permanent external support, an adequate standard of living for all its constituents (Sharpe and Tsiroulnitchenko, 2010).[2] The concept of economic development and economic growth are clearly related. Economic growth is determined by expansion in the size of the labour force and labour productivity growth. Human capital plays a well-known fundamental role in sustaining the economic growth and, more broadly, achieving long-term economic development.

Two relationships will be analyzed in this report. The first one, between educational attainment and economic performance, has been the subject of many studies in the past. The second is less studied, namely the relationship between the remoteness of communities and economic and labour market outcomes. This section will provide some background information on both relationships, to put the report in context.

The Link between Educational Attainment and Economic Performance

As modern economies rely ever more heavily on information, human capital – the stock of knowledge, skills, and abilities embodied in individual workers – is becoming an increasingly important factor of production. Human capital comprises both innate abilities and the skills acquired through education and experience. Since education can be actively cultivated (particularly through government policy intervention), it has received considerable attention from researchers.

Human capital is not directly measurable, so one must use proxies to quantify it. The most common proxies for human capital are measures of educational attainment. Such measures include the highest degree obtained and the number of years of schooling. It is assumed that the more formal education a person experiences, the more human capital he or she will accumulate. In this report, the analysis will use highest levels of education obtained (high school, college and trades, university).

According to human capital theory, schooling raises labour earnings because it enhances skills, thus making workers more productive and more valuable to employers. However, it is possible that the observed correlation between earnings and education, after controlling for other measurable influences on earnings, reflects the contribution of unobserved influences like innate ability, perseverance, and ambition, rather than a causal impact of education on earnings. These arguments are often used in the signaling theory.

A large number of studies based on natural experiments have recently been carried out, using data on sources of variation in education such as those arising from compulsory schooling laws. These studies provide strong evidence that policy interventions that raised the educational attainment of certain groups

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[2] The merit of economic development rests with the associated rise in the well-being of the corresponding community. Well-being of communities is a multidimensional concept that can be approximated by a composite indicator. The Human Development Index (HDI) provides a single measure of well-being based on the following three indicators: (i) life expectancy at birth; (ii) the proportion of a given population with completion of grade 9 or higher and completion of high school or higher; and (iii) the total average income of a given population (Cooke and Beavon, 2007). The Community Well-being Index (CWB) measures well-being at the community level. The CWB combines educational attainment, income, housing conditions, and labour force activity from the Census of Canada into a single score of well-being for individual communities (O'Sullivan and McHardy, 2007).

many years ago had large beneficial effects on the subsequent lifetime earnings of these individuals. This body of research suggests that rates of return to investments in education are high and, in particular, that the return to incremental investments in education among disadvantaged groups may exceed the average return in the overall population.

In addition to a direct effect on individual earnings, education provides additional returns in the form of:

- knowledge spillovers for the rest of the community (i.e. learning from others);
- non-market external benefits such as reduced criminal activity;
- improved health; and
- Intergenerational effects such as those on child development, health and education which are associated with the educational attainment of parents.

This report aims to build on previous research by analyzing the robustness of this relationship at the reserve level. There may be a reduced incentive to complete secondary and post-secondary education for the Aboriginal population residing on reserves, especially if these individuals plan to remain on reserves, given the limited employment opportunities many or most reserves offer. In addition, a number of barriers may impede the completion of secondary and post-secondary educational programs on reserves. These barriers include: poor quality on-reserve educational facilities (reflecting both inadequate infrastructure and personnel funding, and poor governance structures); long distances to post-secondary educational institutions; inadequate financing for post-secondary education; low parental and community expectations related to the educational attainment of children; and limited parental resources to foster a home environment conducive to educational success.

The Effect of Remoteness on Educational Attainment

Remoteness of reserves certainly exacerbates some of these barriers. First, reserves that are in the most remote locations suffer from longer distances to post-secondary educational institutions. It is worst for reserves that are not connected to urban centres by road. In these cases, the costs to move to the cities, as well as returning back to the reserve after, or during the study period are greater, as students must use a plane.

The remoteness of reserves could also affect the quality of the educational facilities. It is more difficult to recruit well-qualified teachers to work on a reserve hundreds of kilometers away from a city, or simply unconnected from the urban centres of the province.

If the barriers to education are greater for remote reserves, it is expected that less people will pursue further education. In addition, those that choose to pursue post-secondary education may not return to the reserve, resulting in the emptying of reserves from their most educated members. This would also contribute to the low community expectations towards education.

Richards and Scott (2009) highlights additional barriers to education for Aboriginal people. They also discuss in greater details the effects of school quality, family socio-economic conditions (in turn affecting family expectations), government funding and cultural factors. One additional barrier discussed by Richards and Scott (2009) is family mobility. Aboriginal families are often more mobile (intra-provincially) than other families: they will move from city to rural areas relatively often, changing their children's school every time. It could be argued that more remote reserves suffer less from this problem.

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Richards and Scott (2009) also discuss financial incentives as a barrier to education. It has been suggested that Aboriginal people on reserve, not having access to a strong labour market, are faced with easier access and relaxed regulations for social assistance (Richards, 2009).[3] This could be discouraging students on reserves from attending school, as their outside option is more attractive. In other words, if Aboriginal students do not expect to find suitable employment following their graduation from school, they may choose to drop out and apply for social assistance. This theory is strengthened by the observation that social assistance dependence is greater among on-reserve Aboriginal people than in the Canadian population at large (Richards and Scott, 2009). Because weak labour markets characterize remote reserves, it could be expected that this dynamic be stronger as reserves are farther from the employment opportunities offered by urban centres.

A recent report by the Frontier Centre for Public Policy (Quesnel, 2010) argues that remoteness of reserves makes it difficult for some of them to sustain economic development and growth. It argues that geographical isolation is one of the source of the problems on reserves, since it not only creates severe limits to job creation, but it also increases the cost of living compared to other reserves that are closer to the urban centres.

Overall, to summarize, the remoteness of reserves has a double effect on economic performance. First, it creates a barrier for higher educational attainment. Because they live far from urban centres, young Aboriginal students need to move far from their families to attend college or university. This creates an additional cost of higher education for Aboriginal students. Also, the distance may make it more difficult to hire a high quality teaching personnel, potentially reducing the quality of the teaching done on reserve.

The second effect of remoteness comes from the limited employment opportunities. Employment on reserves is often limited to low-skill jobs in local stores, restaurants or other services. Residents of reserves closer to urban centres can obtain employment in the town, in which a greater quantity of jobs will be available.

It is easy to see that both effects reinforce each other. Young Aboriginal students on reserves have low incentives to complete school, especially university, due to the lack of employment opportunities on the local labour market. However, those that do complete higher education would often choose to move in cities to find suitable work, thereby emptying the reserves from their most skilled workers. This is documented in previous research, which indicates that highly educated workers, at least in industrialized countries such as Canada, tend to be more mobile (Globerman and Shapiro, 2008). Migration of skilled Aboriginal workers is expected to be more prevalent as the remoteness of the reserve of residence increases. Therefore, the reserves attain the critical mass of skilled workers needed for a robust labour market, further reducing the incentive to complete higher education for young Aboriginals on reserves (Richards and Scott, 2009).

Remoteness may also directly affect economic performance and well-being. White and Maxim (2007) analyze this question, using the Community Well-Being Index. By matching reserves with non-reserve remote communities, they find that well-being decreases as isolation increases. Waslander and Reza (2008) also discuss these issues.

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[3] Indeed, regulations governing the access to social welfare depend on the characteristics of the region. Regions with a weak labour market have relaxed regulations.

The Effect of Governance

Another variable that could have a great effect on the level of economic development of the reserves is governance. Helin (2006) argues that younger Aboriginal generations are growing skeptic of their local governments, in which "Chiefs play a political game for the sole purpose of keeping the gravy train of benefits and perks flowing to their families and supporters (Helin, 2006:151)." Furthermore, the recent incidents at the First Nations University showed that governance in Aboriginal institutions needs reforms. After accusations of mismanagement from a senior employee, the First Nations University saw its funding cut by the federal government. An internal report now recommends granting more independence to the University from its governing body. This recommendation was further supported by Saskatchewan Chief Guy Lonechild, who thinks it was "consistent with our belief that removing politics as much as possible from the institution is what we want. And it could be a model for other institutions – not having leaders serve on the Board of Governors (Globe and Mail, March 8, 2010, A4)."

Good governance is seen as a major determinant of economic development by researchers and international organizations alike. For example, the World Bank views "good governance and anti-corruption as important to its poverty alleviation mission."[4] Moreover, the World Bank Institute group on governance defines this concept as "the traditions and institutions by which authority in a country is exercised for the common good. This includes (i) the process by which those in authority are selected, monitored and replaced, (ii) the capacity of the government to effectively manage its resources and implement sound policies, and (iii) the respect of citizens and the state for the institutions that govern economic and social interactions among them."[5] Furthermore, the OECD defines good governance as governance characterized by "participation, transparency, accountability, rule of law, effectiveness, equity, etc."[6]

More closely related to Aboriginal people is the Harvard project on American Indian Economic Development, founded in 1987. One of the major finding of their research is that "institutions matter" for economic development. According to this research group, First Nations can achieve good governance by "adopt[ing] stable decision rules, establish[ing] fair and independent mechanisms for dispute resolution, and separat[ing] politics from day-to-day business and program management."[7] The Harvard project has generated a vast literature since its founding. An example is a paper by Cornell and Kalt (1998), which explores the reasons why successful reserves in the United States are not necessarily the ones with highest educational attainment or access to financial capital. According to them, "economic development on reservations is first and foremost a political problem." (Cornell and Kalt, 1998) To support this conclusion, the authors propose a "nation-building" model of economic development, incorporating many elements of good governance such as stable institutions and policies, and the separation of politics from day-to-day business decisions.

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[4] Word Bank Institute on Governance and Anti-Corruption, http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html. Accessed May 16, 2010.
[5] "What is our approach to governance?", World Bank Institute on Governance. http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,,contentMDK:20678937~pagePK:64168445~piPK:64168309~theSitePK:1740530,00.html. Accessed May 16, 2010.
[6] "Good Governance", OECD Glossary. http://stats.oecd.org/glossary/detail.asp?ID=7237. Accessed May 16, 2010
[7] "Overview of the Harvard Project", Harvard Project on American Indian Economic Development. http://www.hks.harvard.edu/hpaied/overview.htm. Accessed May 16, 2010

In Canada, the Institute on Governance (IOG) published many research reports on Aboriginal governance. For example, Graham (2010) provides a list of eleven elements of the current Aboriginal governance system that impedes on economic development. The list includes the collective land holding system, the small size of many communities, varying levels of human rights and the dependence of communities on transfers from the federal government. Other reports (Graham and Bruhn, 2008 and 2009) explore the link between taxation (or the lack thereof) and good governance. There is a growing international literature on the connections between taxation and quality of governance in developing countries (Moore, 2007). The argument in Graham and Bruhn (2009) is that the lack of taxation on Indian reserves explains in part why some of these communities suffer from less than optimal governance structures. The IOG also published many reports that address specific modes of governance (for example, Graham (2007) and Bruhn (2009)).

On a more pessimistic note, Graham and Levesque (2010) surveys the international literature on governance reform, and conclude that such reforms rarely increase the quality of governance. The authors thus propose to look at reforms that not only address symptoms of bad governance, but also deeper causal factors. While this paper does not bring specific solutions to the governance problem, it does highlight the important fact that bringing good governance to Aboriginal communities is a complicated task that needs to take into account the background of specific communities.

III. Data Sources

The study uses Aboriginal Population Profiles based on the 2006 Census cross sectional, reserve-level data associated with the Aboriginal identity population[8] aged 15 years and older residing on 312 Indian reserves and Indian Settlements in Canada.[9] Unless otherwise stated, all descriptive statistics and inferences made in this report are for the Aboriginal residents of these reserves aged 15 and older. These 312 reserves were selected based on the availability of data for the indicators used in the report. This sample of Indian reserves and Indian Settlements represents 78.2 per cent of the total Aboriginal population residing on reserves in Canada in 2006 (241,325 out of 308,490 individuals) (Statistics Canada, 2006). Details concerning the shares of this sample that correspond to specific provinces and territories are provided in Table 1. Saskatchewan has the most reserves in the sample, followed by Ontario, Manitoba and British Columbia.

Table 1: Number of Reserves in the Sample and the Sample Size in terms of the Relevant Population in 2006

Province/ Territory	Number of Reserves that meet the data requirements	Aboriginal population residing on reserves in 2006 that meet the data requirements	Total Aboriginal population residing on reserves in 2006	Sample size (in population counts) as a percentage of the total Aboriginal population residing on reserves in 2006 (Per Cent)
NFL	2	1,435	1,435	100.0
PEI	0	0	400	0.0
NS	9	7,415	7,980	92.9
NB	8	5,955	7,005	85.0
QC	26	31,895	33,810	94.3
ON	59	35,485	47,515	74.7
MB	53	52,350	56,765	92.2
SK	65	42,120	49,015	85.9
AB	38	36,890	41,275	89.4
BC	44	23,240	51,055	45.5
YK	0	0	1,970	0.0
NWT	8	4,540	10,260	44.2
NU	0	0	n/a	n/a
CAN	312	241,325	308,490	78.2

Sources: Columns 1-2: Statistics Canada, 2006 Aboriginal Population Profiles.
Column 3: 2006 Census topic-based tabulations Cat. No. 97-558-X2006006.

Any investigation of the relationship between changes in the average level of education attainment associated with the on-reserve Aboriginal population and economic growth for reserves requires a measure of economic activity or production. For this purpose, a proxy has been used in the form of the 2005 estimates of Gross Domestic Product (GDP) per capita based on average annual

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[8] The data from the Aboriginal Population Profiles include First Nations, Metis and Inuit individuals. However, since the report is focusing on reserves, the vast majority of the population included in this report is of North American Indian (First Nations) identity.

[9] There are almost 3,000 reserves in total in Canada. However, full data was only available for 312 of them. Of the rest, some had no population, some declined to participate in the Census, while some were too small to be included in the dataset. Indeed, Statistics Canada does not disclose detailed information for reserves with population under 250. Of the reserves that are not enumerated, in the Census, the majority is located near urban centres. There are also reasons to suspect that the population on these reserves is more educated than the majority of the First Nations population.

earnings of the reserve. Average earnings are also used in the analysis. Details concerning the methodology used to obtain estimates of reserve-specific GDP per capita are provided in Appendix 1.

To assess the existing trends in the labour market on these reserves, three indicators have been used: labour force participation rate, the employment rate and the unemployment rate. All three are based on data collected from responses in the 2006 Census Reference week.

Data on earnings were also retrieved from the Aboriginal Population Profiles. The report uses average earnings by reserve in 2005, which corresponds to the average of employment income for persons aged over 15 years old that worked in 2005.

In addition, reserve-specific remoteness categories have been used to ascertain the effect that the remoteness of a reserve has on the relationship between education attainment and labour market and economic outcomes for the on-reserve Aboriginal population. Specifically, the analysis uses the remoteness classification developed and assigned to Indian bands by Indian and Northern Affairs Canada (INAC). This remoteness classification is comprised of four geographic zones. These are defined as follows:

- Zone 1 (Urban): Indicates a geographic zone where the First Nation is located within 50 km of the nearest service centre with year-round road access.
- Zone 2 (Rural): Indicates a geographic zone where the First Nation is located between 50 and 350 km from the nearest service centre with year-round road access.
- Zone 3 (Remote): Indicates a geographic zone where the First Nation is located over 350 km from the nearest service centre with year-round road access.
- Zone 4 (Special Access): Indicates a geographic zone where the First Nation has no year-round road access to a service centre and, as a result, experiences a higher cost of transportation (INAC, 2008).[10]

Due to a very small number of reserves in Zone 3 (only 10), this report has grouped Zone 2 and Zone 3 together for the analysis.[11] The following categories have been used:

- Remoteness Index 1: Corresponds to Zone 1 of the INAC classification.
- Remoteness Index 2: Corresponds to Zone 2 and Zone 3 of the INAC classification.
- Remoteness Index 3: Corresponds to Zone 4 of the INAC classification.

The key characteristic of Remoteness Index 2 is therefore that there is year-round access to a service centre, whereas reserves with Remoteness Index 3 are not connected to a service centre all year long.

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[10] Under this classification, Zone 4 is further divided into 6 sub-zones that indicate the distance from a service centre (Indian and Northern Affairs Canada, 2008).

[11] Appendix 2 shows the detailed descriptive statistics for the four INAC zones. Interestingly, reserves in Zone 3 have better outcomes on several labour market indicators. The reason for this finding is not clear, but the authors suspect a selection effect. Indeed, while these reserves are situated far away from urban centres (similarly to reserves in Zone 4), governments have built roads to access them. The reason for this must be proximity of these reserves to important resources or other points of interests. For example, four out of the ten reserves in that zone are Cree reserves located near the large hydro-electric dams in Quebec. These resources probably provide employment to the Aboriginal communities nearby.

Table 2: Distribution of the Reserves by Provinces and Remoteness Index

	Remoteness Index 1	Remoteness Index 2	Remoteness Index 3	Total
Alberta	16	20	2	38
British Columbia	25	14	5	44
Manitoba	3	34	16	53
New Brunswick	5	3	0	8
Newfoundland	0	1	1	2
Nova Scotia	4	5	0	9
Northwest Territories	0	3	5	8
Ontario	18	21	20	59
Quebec	10	11	5	26
Saskatchewan	10	52	3	65
Canada	91	164	57	312

Table 2 shows the distribution of the reserves in this sample by the remoteness index and by province. The highest number of reserves of Remoteness Index 1 are in British Columbia (25) followed by Ontario (18) and Alberta (16). For Remoteness Index 2, most of the reserves are in Saskatchewan (52) followed by Manitoba (34) and Ontario (21). For Remoteness Index 3, Ontario (20) and Manitoba (16) have the most reserves. Note that the vast majority of special access reserves are in Manitoba and Ontario.

Finally, the report will also use data on the quality of governance on the reserves. The Frontier Centre for Public Policy estimates a Governance Index annually (FCPP, 2009). They have published a report in the past three years in which they rate reserves in Manitoba, Saskatchewan, and Alberta in 5 categories: elections, administration, human rights, transparency, and economy. The analysis is done by a survey that asks respondents who live on the reserves to rate the reserve's administration in each of the 5 categories. Visits have been made to 68 First Nations,[12] resulting in a sample size of 5,106 Aboriginal Canadians living on reserves. A short questionnaire was given to 4,635, while 471 individuals received the longer questionnaire. The list of questions for both forms is given in Appendix 5.

A score out of 100 is calculated for each category on each reserve, and each reserve is given an overall score which was a weighted average of the 5 scores. For this total score elections, human rights, and transparency were each given a weight of 22 per cent of the total score and administration and economy were each given a weight of 17 per cent. For the purpose of this report, only the overall score was used. A total of 46 reserves had earnings and education data, as well as a governance index from this source. The scores vary between 45.9 and 73.2, with an average of 60.0. It is important to note that reserves that are at the low end of the spectrum on this Index are not necessarily the worst reserves in terms of governance. Indeed, many reserves refused to participate and it could be suspected that governance is worse in these other reserves.

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[12] There was an initial selection of 97 First nations. However, surveyors have been unable to access many of these reserves either due to the refusal of the bands' administration or due to lack of accommodation on the reserve. Also, some reserves did not provide the answers in time for the publication of the Index. Finally, reserves with less than 20 responses were excluded from the survey.

