

# SIZE DISTRIBUTION OF INCOME AND INCOME INEQUALITY AMONG THE NATIVE POPULATION OF NORTHWESTERN ONTARIO

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## Abstract/Resume

This paper examines the distribution of income among Native males and females in Northwestern Ontario and provides estimates of their annual income and the degree of income inequality as measured by the Gini coefficient. Their annual income is significantly below national and provincial levels. Moreover, the degree of income inequality within the Native population is greater than in provincial and national populations. The high incidence of low income among the Native population is associated with levels of employment and educational attainment.

Cet article examine la distribution des revenus par genre parmi les Autochtones en Ontario du nord-ouest. Il fournit des estimations des revenus annuels et le degré de l'inégalité des revenus selon le coefficient Gini. Les revenus sont considérablement au dessous des niveaux provinciaux et nationaux. Le degré d'inégalité de revenu parmi la population autochtone est aussi plus grand que les niveaux provinciaux et nationaux. Le taux élevé de revenu bas est associé aux niveaux de l'emploi et des résultats obtenus aux institutions d'enseignement.

## Introduction

While there exists an extensive literature on income distribution among the overall population of Canada,<sup>1</sup> the literature on income distribution among the Native population is scarce and, in the case of Northwestern Ontario, non-existent. The main reason for the lack of research on the topic is the difficulty associated with obtaining organized data on the level of income and other labour market characteristics of the Native population.

This paper attempts to fill this gap by undertaking an extensive survey of the labour market characteristics of the Native population in Northwestern Ontario. Using the information obtained through survey, we provide frequency distribution of income for Native males and females in Northwestern Ontario and estimate their average annual income and compare these to provincial and national levels.<sup>2</sup> In addition, we estimate the degree of income inequality as measured by the Gini coefficient for Native males and females and compare these to the provincial and national income inequality levels. We hypothesize that the level of income is directly related to the level of employment and educational attainment and attempt to examine whether the available information supports or rejects this hypothesized relationship.

## Sample Size and Characteristics of the Surveyed Population

In the summer of 1993, we undertook a survey of 784 Aboriginal people including on-Reserve Status Indians, off-Reserve Status Indians, non-Status Indians, General Registered Indians and Métis people belonging to different organizations, namely First Nation, Métis local, Women's local and others in the Northwestern Ontario region. Given the random nature of the survey, and noting that a relatively large sample size was employed, the estimates provided in this study can be regarded as fairly reliable estimates of true population characteristics.

Table 1 classifies the surveyed population according to their Aboriginal status. It shows that, from 784 Aboriginal people surveyed in this study, the majority, or 57.4 percent, are off-Reserve Status Indians followed by on-Reserve Status Indians who comprise 30.0 percent of the sample. The non-Status Indians, Métis, and General Registered Indians comprise about 4.8 percent, 7.5 percent and 0.1 percent of the surveyed population, respectively.

Table 2 presents the age distribution of the surveyed population by sex. We can observe that the sample not only represents both sexes approximately equally, but also represents different age categories. Each of the

**Table 1: Classification of Surveyed Individuals Based on Status**

<b>Status</b>	<b>Number</b>	<b>Percentage-</b>
On-Reserve Status	235	30.0
Off-Reserve Status	450	57.4
Non-Status	38	4.8
Métis	59	7.5
General Registered	1	0.1
Other	1	0.1
Total	784	100.00

**Table 2: Age Distribution By Sex**

<b>Age Category</b>	<b>Male</b>	<b>%</b>	<b>Female</b>	<b>%</b>	<b>Total</b>	<b>%</b>
15-19 years	85	22.14	67	16.75	152	19.39
20-24 years	80	20.83	77	19.25	157	20.03
25-34 years	81	21.09	102	25.5	183	23.34
35-44 years	83	21.61	89	22.25	172	21.94
45-54 years	38	9.90	51	12.75	89	11.35
55-60 years	17	4.43	14	3.5	31	3.95
Total	384	100.00	400	100.00	784	100.00

age categories of 15 to 19, 20 to 24, 25 to 34, and 35 to 44 years comprises approximately 20 percent of our sample. The age group of 45 to 54 years comprises about 11.35 percent of the sampled population and the final category of 55 to 60 years represents about 3.95 percent of the observations.

## Estimation of Annual Income and Income Inequality

Using the information obtained from the survey, Table 3 classifies the population under study into different income categories. Income is defined as total income from all sources including employment, self-employment, investment income, government transfer payments, pensions and others.<sup>3</sup> Table 3 shows that 18.85 percent of the surveyed individuals reported income of less than \$3,000 per year. About 65 percent had less than \$15,000 of income per year. About 76 percent of the population had less than \$20,000 per year and, finally, 90.4 percent had annual income of less than \$30,000. Table 3 shows the percentage of males in the higher income categories to be slightly higher than for females. However, there does not seem to exist a significant difference between the distribution of income between the male and female population.