IV. A Portrait of Canadian Indian Reserves

The socio-economic conditions of Aboriginal Canadians living on reserves are generally worst than the rest of the Canadian population. They suffer from higher unemployment, lower income, as well as lower educational attainment as documented by Sharpe, Arsenault and Lapointe (2007) and Sharpe et al. (2009). This section will provide an overview of the socio-economic conditions prevailing on reserves categorized by Remoteness Index, and will use the indicators discussed in the previous section to compare reserves with the national averages.

Labour Market, Education and Economic Indicators of Aboriginal and Non-Aboriginal Population

Outcomes related to labour market, economic and educational indicators for the Aboriginal population are worse than the Non-Aboriginal population of Canada. Previous research have highlighted these findings (Sharpe et al., 2008; Hull, 2005) This section of the report will compare the situation of Aboriginal Canadians to that of Non-Aboriginals, and the situation on reserves to that off reserves. In 2006, compared to the Non-Aboriginal population, the Aboriginal population has a lower participation rate (63 per cent vs. 66.9 per cent), a lower employment rate (53.7 per cent vs. 62.7) and a considerably higher unemployment rate (14.8 per cent vs. 6.3 per cent). The averages earnings (in 2005) are significantly lower ($26,154) and all the educational indicators (in 2006) are lower than the Non-Aboriginal population of Canada (56.3 per cent vs. 76.9 per cent for the completion of a certificate, degree or diploma at the secondary level or higher, 21.8 per cent vs. 25.6 per cent for high school education and 5.9 per cent vs. 18.5 per cent for university education).

The focus of this paper is on the Aboriginal population living on reserves, a great majority of which belong to the First Nations population. As seen from the Table 3, the First Nation population on-reserve fares worse on all the economic, labour market and educational indicators when compared to the First Nations population living off reserves.

It must be noted that this report will focus on the total Aboriginal population living on reserves. Differentiation will not be made between the First Nations population and total Aboriginal population, as virtually all the Aboriginal population living on reserves are North American Indians.

Table 3: Economic, Educational and Labour Market indicators of the Aboriginal and Non-Aboriginal Population of Canada.

	Total Aboriginal Population	First Nation Population		Inuit	Métis	Non-Aboriginal Population
		On-reserve	Off-reserve			
Participation rate in 2006	63.0	52.0	63.8	61.3	70.1	66.9
Employment rate in 2006	53.7	39.0	55.0	48.9	63.1	62.7
Unemployment rate in 2006	14.8	24.0	9.3	20.3	10.0	6.3
Average Annual Earnings in 2005 (2005 dollars)	26,154	19,236	26,187	26,486	26,861	36,616
Percentage of the population 15 and over with a certificate, degree or diploma in 2006	56.3	40.2	59.9	39.3	65.4	76.9
Percentage of the population 15 and over with a high school as the highest level of education, 2006	21.8	14.8	23.7	13.5	25.6	25.7
Percentage of the population 15 and over with a university certificate or degree in 2006	5.8	3.0	6.8	2.7	7.0	18.5

Sources: Statistics Canada, 2006 Aboriginal Population Profiles.
Census topic-based tabulations Cat. No. 97-558-X2006006.
Note: Average Earnings for Off-reserve First Nation Population is calculated using a weighted average of Urban and Rural areas. Weights are based on the number of employed persons.

Labour Market Indicators on Reserves

As highlighted in the literature (Sharpe, Arsenault and Lapointe, 2007), the participation rate of Aboriginal Canadians is lower than among the overall Canadian population, especially on reserves. Chart 1 illustrates, through a histogram, the distribution of reserves by participation rate. One can immediately note that the rate is lower than the Canadian average of 66.8 per cent for the vast majority of reserves. In 2006, the lowest participation rate on a reserve was 17.3 per cent, while the highest rate was 79.3 per cent (Table 4).

Table 4: Means, Medians and Ranges for Levels of Education Attainment, Labour Market Indicators, GDP per capita, and Remoteness, 312 Selected Reserves, 2005/2006

	Mean	Median	Standard Deviation	Minimum	Maximum
Participation rate in 2006	51.5	52.6	136.1	17.3	79.3
Employment rate in 2006	38.7	37.5	125.7	14.3	71.9
Unemployment rate in 2006	25.5	25.0	97.8	0.0	66.7
Average Annual Earnings in 2005 (2005 dollars)	18,482	18,035	4002	9,353	35,956
GDP per capita (2005 dollars)	13,832	12,674	5,931	2,047	36,499
Percentage of the population with at least a high school certificate in 2006	39.1	38.2	243.4	2.2	76.9
Percentage of the population with a high school certificate or equivalent in 2006	14.5	14.0	33.2	3.0	31.6
Percentage of the population with a university certificate or degree in 2006	2.9	2.8	5.8	0.0	14.3

Source: Statistics Canada, 2006 Aboriginal Population Profiles

Chart 1: Histogram of Participation Rate by Reserve, Canada, 2006
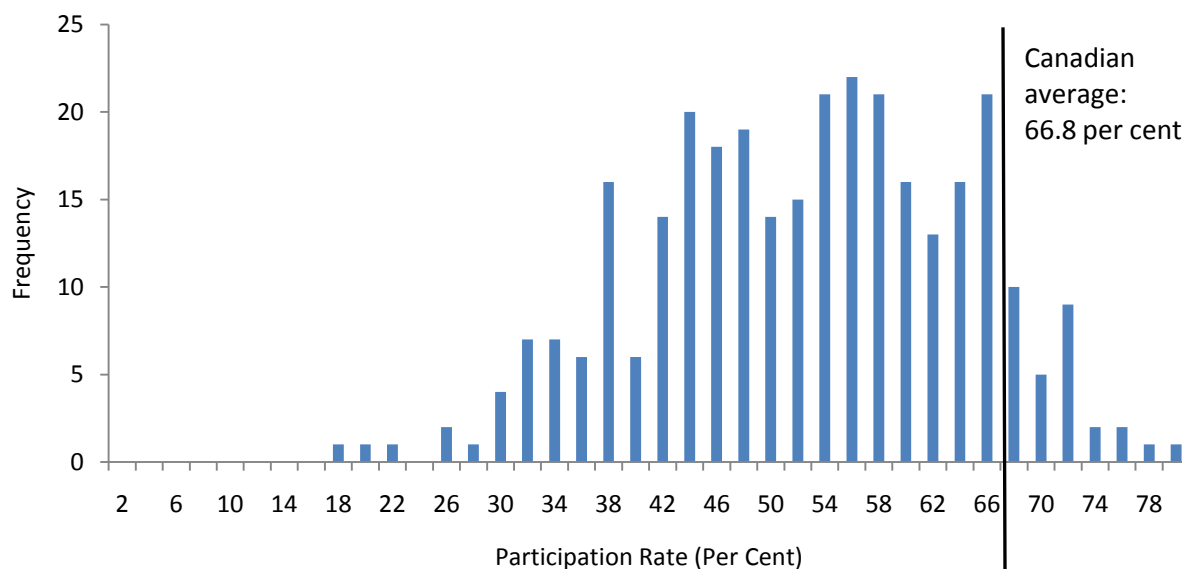
Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

As Chart 2 illustrates, the vast majority of reserves (about 80 per cent) had employment rates below the Canadian average in 2006. The lowest employment rate was 9.8 per cent, while the highest was 84.4 per cent.

Chart 2: Histogram of Employment Rate by Reserve, Canada, 2006
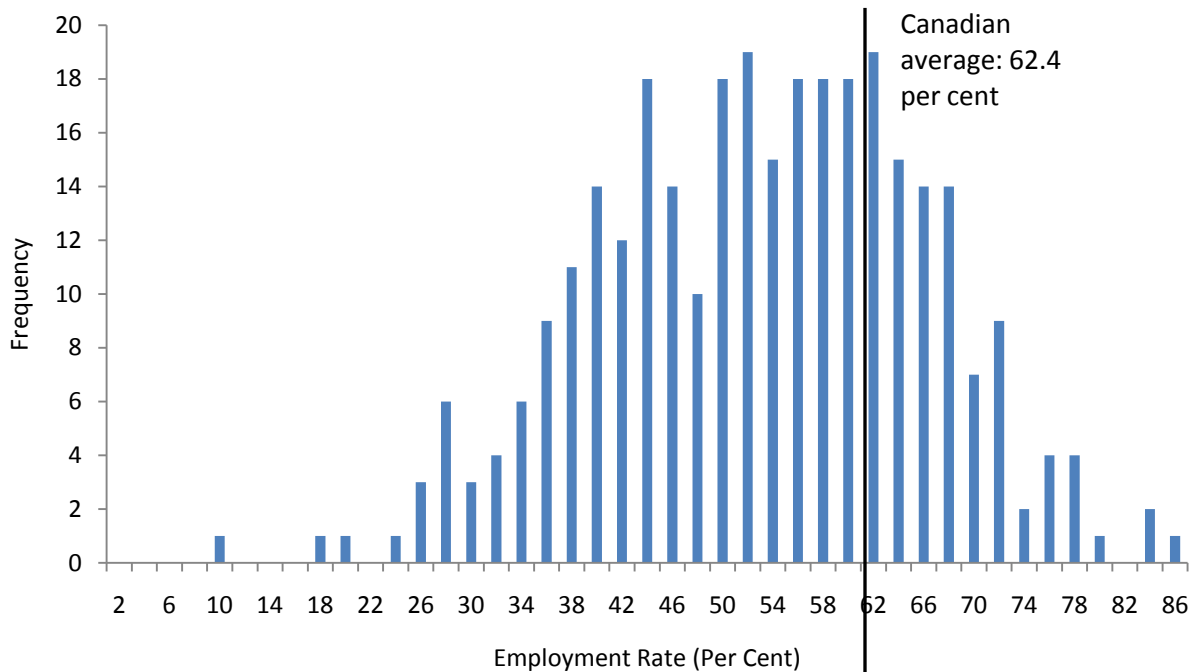
Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

Chart 3 illustrates the distribution of the unemployment rate of the 312 Canadian reserves that were included in this analysis. It also includes a line at the Canadian average unemployment rate of 6.6 per cent in 2006. It shows that only two reserves had an unemployment rate lower than the Canadian average. Most reserves had rates between 22 and 32 per cent, but some reserves had particularly high rates, the maximum being 66.7 per cent.

Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

Economic Outcomes on Reserves

Chart 4 illustrates the distribution of the reserves according to average earnings in 2005, along with a line representing the Canadian average of $36,301. One observation immediately stands out from this chart, and it is that all of the 312 reserves have average earnings lower than the Canadian average. Most reserves were in the range between $15,000 and $21,000, although some reserves have particularly low incomes while few have markedly high incomes (up to almost $36,000).

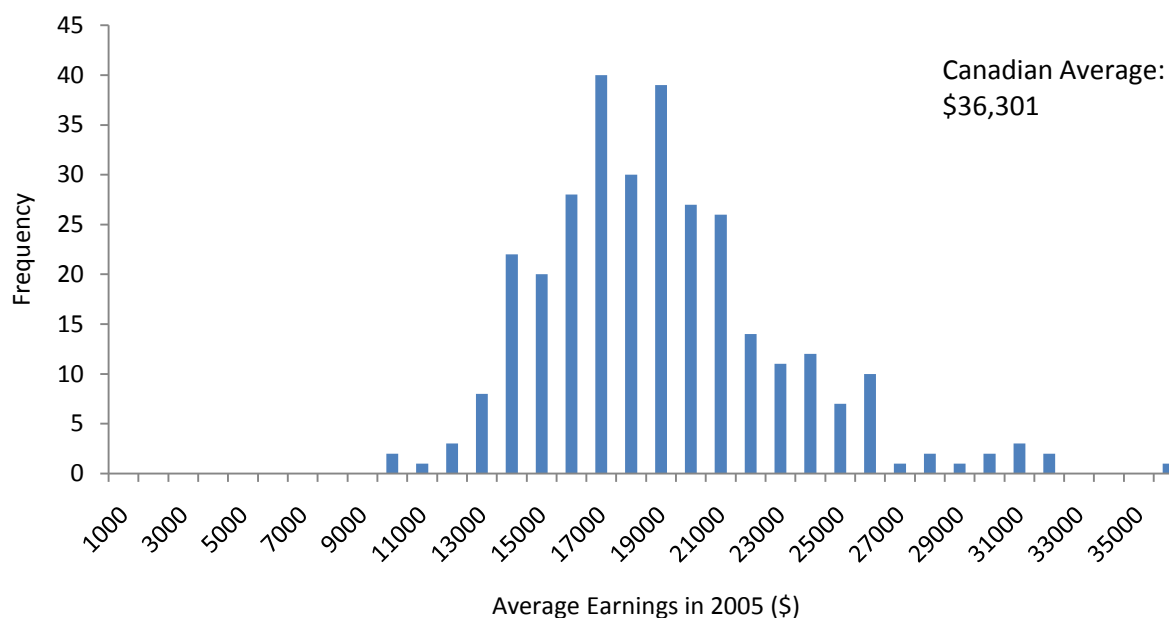**Chart 4: Histogram of Average Earnings by Reserve, Canada, 2005**

Canadian Average: $36,301

Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

The same observation can be made about GDP per capita (Chart 5). Indeed, all reserves have a GDP per capita in 2005 lower than the national average of $42,606. The reserve with the lowest GDP per capita had $2,047[13] while the highest GDP per capita was $36,499. These facts are not surprising, given the low average earnings in the reserves and the low employment rates, both determinants of the GDP per capita.

Chart 5: Histogram of GDP per Capita by Reserve, Canada, 2005

Canadian Average: $42,606
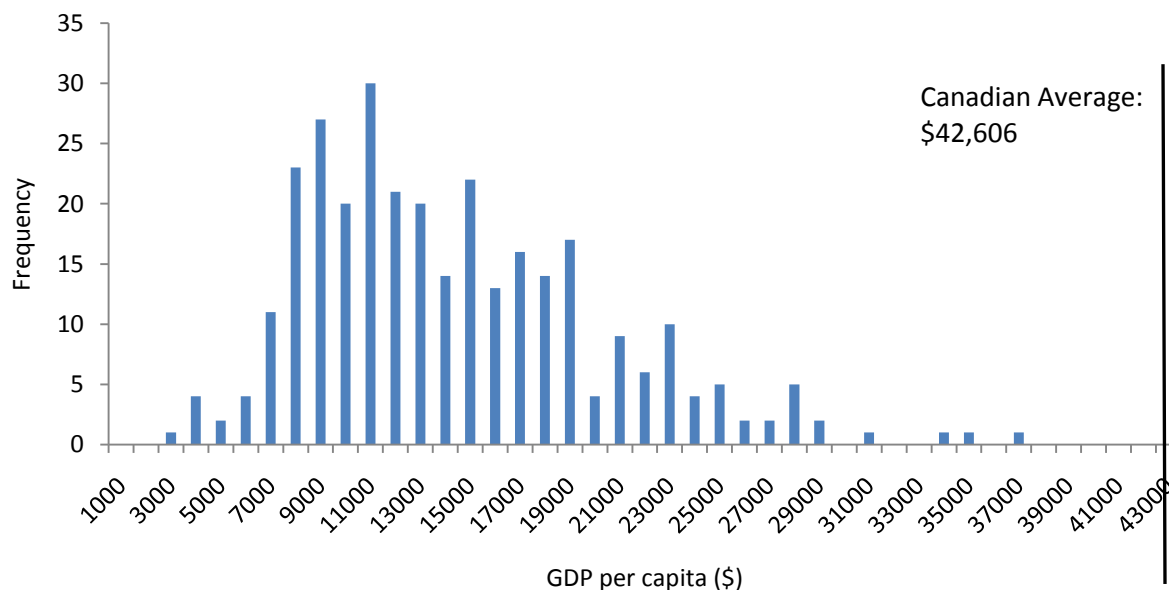
Source: Sharpe and Tsiroulnitchenko (2010) and Census 2006, Topic-Based Tabulations

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[13] Note that this does not signify that average income is that low. In particular, the estimates for GDP per capita are based on the average earnings of the population that worked in 2005, divided by the total population.

Educational Attainment on Reserves

The poor performance of reserves with regards to the labour market is complemented by a lower educational attainment than the overall Canadian population. Considering education as a whole, 76.2 per cent of Canadians aged 15 and over have a diploma, certificate or degree, including high school, colleges, trade schools and universities. Only one reserve had a percentage higher than that, at 76.9 per cent of the population with a certificate, diploma or degree.[14] The reserve with the lowest percentage had 2.2 per cent of its population 15 and over with a certificate, diploma or degree. Most reserves have a percentage of persons with diplomas, certificates or degrees between 25 and 45 per cent (Chart 6).

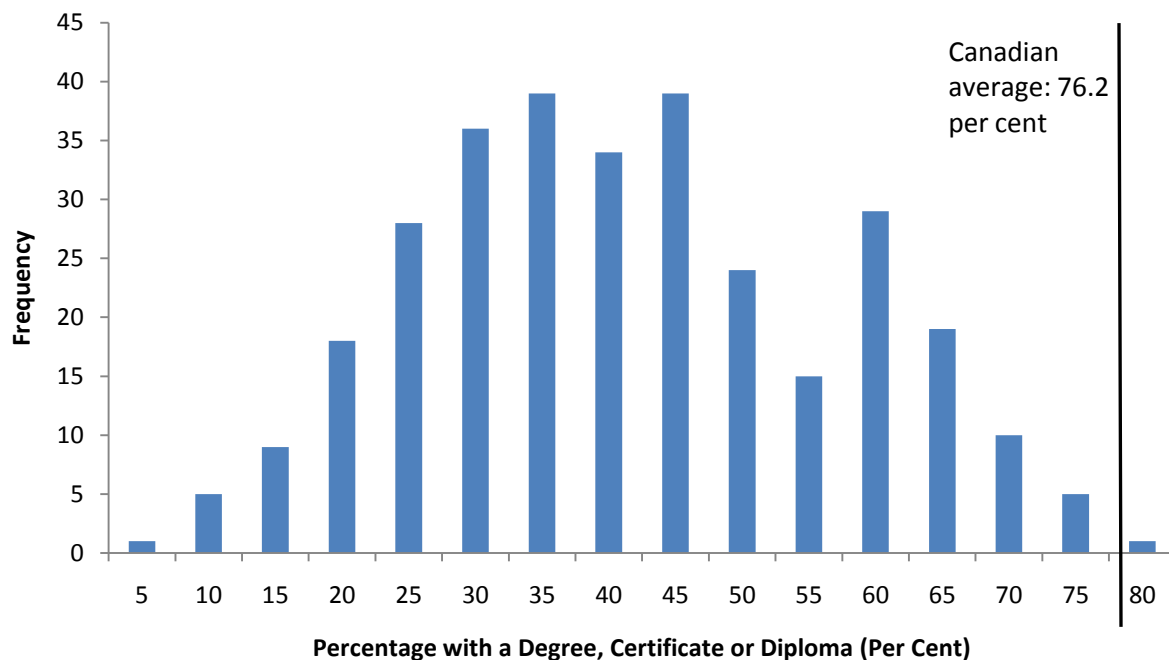**Chart 6: Histogram of Educational Attainment by Reserve, Percentage of the Population 15 years and older with a Diploma, Certificate or Degree, Canada, 2006**

Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

The distribution for the highest level of education in the form of a university degree or a certificate is different, as more reserve are in the lower spectrum. Compared to the average level for Canada (18.1 per cent), the average for these reserves is extremely low at 2.9 per cent. In 85 per cent of the reserves, at most 6 per cent of the population has a university degree or a certificate.

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[14] Eel River 3 reserve, in Manitoba.

Chart 7: Histogram of Educational Attainment by Reserve, Percentage of the Population 15 years and older with University Certificate or Degree, Canada, 2006
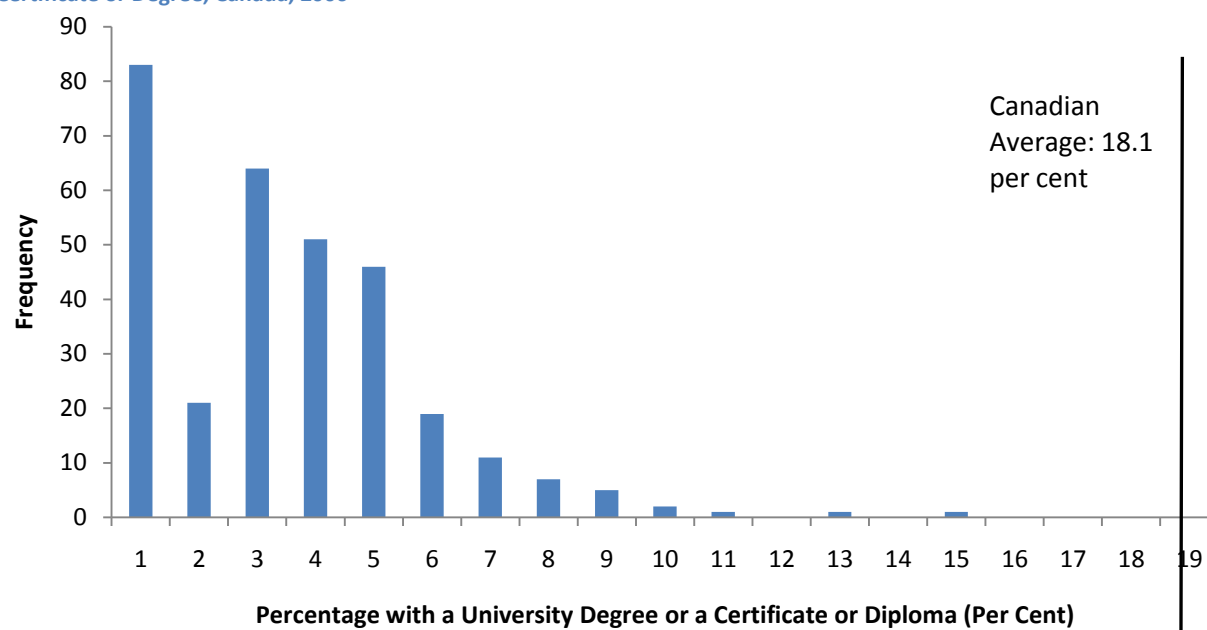

Source: Statistics Canada, 2006 Aboriginal Population Profiles and Census 2006, Topic-Based Tabulations

Effect of Remoteness

Table 5 summarizes the labour market and education characteristics of Aboriginal reserves in Canada, by remoteness index. It must be noted that among the 312 reserves with sufficient data, there are 91 reserves classified as near urban centres (Index 1), 164 as rural and remote (Index 2) and 57 as needing special access (Index 3). Appendix 2 shows detailed statistics for each zone.

This preliminary exercise seems to indicate that the remoteness of a reserve is highly associated with the labour market success and educational attainment of reserves. The least remote reserves (near urban centres) perform far better than rural/remote and special access reserves where educational attainment, economic outcomes and labour market indicators are concerned.

Participation on the labour market is more than six percentage points higher on urban reserves (56.0 per cent) compared to rural reserves (49.8 per cent) and special access reserves (49.5 per cent). The difference in the employment rate is similar, at 43.3 per cent for reserves near urban centres (50 kilometers or less), 36.3 per cent for rural/remote reserves and 38.1 per cent for special access reserves. The unemployment rate in urban reserves is 23.3 per cent, almost the same as in special access reserves (23.5 per cent), but much lower than on rural reserves (27.4 per cent). It is interesting to note that the special access reserves have a higher employment rate and a lower unemployment rate than the rural/remote reserves. The reason for this is unclear and further work would be needed to explain this paradoxical observation.

Table 5: Summary of the Characteristics of Population on Reserves in Canada, by Remoteness

	Index 1 (Urban) (N=91)	Index 2 (Rural and Remote) (N=164)	Index 3 (Special Access) (N= 57)	Weighted Average of Index 2 and 3	Total
Participation Rate for Aboriginal Population in 2006	56.0	49.8	49.5	49.7	51.5
Employment Rate for Aboriginal population in 2006	43.3	36.3	38.1	36.8	38.7
Unemployment Rate for Aboriginal population in 2006	23.3	27.4	23.5	26.4	25.5
Average Earnings for the Aboriginal population in 2005	19,042	18,336	18,007	18,251	18,482
GDP per capita in 2005	15,520	12,921	13,758	13,137	13,832
Percentage with a certificate, diploma or degree in 2006	49.7	38.8	23.3	34.8	39.1
Percentage with High school certificate or equivalent in 2006 (as highest level)	16.2	14.9	10.5	13.8	14.5
Percentage with University certificate or degree in 2006 (as highest level)	3.7	2.9	1.7	2.6	2.9

Average earnings are higher on reserves situated near urban centres, at $19,042 in 2005 (calculated as an average of the average earnings by reserve). On rural/remote and special access reserves, the average earnings were lower than urban reserves, at $18,336 compared to $18,007.

Using a methodology developed by the Centre for the Study of Living Standards (CSLS, 2010 and Appendix 1 of this report), average earnings were used to derive per capita GDP. The highest GDP per capita was found in the urban reserves at $15,520, followed by 13,758 for special access reserves and 12,921 for rural/remote reserves.

Educational attainment differences between the types of reserves are large. While 49.7 per cent of Aboriginal Canadians on reserves near urban centres have a certificate, diploma or degree, 38.8 per cent do on rural/remote reserves and only 23.3 per cent on special access reserves.

There is one important paradoxical observation to note when analyzing these data on remoteness. While the population on special access reserves does have lower educational attainment on average, compared to the two other types of reserves, this fact does not translate in lower labour market success and worse economic outcomes. Indeed, the GDP per capita on this type of reserve is actually higher than rural and remote reserves, which have higher average educational attainment. Also, average earnings and the participation rate are virtually the same in both types of reserves, while the unemployment rate is lower in special access reserves and the employment rate is higher. As mentioned briefly above, the reason for these observations is unclear. Further work is needed to explain the apparent paradox, perhaps with an improved measure of remoteness.

Provincial Differences

There is some significant variation between provinces for all indicators on reserves (Table 6). The lowest participation rate is in Saskatchewan, at 42.8 per cent, while the highest is in Newfoundland, at 70.0 per cent.[15] This corresponds to a difference of 27.2 points between the minimum and maximum. The spread is lower for the employment rate, at 17.8 points. For this indicator, Saskatchewan has the lowest, at 30.5 per cent while the highest rate is in Ontario (48.3 per cent). Given that unemployment rates are usually lower, by construction, than the two other labour market indicators, the spread of 19.9 points in this indicator should be considered large. The highest unemployment rate is in Newfoundland, at 37.0 per cent while the lowest is in Ontario, at 17.1 per cent. The second highest rate was 30.0 per cent in New Brunswick, indicating that Newfoundland was somewhat of an outlier.[16]

In Nova Scotia, 8.0 per cent of the population on the reserves included in this analysis has completed university. This was 6.2 points higher than the percentage in Alberta, at 1.8 per cent only. For completion of high school only, the percentage was lowest in the Northwest Territories, at 10.1 per cent. The proportion in New Brunswick was 21.0 per cent, corresponding to a spread of 10.9 percentage points in this indicator.

The relatively remote Northwest Territories had the highest average earnings in this analysis, at $26,232 in 2005. The lowest average earnings were in Manitoba, with $16,906. The Northwest Territories are an outlier for this indicator, since the second highest average earnings are in Quebec, with $19,854.

In terms of GDP per capita, in 2005, the highest average was unsurprisingly in the Northwest Territories, at $24,908. Again, this figure was an outlier, given that the second highest GDP per capita was in Newfoundland, with only $18,540. The lowest average GDP per capita was in Saskatchewan, at $9,198.

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[15] However, the averages for Newfoundland are somewhat misleading as only two reserves could be included in the data.

[16] Again, with only two reserves in Newfoundland, averages for that province are misleading.

Table 6: Provincial Averages of Indicators for Selected Reserves, 2005/2006

	Employment Rate	Participation rate	Unemployment Rate	Average Earnings in 2005 ($)	Percentage who have High School as the highest completed education	Percentage who completed university	GDP per capita in 2005 ($)
British Columbia	41.5	56.0	26.9	19,255	18.8	2.9	16,246
Alberta	37.8	52.1	27.4	19,222	10.6	**1.8**	13,762
Saskatchewan	**30.5**	**42.8**	28.9	17,233	15.9	2.8	**9,198**
Manitoba	31.8	44.5	28.1	**16,906**	11.7	2.7	10,212
Ontario	**48.3**	57.9	**17.1**	18,815	15.6	2.9	16,706
Quebec	44.2	56.7	23.3	19,854	11.9	3.1	18,139
New Brunswick	43.9	63.4	30.0	17,655	**21.0**	5.9	14,965
Newfoundland	43.5	**70.0**	**37.0**	16,977	11.0	4.5	18,540
Nova Scotia	41.2	53.8	23.6	17,911	16.9	**8.0**	13,932
Northwest Territories	43.3	59.9	27.4	**26,232**	**10.1**	2.3	**24,908**
Canada	38.7	51.6	25.5	18,482	14.5	2.9	13,832
Difference between maximum and minimum	17.8	27.2	19.9	9,325	10.9	6.2	15,710

Source: Statistics Canada, 2006 Aboriginal Population Profiles
Note: Numbers in bold are the minimums and maximums.

These provincial influences suggest that the province of residence is a factor in the determination of the living standards of Aboriginal persons living on reserves. For this reason, provincial variables should probably be included in the regression analysis done later in this report.

The following sections will analyze labour market indicators, earnings, GDP and education in greater details, analyzing the distribution of the reserves for these indicators.

V. Correlation Analysis between the Economic Outcomes, Educational Attainment and Labour Force Indicators

This section will focus on estimating degrees of correlation at the reserve level between educational attainment indicators, economic outcomes (as measured by GDP per capita and average earnings of the reserve), labour market outcomes (in the form of participation rate, employment rate and unemployment rate), and the category of remoteness of the reserve, as described in a previous section of this report. Correlation coefficients measure the degree to which two variables are linearly related. They vary between -1 and 1, with a negative number indication a negative relationship.

The results of the correlation analysis in Table 7 should be interpreted with caution. In particular, it must be noted that this analysis does not account for other endogenous factors that could play some role in the relationship between educational attainment and the indicators for labour force participation, economic outcomes or remoteness of a reserve. Also, these coefficients can only detect linear relationships. Nevertheless, they provide a useful first look at the relationships in the data. Scatter plots depicting each correlation coefficient are contained in Appendix 3. The plots for Remoteness Index are not constructed as the remoteness is a discrete variable and the graphical representation is not interesting.

A strong and positive relationship between educational attainment and earnings is among the most well established relationships in social sciences. The wage regression equation developed by Mincer (1974) describes the 'human capital model' and demonstrates the link between the wages of an individual and the human capital accumulation in terms of the skills acquired by the worker (education and experience). Using this model, studies have often used education and work experience as proxies for human capital accumulation. With regards to this report, the important conclusion is that human capital accumulation, in the form of education, plays an important role in increasing the living standards of a population through higher earnings.

From Table 7, it can be seen that there is a positive relationship between the average educational attainment and earnings of a reserve. The correlation coefficient between average earnings in 2005 and the percentage of individuals with a certificate, diploma or degree at the secondary or post-secondary level is 0.30. The correlation between high school education and average earnings (0.17) was found to be weaker compared to the association between university education and average earnings (0.20).

This relationship is further explored with an alternative economic outcome, GDP per capita on individual reserves in 2005. All correlation coefficients between education and GDP per capita are higher compared to the corresponding coefficient between education and average earnings. The result was 0.48 for overall education and GDP per capita, 0.23 for high school education and GDP per capita and 0.26 for university education and GDP per capita.

It must be noted that the human capital model does not account for unobserved factors such as worker's innate ability and ambition as well as quality of schooling. There is a possibility that workers with greater ability and motivation may be more successful even in the absence of additional education (Riddell, 2006). Similarly, the correlation coefficients presented here do not take into account other variables affecting the relation between earnings and education, such as the quality of the schools on the reserve or governance quality. For this reason, the correlation between earnings and education should not be interpreted as a causal relationship. In addition, the remoteness of the reserve could be an important characteristic, expected to play some role in the relationship between economic outcomes and education.

There is a possibility that the impact of higher education on income will be mitigated if the reserve is remote and there are limited economic opportunities on the reserve.

Table 7: Correlation Coefficients between Economic Outcomes, Educational Attainment, Remoteness and Labour Market Indicators

	% On-reserve population with a certificate, Diploma or a Degree	% On-reserve population with a High school Certificate or Diploma as Highest Level of Education	% On-reserve population with a University Degree	GDP per capita of the Reserve in 2005	Average Annual Earnings of the Reserve in 2005	Remoteness Index
Participation Rate (%) in 2006	0.58	0.31	0.24	0.70	0.38	-0.21
Employment rate (%) in 2006	0.57	0.32	0.29	0.76	0.45	-0.19
Unemployment rate (%) in 2006	-0.23	-0.15	-0.22	-0.45	-0.34	0.04
Average Annual Earnings of the Reserve in 2005	0.30	0.17	0.20	0.78	1.00	-0.09
GDP per capita of the Reserve in 2005	0.48	0.23	0.26	1.00	0.78	-0.13
Remoteness Index	-0.56	-0.32	-0.27	-0.13	-0.09	1.00

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: Data on average earnings refer to individuals aged 15 and older with employment income at any point during the year (wages and salaries, net income from a non-farm unincorporated business and/or professional practice, and/or net farm self-employment income).

For individuals, higher levels of education increase employment opportunities and earnings potential. In turn, attractive labour market opportunities and economic incentives encourage labour market participation. Labour market indicators such as the employment rate and participation rate are generally positively associated with educational attainment and persons with higher education generally run a lower risk of being unemployed (Sharpe and Arsenault, 2010). The correlation analysis shows that the participation and employment rates are positively associated with the educational attainment of the Aboriginal population, while the unemployment rate is negatively associated with higher education.

The correlation between the percentage of individuals with a diploma or degree at the secondary or post-secondary level and employment rate is 0.58. The magnitude of the correlation coefficient between the employment rate and education is higher for the percentage of the population with a high school diploma (0.32) compared to those who have a university degree (0.24). The correlation coefficient between the employment rate and the percentage of population with at least a high school diploma is 0.57.

The size of the correlation coefficient between the participation rate and the percentage of population with a high school education only (0.31) is also larger than the correlation coefficient between the participation rate and university education (0.29). Again, the correlation is higher when considering the percentage of population with at least high school (0.58).

The correlation coefficient between the unemployment rate of a reserve and the percentage of population with at least high school is -0.23. The association between the unemployment rate with

university education (-0.22) is stronger than the correlation between the unemployment rate and the high school diploma variable (-0.15).

Labour market indicators were also found to be positively correlated with economic outcomes, with the GDP per capita of the reserve having a stronger association compared to annual average earnings of the reserve. The correlation coefficient was 0.70 between GDP per capita and the participation rate, while it was slightly higher, at 0.76 between GDP per capita and the employment rate. For the average earnings, the correlation coefficients were lower at 0.38 for participation rate and 0.45 for employment rate. Unemployment was found to be negatively correlated with both GDP per capita (-0.45) and average earnings (-0.34).

The third set of analyses was conducted with the remoteness of the reserve. The results show that remoteness of a reserve is negatively associated with educational attainment. The correlation coefficient between the percentage of population with a diploma or degree at the secondary or post-secondary level and remoteness is -0.56. Looking at the specific educational categories, the negative relationship was stronger for the high school diploma variable (-0.32) than university variable (-0.27). It is important to note that there exists a possibility that university graduates move to a town or a city due to lack of desirable opportunities on the reserve.

The remoteness of a reserve is also negatively correlated with all the labour force indicators and economic outcome variables except unemployment rate (0.04). The correlation coefficient is larger for the participation rate (-0.21) and employment rate (-0.19) compared average annual earnings (-0.09) and GDP per capita (-0.13) where the magnitude of the correlation coefficient is small and the relationship is weak.

VI. Regression Results

In this section, the report presents the results of a series of multiple regressions estimated using the data described earlier. The advantage of the multiple regression method is the *ceteris paribus* interpretation. The regression coefficients can be interpreted as the effect of a specific independent variable on the dependent variable, when holding the effect of all other independent variables constant.

The regressions were estimated using an Ordinary Least Squares (OLS) approach, and are subject to the usual caveats applying to this approach.[17] Some variables, such as the proximity to natural resources or other unobservable characteristics are not included in the regression. Because these variables can be correlated both to the dependant and independent variables, the coefficients could be suffering from omitted variables bias. However, due to lack of additional data, it was impossible to remedy to this situation. For this reason, the results of this section should be interpreted with caution.

All of the estimated models make use of "dummy variables" (for provinces and remoteness). These variables are equal to either one or zero, and, seeing the regression as the estimation of a best-fit line, should be interpreted as a change in the intercept. For example, if in a regression with participation rate as the dependent variable, the coefficient on "British Columbia" is equal to 2.1, then, holding all else constant, the participation rate in that province is 2.1 percentage points higher. When including a set of dummy variables, one of the variables must be omitted. In this report, the variables for Alberta and a Remoteness Index of "1" have been omitted. These variables therefore represent the base case.

Five main regressions are estimated in this section, with the following dependent variables (in 2006, unless mentioned otherwise):

- Labour Force Indicators
  - Participation Rate
  - Employment Rate
  - Unemployment Rate

- Economic Outcomes
  - Average Earnings (2005);
  - GDP per capita (2005);

The independent variables for the regressions are:

- Percentage of the population with high school diploma as highest educational attainment;
- Percentage of the population with university diploma, certificate or degree;
- Three dummy variables for Remoteness Index values 2 and 3 (Remoteness Index value of 1 is omitted);
- Nine provincial dummy variables (Alberta is omitted);

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[17] For example, it is unclear whether education affects economic and labour market outcomes, or if these outcomes are actually factors in the decision of pursuing further education. Also, OLS is a linear model, but it could be the case that the real model is non-linear. Finally, there could be some variables that affect both the independent and dependent variables, but that are unobserved and thus not included in the model. These variables would cause what is commonly referred to as "omitted variables bias," effectively causing the results presented to be erroneous. More advanced models were estimated by the authors, but due to time constraints, they will be presented in a later version of this paper.

- Governance Quality Index.

The regressions are estimated with and without the provincial variables. As mentioned earlier in this report, there is great variation in the educational attainment, labour market indicators, average earnings and GDP per capita on reserves between provinces. Because of this, there is reason to believe that the provincial variables are correlated with both the dependent and independent variables, thus motivating their inclusion in the regression. For transparency and sensitivity analysis, the results are given with and without them.