Using Table 3, we can estimate average annual income and the Gini inequality index for the Native population in the region.<sup>4</sup> For this, we assume that individuals within each interval have the same income equal to the mean of that income category.<sup>5</sup> The only problem that arises is due to the presence of the open interval of income larger than \$35,000. To solve this

**Table 3: Income Distribution Among Native People of Northwestern Ontario by Sex**

<b>Income Category</b>	<b>Male (%)</b>	<b>Female (%)</b>	<b>Aggregate (%)</b>
No income	3.13	5.05	4.1
Under \$1,000	9.38	11.62	10.51
\$1,000 - 2,999	4.43	4.04	4.23
\$3,000 - 4,999	4.43	6.06	5.26
\$5,000 - 6,999	6.77	5.81	6.28
\$7,000 - 9,999	11.98	13.64	12.82
\$10,000 - 14,999	19.53	23.74	21.67
\$15,000 - 19,999	11.2	11.87	11.54
\$20,000 - 24,999	12.24	7.32	9.74
\$25,000 - 29,999	5.47	3.03	4.23
\$30,000 - 34,999	4.95	4.04	4.49
\$35,000 and over	6.51	3.79	5.13
<b>Total</b>	<b>100</b>	<b>100</b>	<b>100</b>

**Table 4: GINI Coefficient of Income Inequality**

<b>Population</b>	<b>GINI</b>
Native Males	0.437
Native Females	0.450
Native Population	0.447
Ontario	0.398
Canada	0.400

Source: Estimates for Ontario and Canada are based on data on income distribution in Ontario and Canada from Statistics Canada, "Income Distribution by Size in Canada," 1992, Cat. 13.207.

difficulty we will approximate the distribution above the lower limit of the open interval by a Pareto distribution.<sup>6</sup> Using this assumption, we estimated the average annual income of the Native male and female in the region to be equal to \$15,042.1 and \$12,042.9, respectively. Overall, the average annual income of the Native population 15 years and over is estimated to be equal to \$13,748.9.<sup>7</sup> The average annual income of the male and female population in Ontario in 1991 was equal to \$32,043 and \$19,761, respectively.<sup>8</sup> The corresponding figures, reported by the 1991 Census, for Canada were \$29,820 and \$18,040, respectively. According to the 1991 Census, the overall average annual income of individuals in the Province of Ontario and in Canada in 1991 was equal to \$25,967 and \$24,038, respectively. Comparing the income estimates for the Native population with the provincial and national averages, we observe that the annual incomes of the Native population of Northwestern Ontario are significantly below the provincial and national averages.

Given that the average income of the Native population is lower than the provincial and national averages, it would be of interest to know whether or not this lower income is distributed more equally among the Native population. For this, we estimated the Gini coefficient of income inequality for the Native population of the region. In addition, we also estimated the degree of income inequality in the Province of Ontario and Canada. Table 4 presents these estimates. We can observe that the degree of income inequality among the Native population of Northwestern Ontario is greater than the provincial and national levels. In other words, the Native population of Northwestern Ontario not only has a lower annual average income but has a higher degree of income inequality compared to provincial and national averages.

**Table 5: Employment Status**

<b>Employment Status</b>	<b>Male (%)</b>	<b>Female (%)</b>	<b>Total (%)</b>
Employed	39.05	36.62	37.81
Self-employed	4.75	3.54	4.13
Unemployed receiving U.I.	7.92	5.81	6.84
Unemployed (not receiving U.I. Benefits)	48.28	54.04	51.23
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

## Possible Causes of Low Income

In this section, using the information obtained from the survey and available national and provincial data, we attempt to shed some light on the possible causes of low income in the Native population of Northwestern Ontario. More specifically, we examine whether this low income is related to the level of employment and educational attainment.

Table 5 presents the employment status of the Native population surveyed in this study. Table 5 shows that only about 44 percent of males, and 40 percent of females, are either employed or self-employed. Overall, about 42 percent are either employed or self-employed. The rest, or about 58 percent of the Native population in Northwestern Ontario, are unemployed. Our survey also revealed that, within the employed population, only about 73 percent have full-time employment and the rest, or 27 percent, have part-time employment. We also found that about 70 percent of the unemployed population is actively looking for a job. Using the number of people who are unemployed but are actively searching for employment, we estimate the unemployment rate among the Native population of Northwestern Ontario to be equal to 40.65 percent.<sup>9</sup> The relatively high unemployment rate among the Native population in the region, compared to the overall unemployment rate of about 10 to 11 percent in Ontario and Canada, provides one explanation for the lower average annual income found among the Native people. As Tables 6 and 7 show, employment and

self-employment are the main sources of income for only 48.7 percent of males and 43.7 percent of females. The rest of the population relies on government transfer payments and other sources for income.