It is believed that the two education variables should have positive effects on all three labour market indicators, earnings and GDP per capita. Also, according to the descriptive statistics presented earlier, provinces with a Remoteness Index of 2 and 3 should have lower participation rates, employment rates, earnings and GDP, corresponding to negative coefficients on these variables. They should also have a positive effect on the unemployment rate (increasing the rate), so the sign of this coefficient should be positive for both Remoteness variables.

As discussed earlier, the case of the reserves with a Remoteness Index of 3 is more complicated. In theory, one would believe that these remote reserves should have lower labour market success and lower educational attainment. However, while they do exhibit lower educational attainment on average, they also show higher average earnings and GDP per capita. Therefore, although the authors supposed hypothesis is that extreme remoteness should have negative effects on the labour market and earnings, according to the data available and presented earlier, a positive sign should be expected for employment and participation rate, earnings and GDP per capita, and a negative sign for unemployment rate.

Additional regressions are estimated using an additional independent variable: the Governance Index. As mentioned earlier in this report, this indicator is estimated by the Frontier Center for Public Policy, and is only available in the provinces of Alberta, Saskatchewan and Manitoba (FPCC, 2009). Therefore, these regressions will be estimated using only a sub-sample of 46 reserves for which data on governance were available. It is believed that good governance has a positive effect on the employment and participation rates, average earnings and GDP per capita. Also, the sign on the unemployment rate should be negative.

Labour Market Indicators

First, the report will analyze the results for the regression using labour market indicators as dependent variables. Table 8 summarizes the results of the regressions with the participation rate as the dependant variable. The first (long) regression included provincial dummy variables, while the second (short) did not. Comparing the two models, it seems that including variables for the provinces adds some information. Indeed, the Akaike Information Criterion (AIC), a tool for model selection, is lower for the longer model, indicating a better model. Also, the adjusted R-squared is higher, also evidence that the longer model is much better. Unless noted otherwise, the report will present the results from the long regression. However, the results of both models are similar for most variables.

First, this regression shows that educational attainment does have a statistically and economically significant positive effect on the participation rate. Increasing the percentage of the population with a high school diploma by one percentage point would increase the participation rate by 0.55 percentage points. Similarly, an increase of one point in the percentage of the population with completed university education would increase the participation rate by 0.57 points.

In the best-fitting model (with provincial variables), both the remoteness indicators have statistically insignificant coefficients (i.e. not different from zero). This seems to indicate that, compared to being an reserve near an urban centre, being rural and remote or necessitating special access does not have any impact on the participation rate. In the model without provincial variables, the coefficient on rural and remote reserves is statistically significant and negative, at -5.04. The sign on this coefficient is what was expected and indicates that, holding all else constant, reserves in rural areas have on average a participation rate -5.04 points lower than reserves in urban areas. Its high statistical significance could be due to the absence of provincial effects, which have possibly mitigated the remoteness effects in the first model.

Four provinces and territories had statistically significant coefficients in this regression: Manitoba, Newfoundland, Northwest Territories and Saskatchewan. Two of them had negative coefficients (Manitoba, -7.89 and Saskatchewan, -12.41), indicating that participation rates on reserves are lower in these provinces, holding all else constant, than in Alberta. The other two provinces have positive coefficients (Northwest Territories, 9.15 and Newfoundland, 17.32).

Table 8: Results of the Regressions with Participation Rate as the Dependant Variable

	With Provincial Effects		No Provincial Effects	
	Coefficients	Standard Errors	Coefficients	Standard Errors
Percentage with High School Diploma as Highest Level of Education	0.55***	0.11	0.52***	0.11
Percentage with University Certificate or Degree	0.57**	0.24	0.64**	0.26
Remoteness Index (2)	-1.24	1.38	-5.04***	1.36
Remoteness Index (3)	-2.71	1.82	-2.18	1.88
British Columbia	-1.38	2.47	n/a	
Manitoba	-7.89***	2.21	n/a	
New Brunswick	2.89	2.86	n/a	
Newfoundland	17.32***	3.58	n/a	
Nova Scotia	-5.44	3.51	n/a	
Northwest Territories	9.15***	2.91	n/a	
Ontario	3.03	2.10	n/a	
Quebec	3.43	2.74	n/a	
Saskatchewan	-12.41***	2.07	n/a	
Intercept	46.03***	2.12	45.18***	2.17
Number of observations	312		312	
R-squared	0.43		0.153	
Adjusted R-squared	0.41		0.142	
F test	29.15		18.763	
Akaike Information Criterion	2,269.38		2,375.325	

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

The results for the regression with the employment rate are somewhat more interesting (Table 9). In this case, both models conclude that the coefficient on remote and rural reserves (Remoteness Index of

2) is statistically significant. In the regression with provincial dummy variables, the coefficient is -2.24 while in the second regression, it is -5.58. Again, the model with provincial variables is better according to the R-squared and the AIC, therefore the true coefficient should be closer to -2.24. Special access reserves have a coefficient that was statistically insignificant in the both models, and therefore no conclusions can be drawn about them.

The estimates of the coefficients on the education variables have the expected positive sign. The effect of university education is strong, at 0.91. This means that an increase of one point in the percentage of the population with university education translates in a 0.91 points increase in the employment rate. To put this in perspective, it is interesting to remember the percentage of Aboriginal population on reserves that have completed university: 2.9 per cent. If this population had the university completion rate of the Non-Aboriginal population in Canada, 18.1 per cent of them would have a university degree, certificate or diploma. This increase of 15.2 points in educational attainment would thus translate in a 13.8 percentage point increase in the employment rate, bringing this population to an average rate of 52.4 per cent (remembering that this number is only for illustrative purposes, as it is difficult to prove causality without doubts). The estimate for high school education is also statistically significant, but relatively much lower than for university education, at 0.53.

Table 9: Results of the Regression with Employment Rate as the Dependent Variable

	With Provincial Effects		No Provincial Effects	
	Coefficients	Standard Error	Coefficients	Standard Error
Percentage with High School Diploma as Highest Level of Education	0.53***	0.10	0.52***	0.10
Percentage with University Certificate or Degree	0.91***	0.21	0.86***	0.24
Remoteness Index (2)	-2.24*	1.24	-5.58***	1.29
Remoteness Index (3)	-1.57	1.74	-0.46	1.90
British Columbia	-2.10	2.27	n/a	
Manitoba	-6.79***	1.78	n/a	
New Brunswick	-3.64	2.48	n/a	
Newfoundland	3.64	2.61	n/a	
Nova Scotia	-5.62*	3.00	n/a	
Northwest Territories	5.82***	2.21	n/a	
Ontario	6.88***	1.85	n/a	
Quebec	4.48*	2.67	n/a	
Saskatchewan	-10.43***	1.75	n/a	
Intercept	31.81***	1.90	31.66***	2.02
Number of observations	312		312	
R-squared	0.48		0.20	
Adjusted R-squared	0.46		0.19	
F test	34.69		22.85	
Akaike Information Criteria	2,215.85		2,335.53	

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

Six provinces and territories had statistically significant coefficients in this regression: Manitoba, Nova Scotia, Northwest Territories, Ontario, Quebec and Saskatchewan. Three of them had negative coefficients (Manitoba, Nova Scotia and Saskatchewan), indicating that employment rates on reserves are lower in these provinces, holding all else constant, than in Alberta. The lowest coefficient is in Saskatchewan, at -10.43, while the two other provinces have similar estimates (-6.79 for Manitoba and -5.62 for Nova Scotia). The other three provinces have positive coefficients (Quebec with 4.48, Northwest Territories with 5.82 and Ontario with 6.88).

Table 10 shows the results for the unemployment rate. The best model in this case is again the one including the provincial variables, with a higher R-squared and a lower AIC. In both models, the results on Remoteness Index 3 are statistically insignificant. Consistent with the previous models, the effect of rural and remote reserves (Index of 2) is lower in the presence of provincial effects (2.26 vs. 3.11). Holding all else constant, rural and remote reserves have an unemployment rate of 2.26 per cent (with provincial effects) and 3.11 points lower than the reserves near urban centres.

As in the previous regressions, the estimates for education are statistically significant. The estimated coefficient on university education is -0.94, much larger than the one on high school (-0.22). The estimate on the completion of university would correspond to a decrease of 14.1 points in the average unemployment rate, to a rate of 11.4 per cent, if the on-reserve Aboriginal population analyzed in this report would have the university completion level of Non-Aboriginal Canadians.

Four provincial variables have significant coefficients in this regression: New Brunswick, Newfoundland, Ontario and Saskatchewan. Only Ontario has a negative coefficient, of -7.44 indicating a lower unemployment rate in that province compared to Alberta. Newfoundland had the highest coefficient, with 12.79, while it was 8.93 for New Brunswick and much lower at 2.97 for Saskatchewan. It is interesting to note that the coefficient on Newfoundland was also high in the regression using the participation rate. This indicates that the participation rate on reserves is higher in Newfoundland, along with a higher unemployment rate. This could be the result of a greater number of persons looking for work in that province.

Table 10: Results of the Regression with Unemployment as the Dependent Variable

	With Provincial Effects		No Provincial Effects	
	Coefficients	Standard Error	Coefficients	Standard Error
Percentage with High School Diploma as Highest Level of Education	-0.22**	0.10	-0.21**	0.10
Percentage with University Certificate or Degree	-0.94***	0.21	-0.81***	0.23
Remoteness Index (2)	2.26*	1.21	3.11***	1.17
Remoteness Index (3)	-1.20	1.82	-2.56	1.85
British Columbia	2.83	2.23	n/a	
Manitoba	1.76	1.72	n/a	
New Brunswick	8.93***	2.78	n/a	
Newfoundland	12.79**	5.95	n/a	
Nova Scotia	3.18	3.57	n/a	
Northwest Territories	1.30	1.99	n/a	
Ontario	-7.44***	1.62	n/a	
Quebec	-2.27	2.36	n/a	
Saskatchewan	2.97*	1.58	n/a	
Intercept	30.27***	1.85	29.79***	1.84
Number of observations	312		312	
R-squared	0.28		0.10	
Adjusted R-squared	0.25		0.09	
F test	14.57		10.11	
Akaike Information Criteria	2,241.72		2,290.76	

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

Average Earnings

Table 11 shows the results using reserve-specific average annual earnings as the dependent variable. As was the case in the previous models, the regression including the provincial variables shows a better fit with a higher R-squared and lower AIC.

Education plays a positive and statistically significant role on average earnings on reserves. The estimated model shows that a one percentage point increase the reserve population with a high school diploma only causes the average earnings to increase by $126, while an increase in the reserve population with university certificate, diploma or degree by one percentage point increases the average earnings by $383. The two remoteness variables are statistically insignificant coefficients, and thus it is impossible to conclude that remoteness has any impact on average earnings of the reserves.

Using Alberta as a base case, the provincial effects for the Northwest Territories is statistically significant and positive while the provincial effects for Nova Scotia, New Brunswick, Saskatchewan and Manitoba are statistically significant but negative. The coefficients on the other provinces are not statistically significant.

When control variables for provincial effects are removed, the impact of education remains positive and statistically significant ($76 for high school diploma and $268 for university degree) while the variables of the remoteness categories of rural/remote and special accesses are statistically insignificant.

Table 11: Results of the Regression with Average Earnings as the Dependent Variable

	With Provincial Effects		No Provincial Effects	
	Coefficients	Standard Error	Coefficients	Standard Error
Percentage with High School Diploma as Highest Level of Education	126.21***	43.31	76.31*	39.01
Percentage with University Certificate or Degree	383.61***	95.99	268.78**	105.96
Remoteness Index (2)	218.63	542.83	-385.30	492.83
Remoteness Index (3)	-64.21	714.80	-62.85	664.21
British Columbia	-1,371.38	1,055.25	n/a	
Manitoba	-2,803.06***	848.40	n/a	
New Brunswick	-4,412.76***	1,021.72	n/a	
Newfoundland	-3,296.33	2,427.60	n/a	
Nova Scotia	-4,492.33***	1,741.42	n/a	
Northwest Territories	6,967.08***	1,388.86	n/a	
Ontario	-1,410.81	911.77	n/a	
Quebec	7.41	1,108.54	n/a	
Saskatchewan	-3,104.40***	932.02	n/a	
Intercept	17,081.60***	809.85	16,660.2***	720.6
Number of observations	312		312	
R-squared	0.26		0.05	
Adjusted R-squared	0.23		0.04	
F test	9.60		4.23	
Akaike Information Criteria	5,994.51		6,052.85	

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

GDP per Capita

Table 12 shows the results using reserve-specific GDP per capita as dependent variable. As with all the other models estimated, including provincial variables in the regression results in a better fit (higher R-squared). The results from both models show that education has a positive and statistically significant impact on the GDP per capita of the reserve. The longer model indicates that a one percentage point increase in the reserve population with a high school diploma translates in a $216 increase in the GDP per capita. Furthermore, a one percentage point increase in the share of the population with a university diploma, certificate or degree increases the GDP per capita by $566, all other factors held constant.

In the long model, the categorical variables for remoteness are statistically insignificant and do not allow for any conclusion on the effect of remoteness on GDP per capita. However, in the model without provincial variables, the effect of remoteness on the dependent variable is as expected. In

particular, the GDP per capita is $1,961 lower in reserves located in rural or remote areas (Index 2) than the reserves in the urban reserves (Index 1).

Using Alberta as a base case, the provincial effects for Quebec, Northwest Territories and Newfoundland are positive and statistically significant. In other words, everything else held constant, on average, GDP per capita is higher on reserves in these provinces than in Alberta. The effect is particularly strong for Northwest Territories, at $11,133. The effects for Saskatchewan, Nova Scotia, Manitoba and New Brunswick are statistically significant but negative. The regional effects for British Columbia and Ontario are statistically insignificant.

Table 12: Results of the Regression with GDP per Capita as the Dependent Variable

	With Provincial Effects		No Provincial Effects	
	Coefficients	Standard Error	Coefficients	Standard Error
Percentage with High School Diploma as Highest Level of Education	215.96***	54.57	181.93***	53.11
Percentage with University Certificate or Degree	566.49***	120.03	487.10***	144.06
Remoteness Index (2)	38.76	686.04	-1,961.41***	725.12
Remoteness Index (3)	-233.37	865.57	252.03	943.43
British Columbia	117.03	1,383.62	n/a	
Manitoba	-4,235.26***	1,087.92	n/a	
New Brunswick	-3,357.57**	1,410.62	n/a	
Newfoundland	3,268.26***	1,237.65	n/a	
Nova Scotia	-4,712.70**	1,888.73	n/a	
Northwest Territories	11,133.97***	1,337.33	n/a	
Ontario	1,305.66	1,202.74	n/a	
Quebec	3,404.91**	1,462.58	n/a	
Saskatchewan	-6,290.41***	1,122.12	n/a	
Intercept	10,444.31***	1,008.08	10,737.08***	1,041.90
Number of observations	312		312	
R-squared	0.50		0.12	
Adjusted R-squared	0.48		0.11	
F test	48.02		12.61	
Akaike Information Criteria	6,116.10		6,275.95	

Source: Statistics Canada, 2006 Aboriginal Population Profiles.
Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

Governance

As mentioned earlier, data on governance are available from the Frontier Centre for Public Policy (FCPP 2009) for 46 of the 312 reserves. All of these reserves are located in the urban (Index 1) and rural areas (Index 2) of Alberta, Manitoba and Saskatchewan. This section discusses the estimations of the additional models using this data as an independent variable. Similar to the analysis in the previous section, these models will include data on education, remoteness and province.

Table 13: Results of Regression using Labour Market Indicators as Dependent Variables, and Including Governance as Explaining Factor

	Labour Market Indicators		
	Employment Rate	**Participation Rate**	**Unemployment Rate**
Percentage with a Diploma, Degree or Certificate	0.50***	0.61***	-0.17**
Remoteness Index (2)	0.82	1.95	0.22
Governance	0.54**	0.49*	-0.26*
Manitoba	-4.52	-6.87*	-1.55
Saskatchewan	-10.47***	-13.15***	2.73
Constant	-12.76	-0.04	49.23***
Number of observations	46	46	46
R-squared	0.39	0.44	0.17
Adjusted R-squared	0.29	0.37	0.07
F test	5.15	8.09	1.36
Akaike Information Criteria	840.69	331.67	298.30

Note: *** p<0.01, ** p<0.05, * p<0.1, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.
Source: Statistics Canada, 2006 Aboriginal Population Profiles and FCPP 2009.

Table 13 shows the estimated impact on the labour market indicators of governance. The estimated models also included variables for education, remoteness and provincial effects. Good governance has a positive and a significant impact on both the employment and participation rate. A one point increase in the governance index would lead to an increase of 0.54 points in the employment rate and 0.49 points in the participation rate. To put this in perspective, if the worst reserve in terms of governance in the sample achieved to reach the level of the best reserve in the sample, then there is a theoretical possibility of increasing its employment rate by 14.7 percentage points and the participation rate by 13.4 percentage points on reserves, holding all other factors constant. As expected, better and improved governance also leads to a lower unemployment rate. A one point increase in the governance index[18] would lead to a 0.26 points decrease in the unemployment rate. Again, for the lowest-rated reserve, there is a possibility of reducing unemployment by 7.1 percentage points, if it would achieve the score of the best-rated reserve.

As in the previous analysis, education has a statistically significant impact in all three of these models, while the variable for the remoteness index is statistically insignificant. The coefficient for Saskatchewan was negative and significant in the models that have the employment and participation rate as the dependent variable, while Manitoba had a negative effect on the participation rate only.

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[18] A one point increase in this index could come from a variety of sources. Appendix 5 lists all the questions asked in the survey that was used to construct this index.

Table 14: Results of the Regression with Economic Outcomes as Dependent Variables, and Including Governance as an Explaining Factor

	Economic Outcomes	
	GDP per capita	**Average Earnings**
Percentage with a diploma, certificate or degree	238.8***	110.1***
Remoteness Index (2)	-25.4	512.7
Governance	188.5**	122.5*
Manitoba	-1,610.2	-1,330.8
Saskatchewan	-5,201.0***	-1,967.4*
Constant	-6,719.8	6,874.4
Number of observations	46	46
R-squared	0.56	0.39
Adjusted R-squared	0.50	0.29
F test	11.32	5.15
Akaike Information Criteria	861.1	840.6

Note: *** p<0.01, ** p<0.05, * p<0.1, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.
Source: Statistics Canada, 2006 Aboriginal Population Profiles and FCPP 2009.

Table 13 shows the estimated impact of governance on the economic outcomes of the reserves. The first model uses GDP per capita as the dependant variable. It is found that a one point increase on the governance index leads to an increase of $189 in GDP per capita (Table 14). As stated earlier, the average score on governance for this sample is 60. Therefore, if the reserves could achieve perfect governance (a score of 100), the result on GDP per capita would be an increase of $7,520. Obviously, the index used is only one measure of governance, and achieving a perfect system of governance may not be a feasible goal. However, this analysis shows that governance does have a strong effect on the well-being of reserves. The governance index has a similar effect on average earnings, with a coefficient of $123, further supporting this conclusion. The increase in earnings by index point would translate to $4,880 if the reserves achieved prefect governance. However, the statistical significance level is lower for average earnings, at 10 per cent, compared to 5 per cent for GDP per capita.

In this model, as in previous analysis, education is found to have a positive impact on both economic outcomes. In particular, GDP per capita would increase by $239 for each percentage point increase in the percentage of population with a certificate, diploma or degree. For average earnings, the estimated coefficient is somewhat lower, at $110. The model was also estimated with two education variables instead (high school and university). However, the inclusion of those two variables gave insignificant results on all the other variables, indicating either problems in the data or that governance is not an important factor.[19]

Using the least remote category on the remoteness index, Zone 1 as the base case, the variable for Zone 2 is statistically insignificant in both models. It is therefore impossible to conclude from this model that remoteness of a reserve has any impact on the well-being of the reserve. The provincial effects of

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[19] An example of this problem is included in Appendix 4 (Table 18) for GDP per capita.

Manitoba are statistically insignificant in both models, while the provincial effects of Saskatchewan are negative in both models.

The statistics for this very limited sample show that there improving governance on reserves should lead to better economic outcome and better labour market conditions. However, without better data covering more reserves, it is difficult to draw strong conclusions.

VII. Conclusion

The goal of this report was to understand the nature and the magnitude of the relationship between remoteness of reserves, educational attainment, labour market indicators and economic outcomes of the Aboriginal population residing on Indian reserves. It did so by analyzing reserve-level data from the 2006 Census on 312 reserves across Canada.

Descriptive statistics have shown that the living conditions on reserves are much worse than in the rest of the country. In particular, almost all reserves have a higher unemployment rate, a lower participation rate and a lower employment rate than the Canadian average. Also, average annual earnings and GDP per capita were lower than the Canadian average on all reserves. Educational attainment is also much lower on reserves than in Canada at large. From this starting point, the report analyzed the reserve-level data to find ways to increase the well-being of reserves. The report answered to three main questions, as mentioned in the introduction:

1. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated, on average, with higher labour market participation and employment rate, as well as lower unemployment rate?

2. Is a higher level of educational attainment for the Aboriginal population residing on reserves associated with greater average earnings for these individuals and greater GDP per capita for these reserves?

3. How does the remoteness of a reserve affect the relationship between educational attainment and labour market and economic outcomes on reserves?

Table 15: Summary of Regression Results for Five Dependent Variables (Estimated Coefficients)

Independent Variables	Participation rate in 2006	Employment rate in 2006	Unemployment rate in 2006	Average Annual Earnings (2005 dollars)	GDP per capita (2005 dollars)
Percentage with High School Diploma as Highest Educational Attainment	0.55	0.53	-0.22	126.1	216.0
Percentage with University Certificate or Degree	0.57	0.91	-0.94	383.3	566.5
Remoteness Index (2)	-	-2.24	2.26	-	-
Remoteness Index (3)	-	-	-	-	-
Governance Index	0.49	0.54	-0.26	122.5	188.5

Note: "-"means that no significant effect was found, therefore no conclusion can be drawn about these relationships. Governance Index coefficients were estimated using separate regressions on a smaller sub-sample.

The report found that at the reserve level, a higher level of educational attainment was associated with higher labour market participation and employment rate, and a lower unemployment rate. The correlation between the education and labour market variables was clear: higher educational attainment is associated with better labour market success. This conclusion was reinforced by the results of the regression analysis, as highlighted in Table 15. A one point increase in the percentage of the population with a high school diploma (as their highest level of education) increases the participation rate by 0.55 points (holding all else constant), the employment rate by 0.53 points and decreases the unemployment

rate by 0.22 points. The relationship was even stronger with university education. Indeed, a one point increase in the percentage of population with a university certificate, diploma or degree would increase the participation rate by 0.57 points, the employment rate by 0.91 points and reduce the unemployment rate by 0.94 points. Considering the low educational attainment of Aboriginal Canadians on reserves, the potential for improvement in their labour market conditions is large if they increased their education.

The answer to the second question is also positive: higher educational attainment is associated with higher average earnings and GDP per capita. An increase of one point in the percentage of population with only a high school diploma would increase the average earnings of the reserve by $126, and its GDP per capita by $216. The effect of university education is greater. Indeed, an increase of one point in this indicator could increase average earnings by $383 and GDP per capita by $566. The current gap in university education between on-reserve Aboriginal and the other Canadians is of 15.2 percentage points. If Aboriginal Canadians on reserves would reach the educational attainment of Non-Aboriginal Canadians, and have a similar percentage of their population with completed university education, it could translate in an increase of $8,603 in the GDP per capita on reserves (holding everything else constant).

As mentioned earlier in the report, geographical isolation is an important factor that contributes to the poor economic and labour market outcomes for some of the reserves, as well as their low average educational attainment. In addition to a direct impact on education, remoteness of reserves could also have an indirect impact through the other barriers to education for Aboriginal students, as discussed in an earlier section of this report. Educational attainment on reserves is low on average, but it was shown that a greater distance to urban centres may exacerbate the barriers to quality education. This was also observed in the data. Remote and rural reserves connected to service centres have a lower average educational attainment than reserves near urban centres, while special access reserves have the lowest average educational attainment.

Another potential effect of remoteness on reserves was on the labour market and economic outcomes. In particular, it is believed that the remoteness of a reserve acts as an impediment in the development of a robust labour market. The limited labour market opportunities as a result of remoteness not only results in low completion rates for secondary and post-secondary education, but they also deprive the reserve of the most skilled workers who migrate to urban centres in search of better opportunities. An interesting observation from the analysis in this paper was the high employment rate and low unemployment rate in the rural and remote reserves compared to the special access reserves. The reason for this is unclear, but among other factors, it could reflect a lower motivation to find work among these populations which results a large number of discouraged workers who have opted out of the labour force.

Better data are needed to find more conclusive evidence on the relationship between remoteness, educational attainment, labour market success and economic outcomes of reserves. One possibility is to add to more categories in the remoteness variable, with each category having a smaller band in terms of distance. There could, alternatively, also be a direct measure of the distance (from the service centre) for each reserve instead of categorizing it into a range.

Finally, the report analyzed the effect of governance structures on the well-being and labour market conditions of reserves. It was found that better governance increased the employment rate and the participation rate, decreased the unemployment rate, and increased average earnings and GDP per capita. These findings were estimated using only a small sub-sample of the data.

The analysis and the discussion in this paper clearly show the impact of educational attainment and highlight its importance on the labour force indicators and economic outcomes in the light of a key barrier in the form of remoteness. Further research should be conducted to test the robustness of the relationship explored in this paper between education and economic and labour market outcomes with a larger data set that has information on an increased number of reserves.

A better indicator of remoteness could also provide a better understanding of the role of this variable in determining educational attainment and labour market outcomes. The indicator used in this analysis was based on the distance to a service centre, while not taking into account the size of that centre. While some reserves categorized in a given Index may be situated close to a larger city (and potentially to a university), others may be close to a small town. Further work on this subject is also needed to understand the paradox of special access reserves (higher employment rates and lower unemployment rates). Finally, an expanded index of governance quality is desirable to allow researchers to explore its effect on well-being.

Further work should also include additional variables. The mobility of Aboriginal workers on reserves, both in terms of commuting (working off-reserve while living on reserve) and in terms of moving permanently should be explored. Data on these indicators are available from the Census, and could be tabulated at the reserve level and included in the research.

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Appendix 1: General Approach to Estimating Gross Domestic Product for Reserves

There are two main approaches to estimating Gross Domestic Product. These are expenditure-based approach and income-based approach. Based on the data available for on-reserve population, particularly at the community-level, the latter approach is the more practicable one, for the purposes of this report. Under the standard income-approach of estimating GDP, five sources of private and public sources of income are summed. These are: (i) rents, (ii) interest income, (iii) profits of corporate and unincorporated businesses and dividends, (iv) wages and salaries (and security benefits), (v) corporate income taxes and taxes less subsidies on production and imports. While it is not the only component, employment income is an important element of GDP. In 2005, total earnings of the general population accounted for 48 per cent of national GDP. It follows that key determinants of aggregate earnings in a given year play an important role in the shaping the GDP statistics for that year.

The main assumption behind the estimation procedure for on-reserve GDP by province and territory is the following:

The share of provincial/territorial GDP accounted by on-reserve Aboriginal people in a given geographical area (province, territory or reserve) is assumed to be the same as their share of total provincial/territorial earnings. For example, if Aboriginal identity population residing on a reserve in British Columbia accounts for 0.03 percent of total earnings in a given year, the GDP of this reserve will be 0.03 percent of British Columbia's GDP in that same year.

This assumption means that, a dollar of employment income earned by the Aboriginal population residing on reserves, on average, is associated with the growth of as much economic activity as a dollar earned by an average individual in the province/territory. Implicit in this assertion is the embedded assumption that the same unit of labour provides equal value added anywhere (e.g. on and off reserve) within a given province or territory. That is, population residing on and off reserves within a given province or territory is assumed to equally share the rents to the production taking place in their province or territory of residence.

This estimation technique yields overestimates of reserve GDP in some cases and underestimates this indicator in some of the others. For example, differences in government subsidies, support to business, transfer programs, personal and corporate income tax specific to private businesses operating on and off reserves and the on-reserve and off-reserve population with employment income would generate either overestimates or underestimates in GDP for reserves in a given province or territory. In a given province or territory where Aboriginal identity population residing on reserves tend to work off-reserves, the GDP estimates for reserves in this province or territory, holding everything else constant, would be overestimated. At the same time, the on-reserve non-Aboriginal population that is working on reserves (e.g. for the purposes of scientific or research) generates economic activity that is not included in the GDP estimates for a given group of reserves. Exclusion of this economic activity results in an underestimation of GDP for reserves in the corresponding province or territory, holding everything else constant. Finally, for provinces and territories that provide substantial income support or income tax deductions to Aboriginal workers that reside on reserves but are employed by a corporation operating off-reserve, GDP estimates for reserves are underestimated under this

methodology, holding everything else constant. It is also important to note that these considerations are not mutually exclusive and can, thus, offset each other, at least in part.

Assuming that earnings represent a good proxy for economy wide value-added, total earnings associated with the Aboriginal population residing on reserves in a given geographical area (a reserve) was divided by the share of total earnings in GDP at the national level, in order to obtain reserve-specific estimate of GDP. Dividing this Aboriginal earnings-based indicator of economic activity by the total on-reserve working age Aboriginal population (item 3 in Summary Table 2) provides reserve-specific estimates GDP per capita for 2005. For the purposes o f the analysis, these estimates will be linked to the parentage of the total Aboriginal population aged 15 and older that attained a high school graduation certificate or diploma, as well as the percentage that attained a post-secondary education certificate, diploma or degree (College, CEGEP, other non-university or university certificate, diploma or degree).

In addition to the limitations presented by the issue of data availability, three main analytical caveats arise from this general approach to obtaining estimates of reserve-specific GDP. These are:

1. The analysis at hand does not control for on-reserve/off-reserve place of work and for paid worker/self-employed class of worker, as it relates to the Aboriginal population residing on reserves;

2. Estimates of GDP presented in this report are earnings-based and do not account for profits, rents and other elements of income-based approach to measuring GDP;

3. There exists a one year gap between the data on earnings and population, in estimating GDP per capita for reserves.

Bearing these caveats in mind, it is possible to estimate GDP for reserves based on the share of total earnings in GDP associated with broader geographical areas, such as provinces, territories and Canada as a whole.

Appendix 2: Medians, Standard Deviations and Ranges for Levels of Education Attainment, Labour Market Indicators, and GDP per capita, by Reserve Remoteness, 2006

	Median	Standard Deviation	Min	Max
Urban (1)				
Participation rate in 2006 Census Reference week (%)	57.80	10.24	26.70	76.00
Employment rate in 2006 Census Reference week (%)	44.30	10.72	20.20	66.30
Unemployment rate in 2006 Census Reference week (%)	22.73	9.43	7.09	55.20
Average Annual Earnings in 2005 (2005 dollars)	18,947	3,764.48	9,404.00	30,050.00
GDP per capita (2005 dollars)	15,410	5,761.65	3,314.59	34,316.79
Percentage of the on-reserve population with at least a high school certificate in 2006 (%)	53.80	14.26	17.46	76.92
Percentage of the on-reserve population with a high school certificate or equivalent in 2006 (%)	16.46	5.93	4.08	31.58
Percentage of the on-reserve population with a university certificate or degree in 2006 (%)	3.74	2.59	0.00	14.29
Rural (2)				
Participation rate in 2006 Census Reference week (%)	50.00	11.39	17.30	79.30
Employment rate in 2006 Census Reference week (%)	34.5	9.93	14.30	61.80
Unemployment rate in 2006 Census Reference week (%)	28.10	8.91	10.34	57.66
Average Annual Earnings in 2005 (2005 dollars)	17,338	4,058.02	11,452.00	35,956.00
GDP per capita (2005 dollars)	11,306	5,551.91	2,046.55	36,499.00
Percentage of the on-reserve population with at least a high school certificate in 2006 (%)	37.84	12.67	11.94	71.76
Percentage of the on-reserve population with a high school certificate or equivalent in 2006 (%)	15.38	5.18	4.48	31.13
Percentage of the on-reserve population with a university certificate or degree in 2006 (%)	2.78	2.39	0.00	12.94
Remote (3)				
Participation rate in 2006 Census Reference week (%)	61.80	18.43	21.60	72.30
Employment rate in 2006 Census Reference week (%)	51.10	16.36	19.60	64.70
Unemployment rate in 2006 Census Reference week (%)	16.05	7.74	9.22	33.32
Average Annual Earnings in 2005 (2005 dollars)	20,427	5,240.27	11,628.00	27,005.00
GDP per capita (2005 dollars)	22,784	8,593.45	8,514.33	30,096.98
Percentage of the on-reserve population with at least a high school certificate in 2006 (%)	34.55	11.30	17.65	50.60
Percentage of the on-reserve population with a high school certificate or equivalent in 2006 (%)	9.90	6.29	3.64	23.53
Percentage of the on-reserve population with a university certificate or degree in 2006 (%)	2.73	1.22	0.00	3.92
Special Access (4)				
Participation rate in 2006 Census Reference week (%)	47.70	11.34	25.20	75.00
Employment rate in 2006 Census Reference week (%)	37.50	11.59	17.00	71.90
Unemployment rate in 2006 Census Reference week (%)	23.64	11.53	0.00	66.70
Average Annual Earnings in 2005 (2005 dollars)	17,230	3,864.49	9,353.00	27,199.00
GDP per capita (2005 dollars)	13672	5,575.44	5,065.53	27,364.04
Percentage of the on-reserve population with at least a high school certificate in 2006 (%)	21.21	10.78	2.17	46.15
Percentage of the on-reserve population with a high school certificate or equivalent in 2006 (%)	9.38	5.00	3.03	23.58
Percentage of the on-reserve population with a university certificate or degree in 2006 (%)	1.75	1.79	0.00	6.25

Source: Statistics Canada, 2006 Aboriginal Population Profiles.

Appendix 3: Scatter Diagrams

Chart 7: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with a certificate, diploma or degree in 2006 and reserve-specific GDP per capita for 2005, Canada
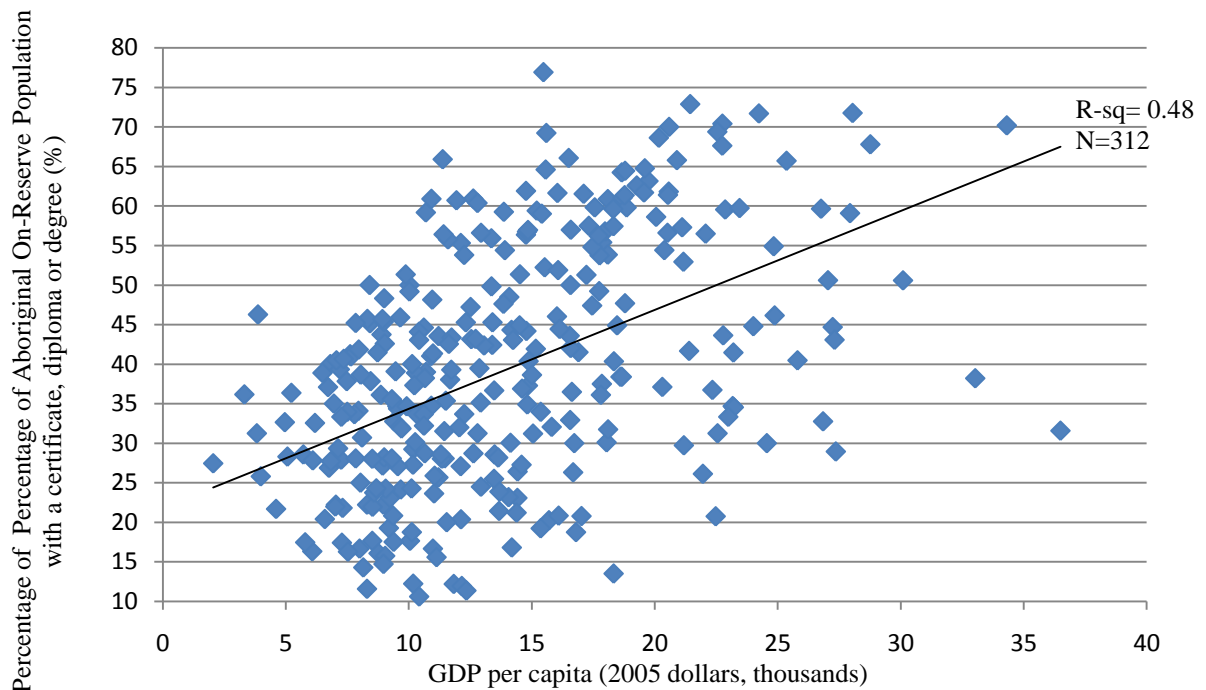

Chart 8: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with a high school certificate or equivalent in 2006 and reserve-specific GDP per capita for 2005, Canada
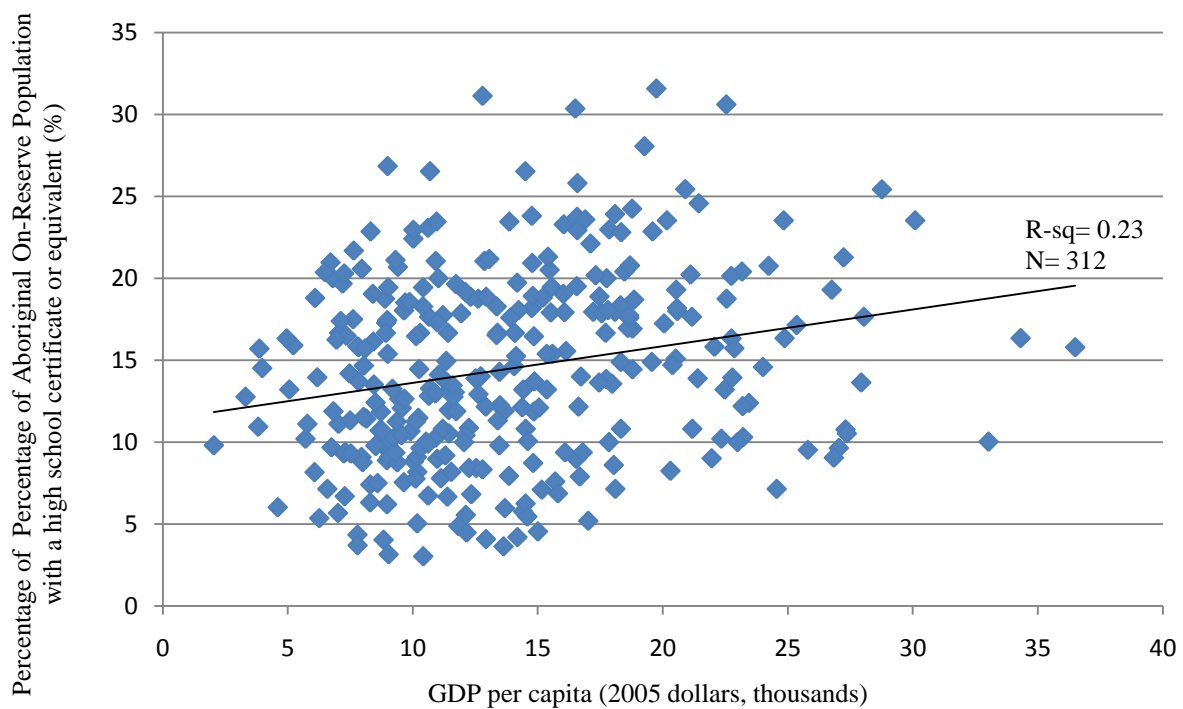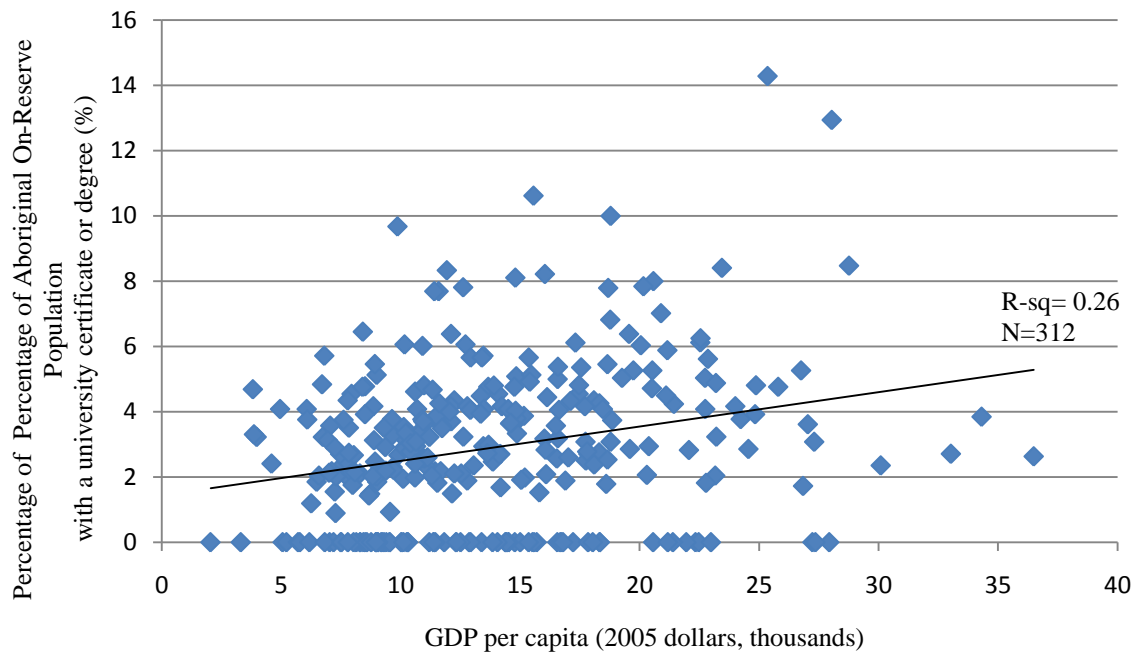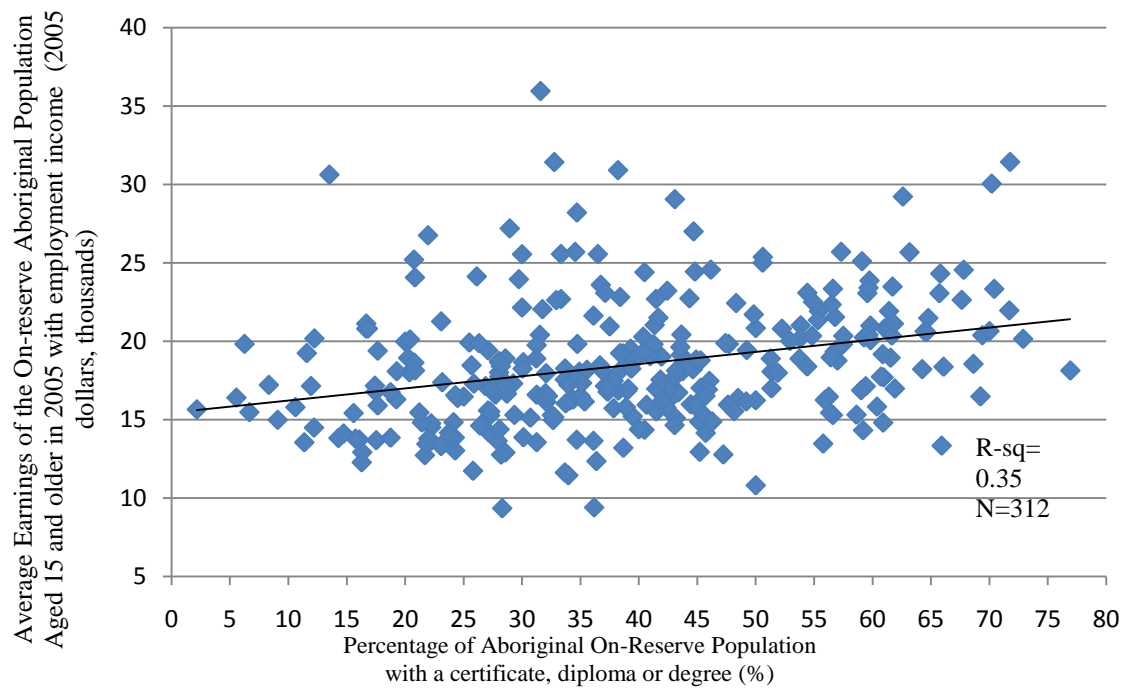
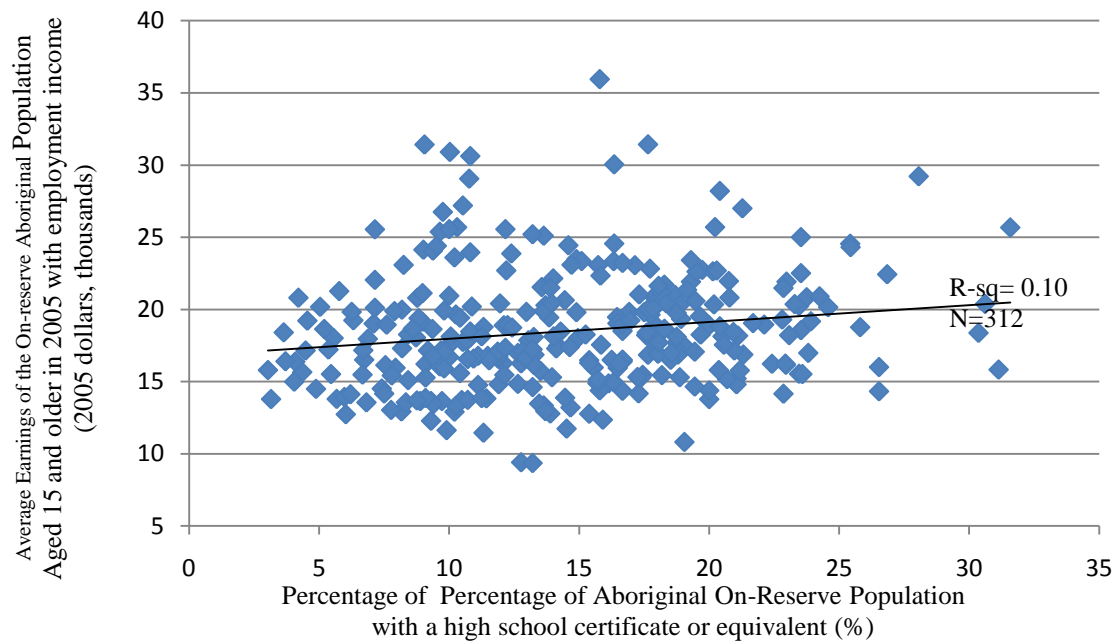**Chart 9: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with a university certificate or degree in 2006 and reserve-specific GDP per capita for 2005, Canada**

Chart 8: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with certificate, diploma or degree in 2006 and average annual earnings for the reserve in 2005, Canada

Chart 9: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with high school certificate or equivalent in 2006 and average annual earnings for the reserve in 2005, Canada

Chart 10: Percentage of the Aboriginal population aged 15 and older residing on a given reserve with university certificate or a degree in 2006 and average annual earnings for the reserve in 2005, Canada
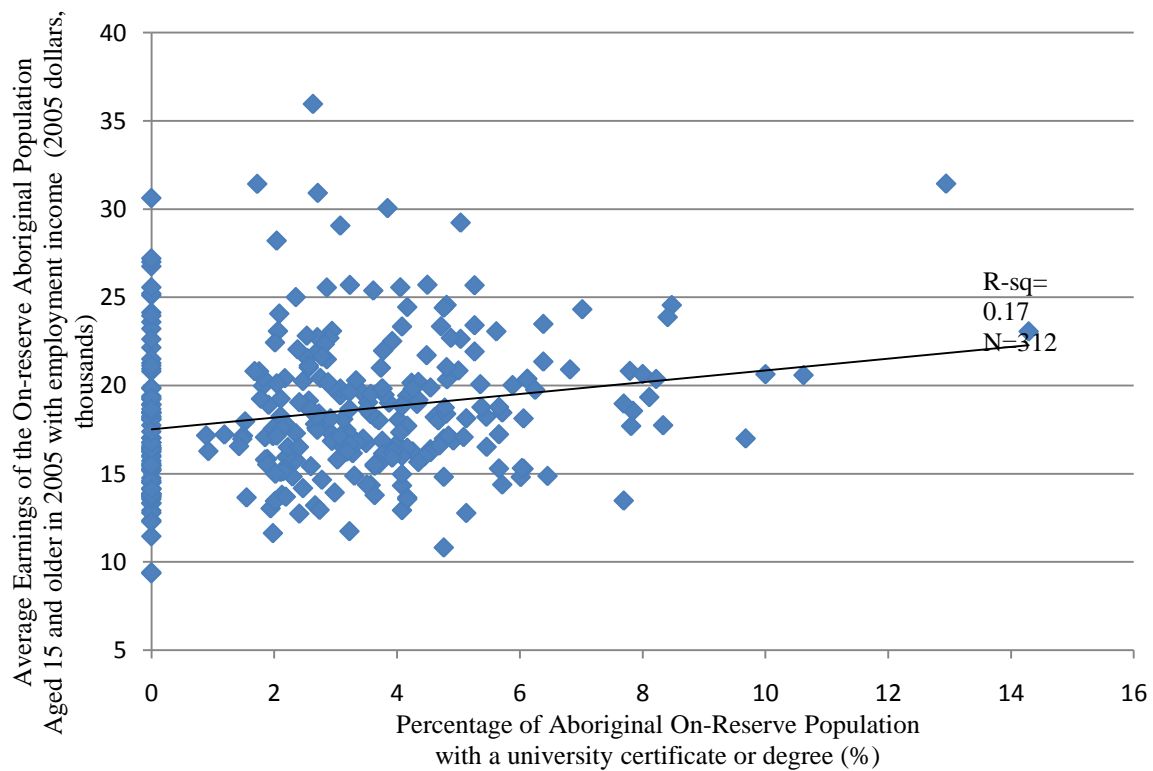
Chart 11: Participation Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a certificate, diploma or degree
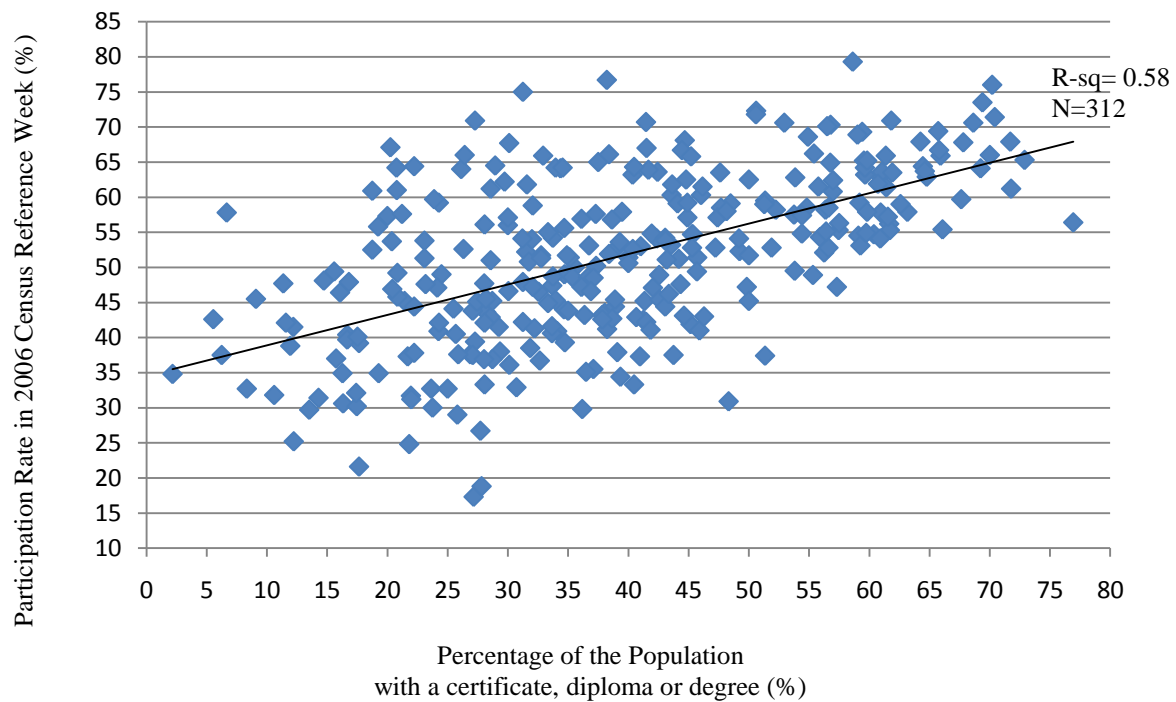

Chart 10: Participation Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a high school certificate or equivalent
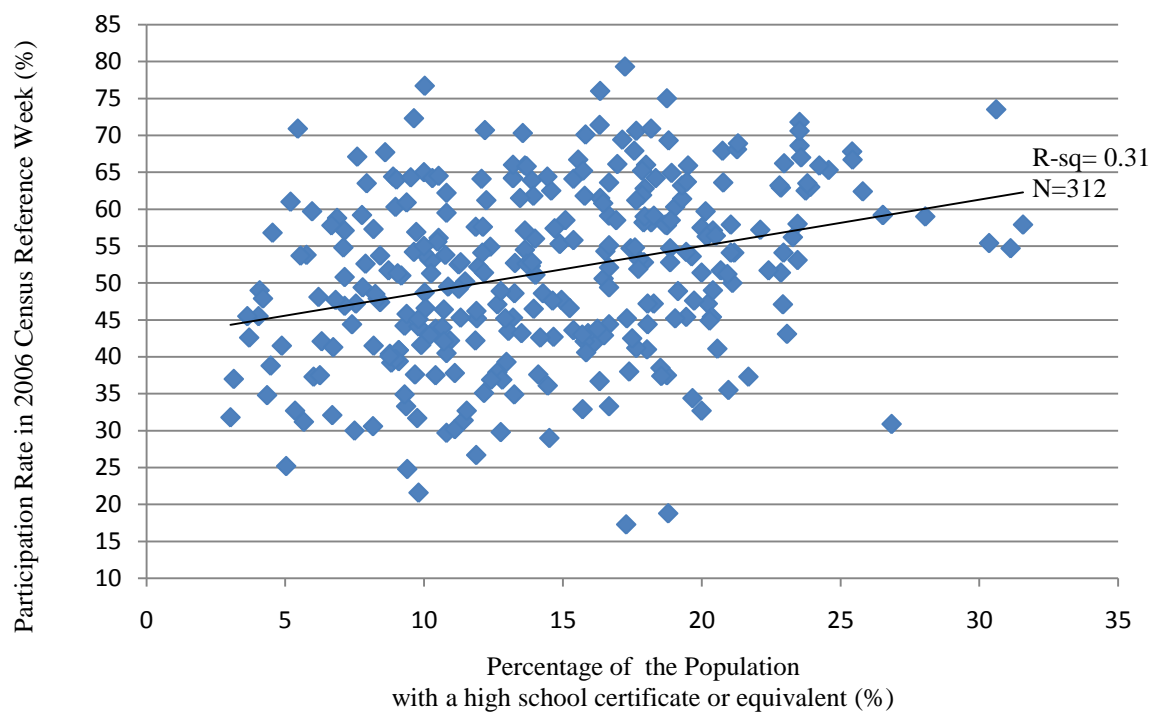
Chart 11: Participation Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a university certificate or degree
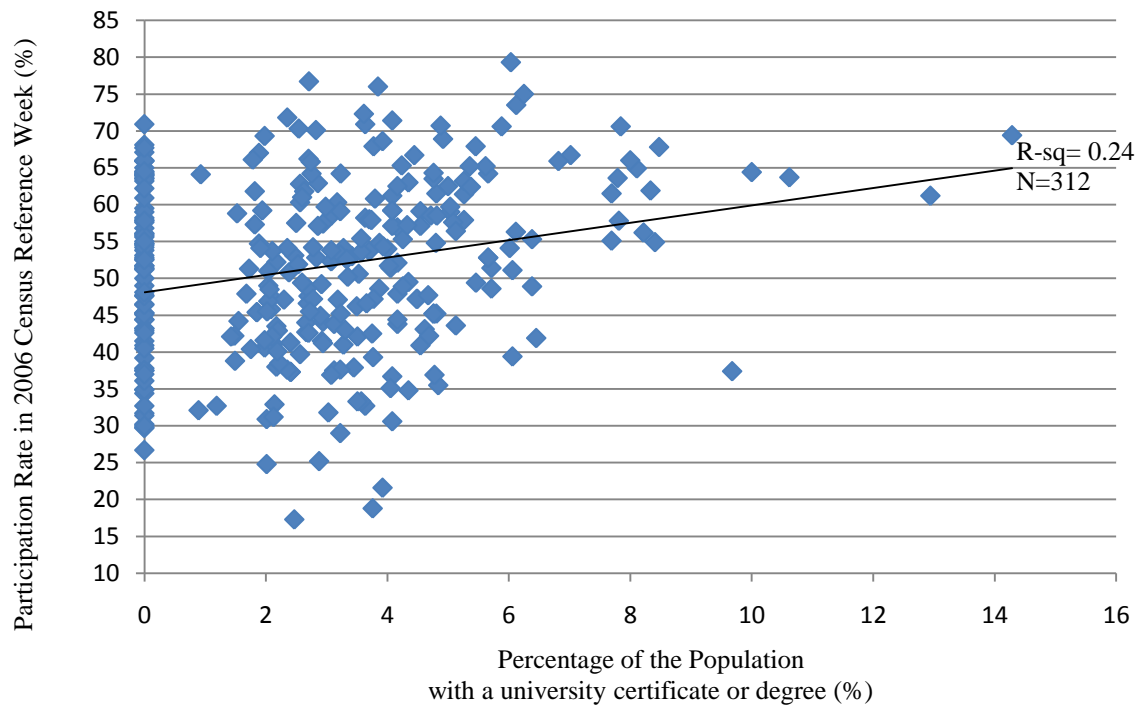

Chart 12: Employment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a certificate, diploma or degree
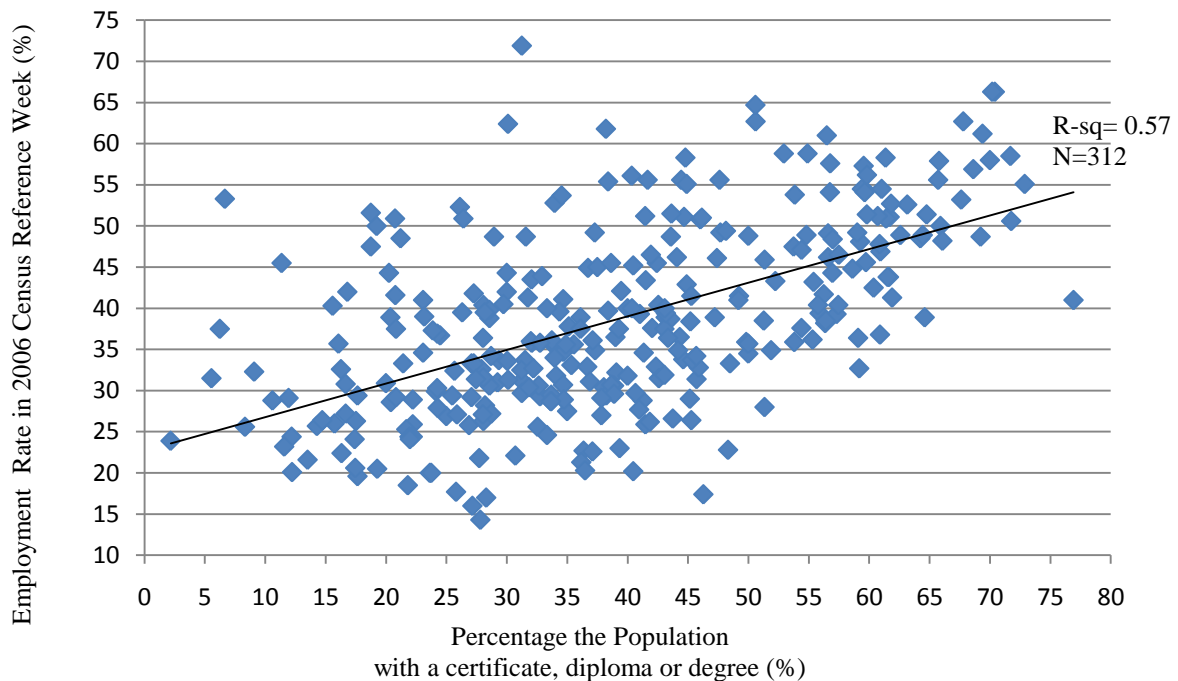
Chart 13: Employment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a high school certificate or equivalent

R-sq= 0.32
N=312

Employment Rate in 2006 Census Reference Week (%)

Percentage of the Population
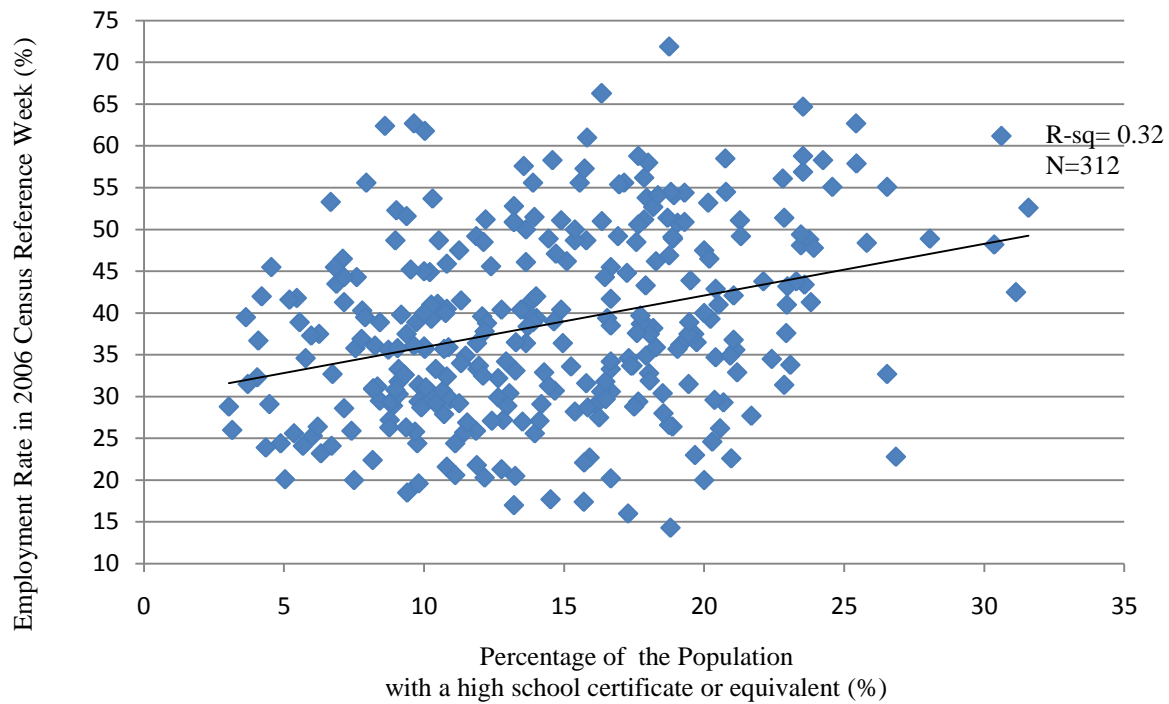with a high school certificate or equivalent (%)

Chart 14: Employment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a university certificate or degree

R-sq= 0.29
N=312

Employment Rate in 2006 Census Reference Week (%)

Percentage of the Population
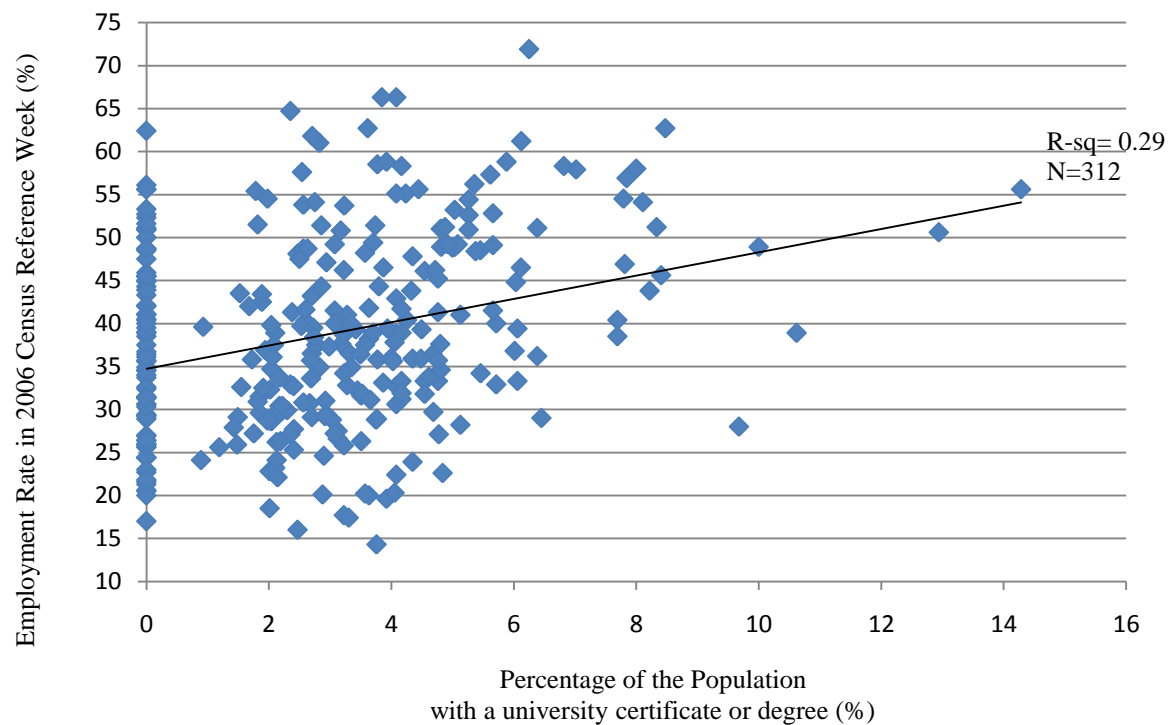with a university certificate or degree (%)

Chart 15: Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a certificate, diploma or degree

R-sq= -0.23
N=312

Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week (%)

Percentage of Aboriginal On-Reserve Population
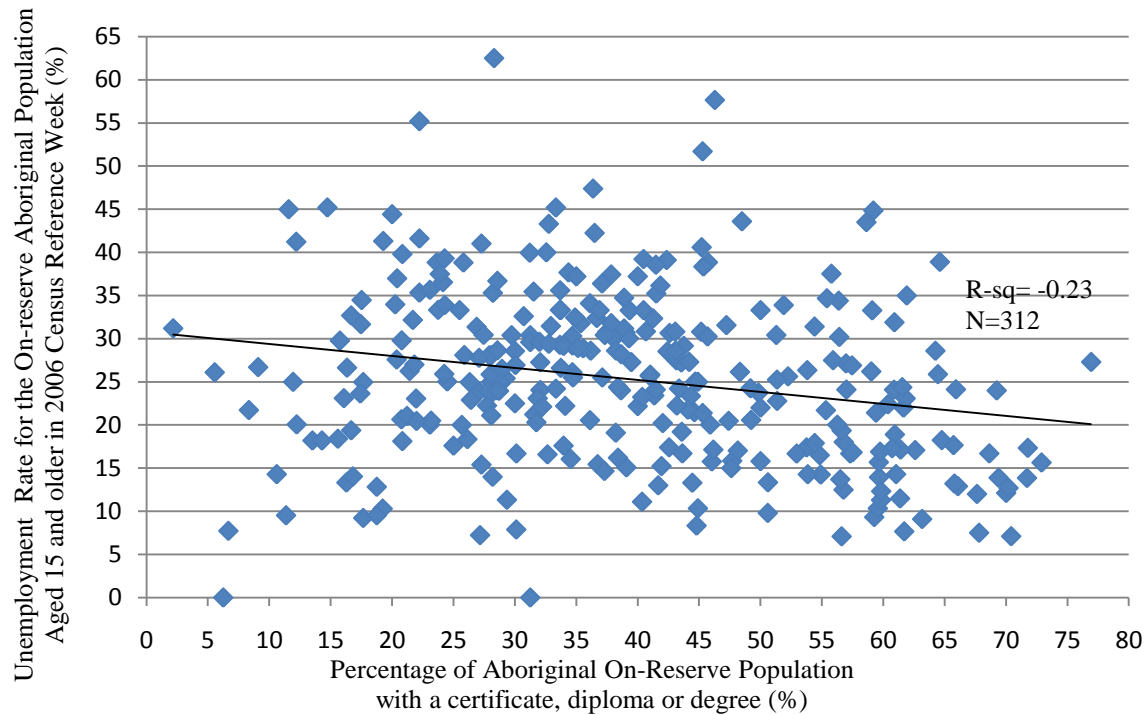with a certificate, diploma or degree (%)

Chart 16: Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a high school certificate or equivalent

R-sq= -0.15
N=312

Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week (%)

Percentage of Percentage of Aboriginal On-Reserve Population
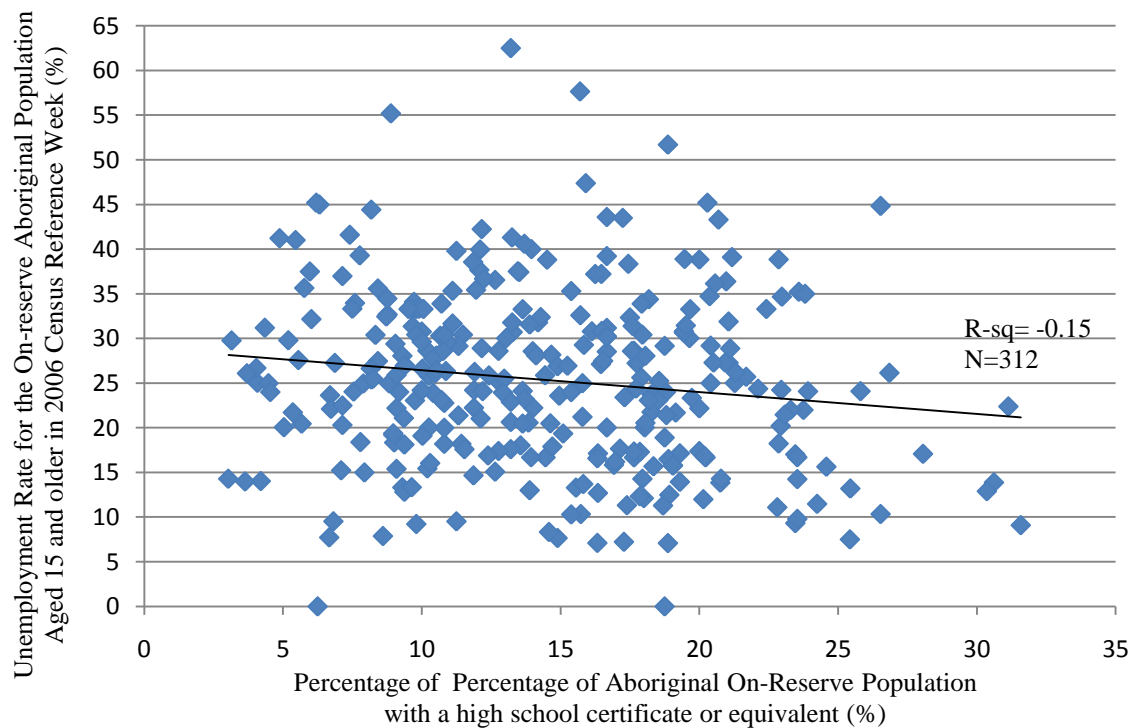with a high school certificate or equivalent (%)

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Chart 17: Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and older with a university certificate or degree
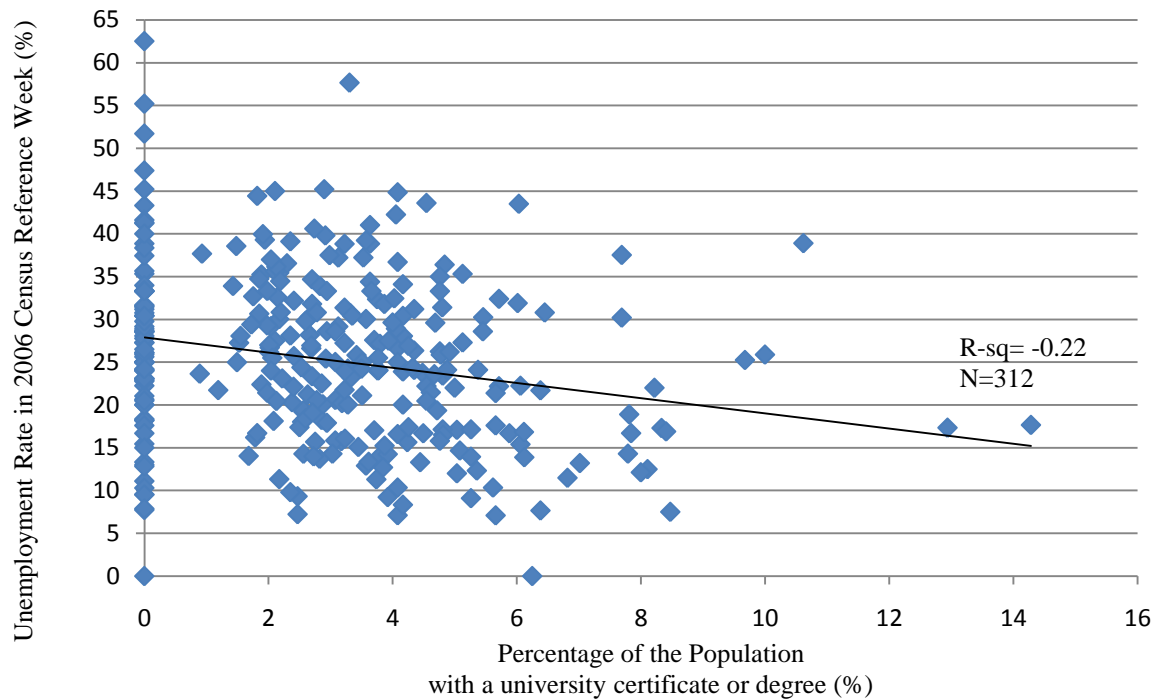

Chart 17: Participation Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific GDP per capita for 2005, Canada

Chart 18: Employment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific GDP per capita for 2005, Canada

Chart 19: Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific GDP per capita for 2005, Canada
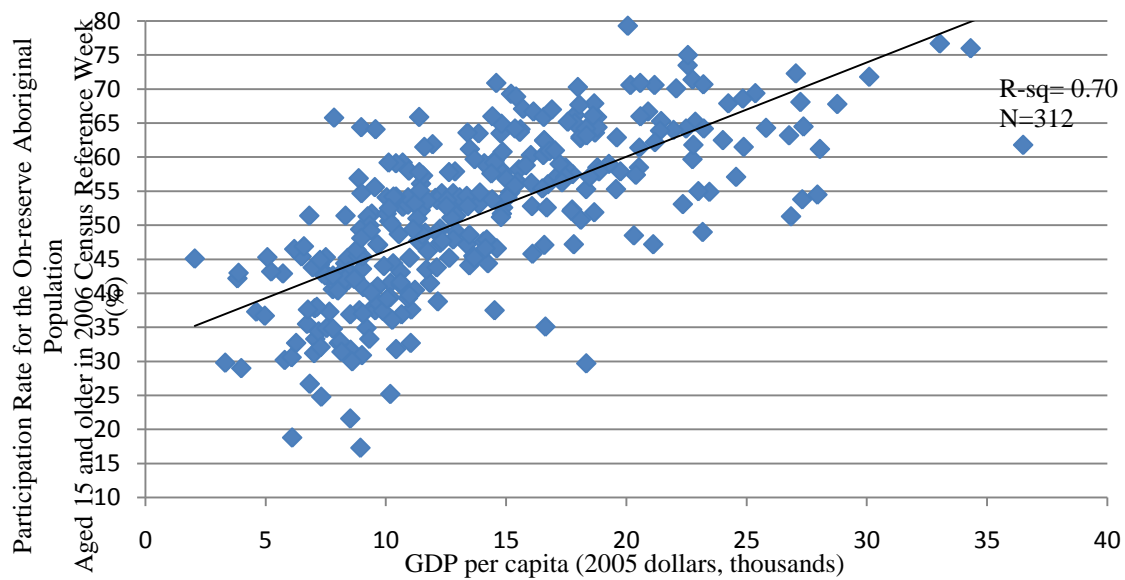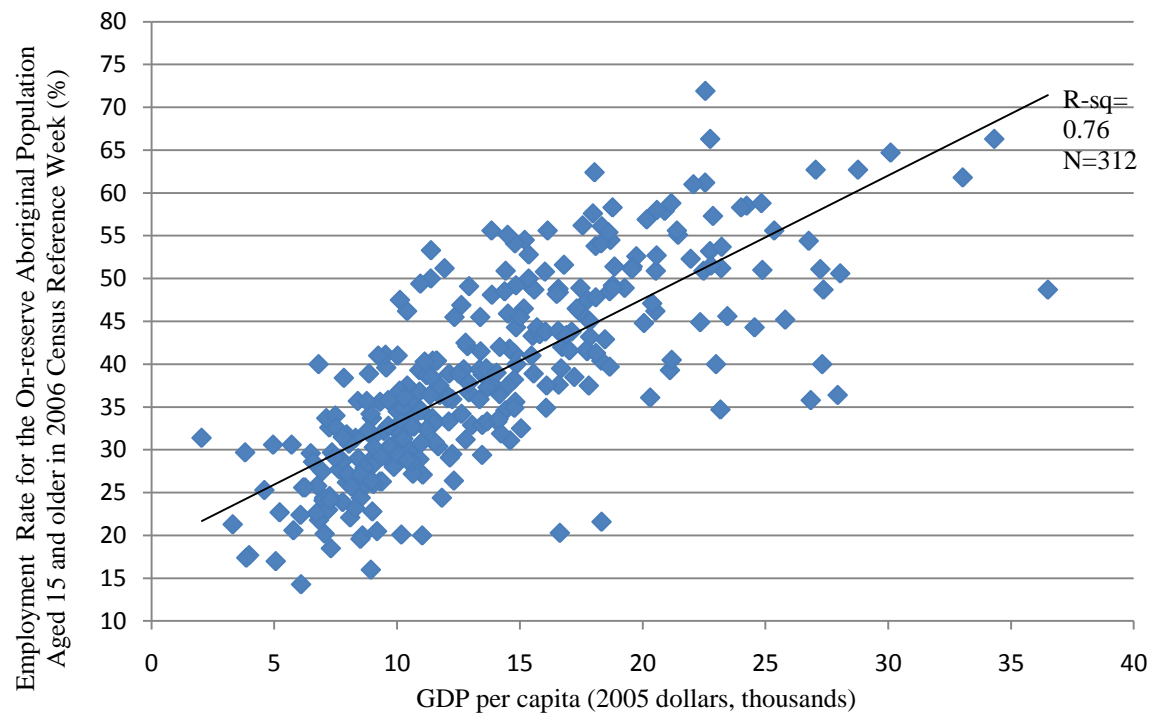
Chart 20: Participation Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific average annual earnings in 2005, Canada

Chart 21: Employment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific average annual earnings in 2005, Canada
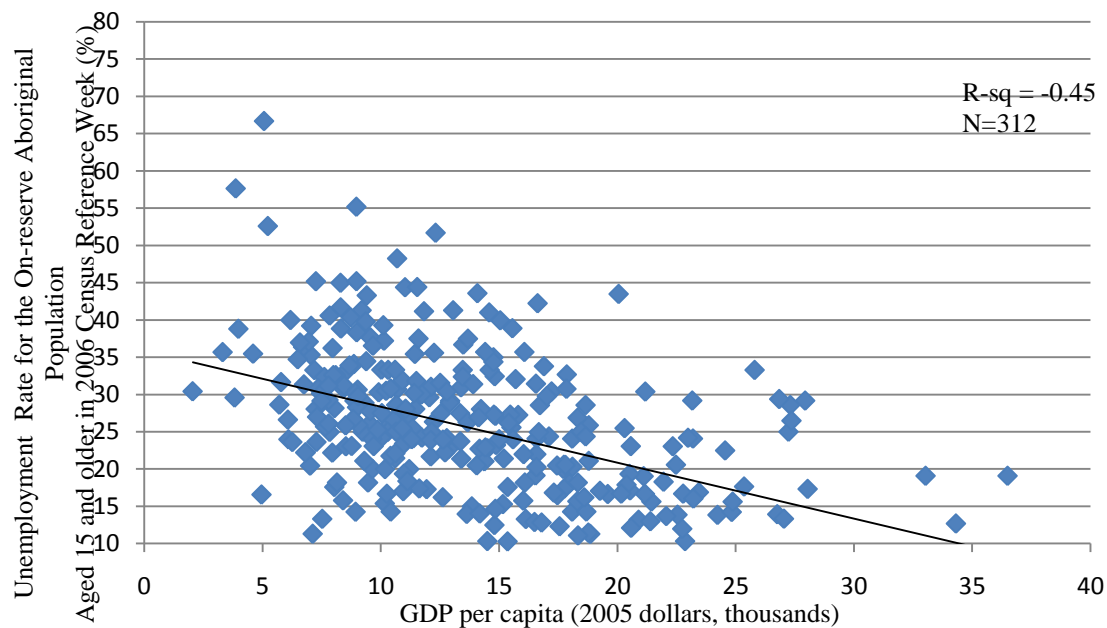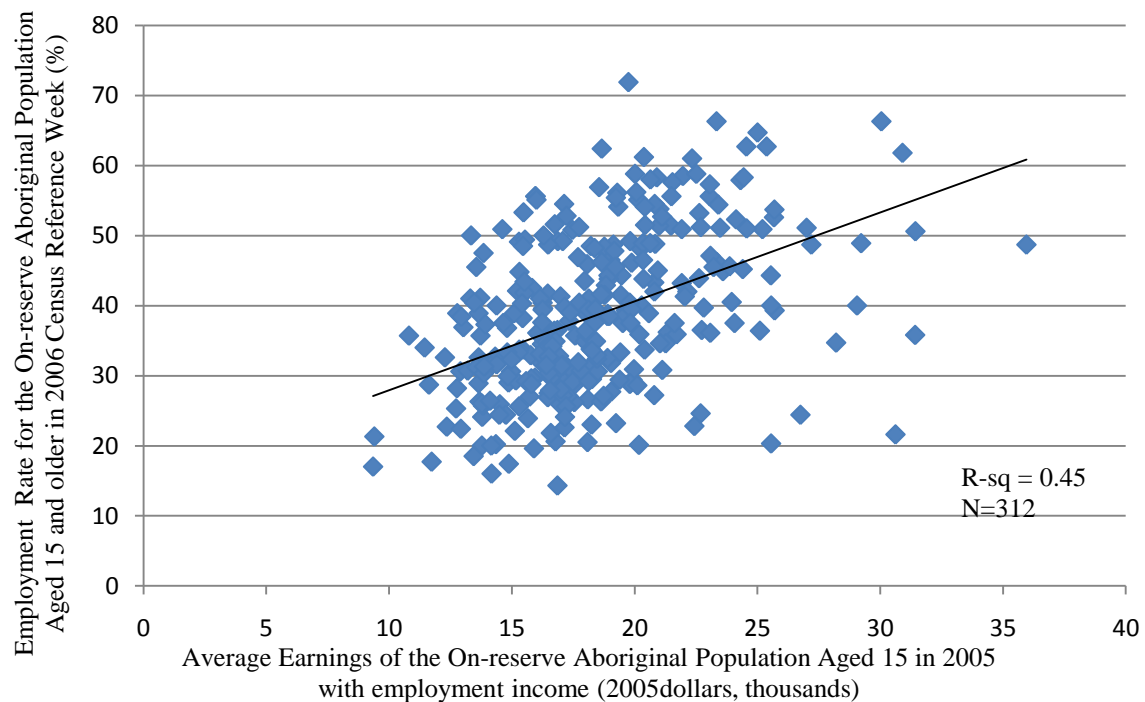
Chart 22: Unemployment Rate for the On-reserve Aboriginal Population Aged 15 and older in 2006 Census Reference Week and Percentage of Aboriginal On-Reserve Population Aged 15 and reserve-specific average annual earnings in 2005, Canada

Average Earnings of the On-reserve Aboriginal Population Aged 15 in 2005
with employment income (2005dollars, thousands)

R-sq= -0.34
N=312

Chart 22: Reserve-specific GDP per capita for 2005, Canada and reserve-specific average annual earnings in 2005, Canada

Average Earnings of the On-reserve Aboriginal Population Aged 15 in 2005
with employment income (2005dollars, thousands)

R-sq= 0.78
N=312
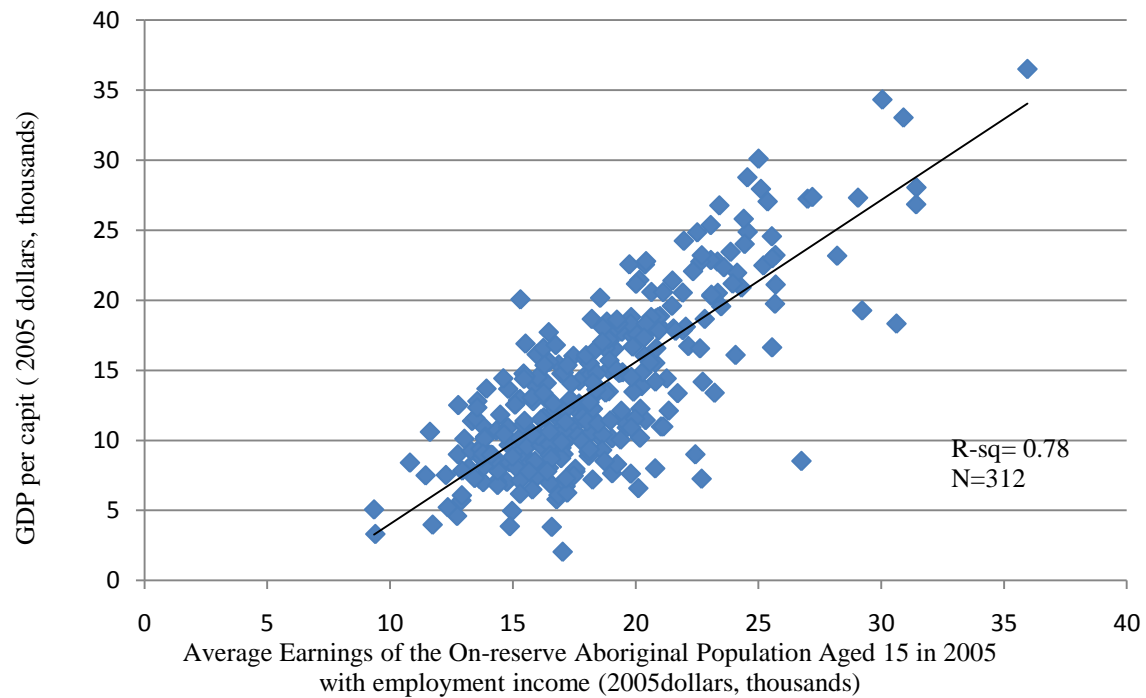
Appendix 4: Additional Detailed Regression Results

Table 16: Regression Results for Economic Outcomes and Governance Index

	GDP per Capita (2005)		Average Earnings (2005)	
	Coefficient	Standard Error	Coefficient	Standard Error
Percentage with High School Diploma	238.8***	42.6	110.1***	32.5
Remoteness Index (2)	-25.4	843.1	512.7	830.8
Governance	188.5**	78.3	122.5*	65.9
Manitoba	-1,610.2	1,162.6	-1,330.8	980.0
Saskatchewan	-5,201.0***	1,002.8	-1,967.4*	1,020.2
Constant	-6,719.8	5,525.0	6,874.4	4,678.6
Number of observations	46		46	
R-squared	0.56		0.39	
Adjusted R-squared	0.50		0.29	
F test	11.32		5.15	
Akaike Information Criteria	861.14		840.69	

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.
Source: Appendix Data (Statistics Canada, 2006 Aboriginal Population Profiles) and FCPP 2009.

Table 17: Regression Results for Labour Market Indicators and Governance Index

	Employment Rate		Participation Rate		Unemployment Rate	
	Coefficient	Standard Error	Coefficient	Standard Error	Coefficient	Standard Error
Percentage with a Diploma, Degree or Certificate	0.50***	0.1	0.61***	0.13	-0.17**	0.08
Remoteness Index (2)	0.82	2.1	1.95	2.76	0.22	1.83
Governance	0.54**	0.2	0.49*	0.27	-0.26*	0.16
Manitoba	-4.52	2.8	-6.87*	3.74	-1.55	1.71
Saskatchewan	-10.47***	2.5	-13.15***	3.35	2.73	1.78
Constant	-12.76	15.5	-0.04	18.48	49.23***	10.40
Number of observations	46		46		46	
R-squared	0.39		0.44		0.17	
Adjusted R-squared	0.29		0.37		0.07	
F test	5.15		8.09		1.36	
Akaike Information Criteria	840.69		331.67		298.30	

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.
Source: Appendix Data (Statistics Canada, 2006 Aboriginal Population Profiles) and FCPP 2009.

Table 18: Regression Estimates Using GDP per Capita as Dependent Variable, Including Education Breakdown

	Coefficients	Standard Error
Percentage with High School Diploma as Highest Educational Attainment	346.5***	118.7
Percentage with University Diploma, Certificate or Degree	437.3**	219.8
Governance Index	81.7	87.2
Saskatchewan	-7,030.4***	1,561.3
Manitoba	-3,057.6**	1,417.3
Remoteness Index (2)	-943.4	1,129.9
Constant	4,372.2	5,379.9
Number of observations	46	
R-squared	0.446	
Adjusted R-squared	0.361	
F test	5.308	
Akaike Information Criteria	873.4	

Note: *** $p<0.01$, ** $p<0.05$, * $p<0.1$, Robust standard errors. Alberta and Remoteness Index of 1 were omitted.

Source: Appendix Data (Statistics Canada, 2006 Aboriginal Population Profiles) and FCPP 2009.

Appendix 5: Questions on the Governance Survey from the Frontier Centre for Public Policy

Long Questionnaire

I. ELECTIONS

1. Are elections held every two years or is the frequency established by custom? Every 2 years □ Other □

2. Are you satisfied with the quality of the candidates? Yes □ No □

3. Have favours or payments ever been exchanged for votes? Yes □ No □

4. Have election results ever been disputed? Yes □ No □

5. Is the person who resolves such disputes independent from band officials? Yes □ No □

6. Does your band decide leadership by hereditary custom? Yes □ No □

II. ADMINISTRATION

1. Do the Chief and band council make all decisions? Yes □ No □

2. Are other band members consulted? Yes □ No □

3. Do band officials ever benefit personally from their own decisions? Yes □ No □

4. Does the council tend to hire family? Yes □ No □

5. Does band employment depend on family or political relations with existing leaders? Yes □ No □

6. Are open positions of employment with the band posted on bulletin boards? Yes □ No □

7. Has your band ever had a third-party administrator appointed under the Indian Act? Yes □ No □

8. Do you think the band is overstaffed? Yes □ No □

9. Does the band use too many outsiders to do its work? Yes □ No □

10. Have you ever seen a copy of the band's financial statements? Yes □ No □

11. Overall, how would you rate your band's administration? Good □ Bad □

III. HUMAN RIGHTS

1. Does the Chief or council use band council resolutions (BCRs) to force residents to leave the reservation? Yes □ No □

2. Have residents been removed with BCRs within the last five years? Yes □ No □

3. Do band members removed from the reservation have the right to an appeal? Yes □ No □

4. Does an independent agency hear such appeals? Yes □ No □

5. Who appoints that agency? Chief/Council □ Other □

6. Do band members have security in the possession of their homes and enterprises? Yes □ No □

7. Have band members ever been evicted from their homes? Yes □ No □

8. Does the band provide its own police services? Yes □ No □

9. Is the band policed by an outside force, such as the R.C.M.P.? Yes □ No □

10. How would you rate the personal security of band residents? Good □ Bad □

11. How would you describe the percentage of band members incarcerated in jails or prisons over the last five years? High □ Low □

IV. TRANSPARENCY

1. Do you think the band council meets often enough? Yes □ No □

2. Are band council meetings open to band members on a regular basis? Yes □ No □

3. Are band council minutes and decisions made available to band members? Yes □ No □

4. Is there in place a formal process for consulting residents? Yes □ No □

5. Does the band publish a newsletter, information bulletins or other communications to inform members of band activities? Yes □ No □

6. Does the band allow access for its members to its business plan and financial statements? Yes □ No □

7. How would you rate the financial information given band members? Adequate □ Inadequate □

8. Are band members provided with information on the performance of band enterprises? Yes □ No □

9. To your knowledge, has the band council ever defaulted on its financial responsibilities? Yes □ No □

10. Do you think your band carries too much debt? Yes □ No □

11. Do you think your band's management of records is adequate? Yes □ No □

12. Is there a formal process in place for handling complaints from band members? Yes □ No □

V. SERVICES

1. Do you think your band's schools are performing well? Yes □ No □

2. Is your school drop-out rate good or bad? Good □ Bad □

3. Do you think your band provides enough support for those who want to go on to college or university? Yes □ No □

4. Overall, how would you rate your band's performance with regard to education? Yes □ No □

5. Do people in your community wait too long for medical attention? Yes □ No □

6. Overall, how would you rate your band's performance with regard to health services? Yes □ No □

7. How would you rate the access of your band members to welfare? Adequate □ Inadequate □

8. Does your band suffer from a shortage of housing? Yes □ No □

9. Do you think housing is assigned fairly? Yes □ No □

10. How would you rate the quality of water provided to your community? Good □ Bad □

11. Overall, are you happy with the services your band's leaders are providing? Yes □ No □

VI. THE ECONOMY

1. Do the members of your band council also run the band's businesses? Yes □ No □

2. Do you think the hiring of people to work for band businesses is fair? Yes □ No □

3. Does the band provide equal and fair access to credit or loan capital? Yes □ No □

4. How would you rate the availability of jobs in your community? Adequate □ Inadequate □

5. How would you rate the number of band members who have left the reservation? High □ Low □

6. Is or has the band ever been under third party management? Yes □ No □

7. Do you think your community's economy is growing? Yes □ No □

8. Do you think that your children would do better for themselves if they stayed in your community or left? Stay □ Leave □

Short Questionnaire

1. In the last Band Council election, were rightful voters able to trust that their votes, and only their votes, would be counted?

□ Yes, definitely   □ Probably not

□ Probably   □ Definitely not

□ Don't know/not sure

2. If you were a member of the Chief's family, would this

□ Guarantee a job   □ Not help

□ Help get a job   □ Make it more difficult

□ Be a small help getting a job   □ Don't know/not sure

3. Are Council minutes and decisions easily available to anyone on the reserve?

□ Always   □ Rarely

□ Mostly   □ Never

□ Sometimes   □ Don't know/not sure

4. Does the Council force people off the Reserve whom it doesn't like (with a Band Council Resolution - BCR)?

□ Definitely   □ Never

□ Perhaps sometimes   □ Don't know/not sure

□ Not really

5. Does the band allow access for its members to its business plan and financial statements?

□ Definitely   □ Never

□ Perhaps sometimes   □ Don't know/not sure

□ Not really

6. Do members of your band council or their family members run the Reserve's independent service outlets (for example retail outlets or restaurants)?

□ Definitely   □ Never

□ Perhaps sometimes   □ Don't know/not sure

□ Not really