The high unemployment rate among the Native population of Northwestern Ontario is likely to be related to their various labour market characteristics including education, gender, age, experience, language, area of residence, etc. However, among these factors, the education variable is the closest proxy for qualification, which ultimately affects employability and income. In what follows, we examine whether there exists a positive association between employment and income and the level of educational attainment among the Native population of Northwestern Ontario.<sup>10</sup>

Table 8 classifies the surveyed population according to their highest level of primary and secondary education. The last column of Table 8 shows the cumulative percentage of Native population according to their highest level of primary and secondary education. We can observe that about 77 percent of the Native population 15 years and over has less than a grade 12 education. Only about 22.6 percent of the Native population 15 years and over has completed grade 12 or 13.

Table 9 presents and compares the educational level of the Native population in Northwestern Ontario with that of the population in the Province of Ontario and Canada. Table 9 shows that about 80 percent of the Native population has up to Grade 13 education. In Ontario and Canada, about 52 to 53 percent of the population has up to grade 13 education. Table 9 shows that only 4.34 percent of the Native people have university education as compared to about 20 to 22 percent in Ontario and Canada. Finally, only about 14 percent of the Native population has community college education compared to about 22 percent in Ontario and Canada. It is clear that the level of education of the Native population in the region is significantly below the provincial and national levels.

To examine the relationship between income and education of the Native population of the region, we selected the subset of the surveyed population who had full-time employment and tabulated their average annual income against their level of education. The choice of the fully employed individuals is based on the fact that variation in income can be caused by the number of days of work rather than the level of education or other labour market characteristics. Table 10 presents the relationship between the level of education and income of the Native population in Northwestern Ontario. The second column of Table 10 shows the average annual income of the full-time individuals according to different education category. As can be seen, there exists a remarkable association between the level of education and income. We can observe that as the level of

Table 6: Main Source of Income (Males) by Age Category

Age Category	Employment (%)	Self-Employment (%)	U.I. Benefit (%)	Welfare (%)	Family Benefit (%)	Pension (%)	Other Income (%)
15-19	36.67	8.33	1.67	40.00	1.67	0.00	11.67
20-24	40.26	2.60	9.09	37.66	1.30	0.00	6.49
25-34	51.32	6.58	11.84	23.68	1.32	0.00	5.26
35-44	44.05	5.95	11.90	19.05	7.14	0.00	5.95
45-54	45.45	9.09	9.09	6.06	6.06	6.06	6.06
55-60	15.38	7.69	0.00	15.38	7.69	23.08	0.00
Total (%)	42.57	6.12	8.75	26.53	3.50	1.46	6.71

Table 7: Main Source of Income (Females) by Age Category

Age Category	Employment (%)	Self-Employment (%)	U.I. Benefit (%)	Welfare (%)	Family Benefit (%)	Work-Comp. (%)	Disability Pension (%)	Pension (%)	Other Income (%)
15-19	30.43	0.00	0.00	23.91	30.43	0.00	0.00	0.00	15.22
20-24	21.92	2.74	9.59	23.29	32.88	0.00	2.74	0.00	6.85
25-34	48.94	4.26	9.57	11.70	21.28	0.00	0.00	0.00	4.26
35-44	51.16	2.33	3.49	13.95	17.44	2.33	3.49	0.00	5.81
45-54	40.48	9.52	7.14	7.14	16.67	0.00	9.52	4.76	4.76
55-60	35.71	7.14	0.00	7.14	0.00	0.00	28.57	21.43	0.00
Total	40.00	3.66	6.20	15.49	22.54	0.56	3.66	1.41	6.48

**Table 8: Highest Level of Primary and Secondary Education  
(Population 15 Years and Over)**

<b>Grade Completed</b>	<b>Number</b>	<b>(%)</b>	<b>Cumulative (%)</b>
0	4	0.51	0.51
1	2	0.26	0.77
2	4	0.51	1.28
3	14	1.79	3.07
4	9	1.15	4.21
5	10	1.28	5.49
6	22	2.81	8.30
7	14	1.79	10.09
8	93	11.88	21.97
9	116	14.81	36.78
10	204	26.05	62.84
11	114	14.56	77.39
12	154	19.67	97.06
13	23	2.94	100.00
Total	783	100.00	--

education increases so does the average annual income. We can also see that the average annual income of the full-time population is equal to \$27,286.23, which is significantly higher than the overall average income of the Native population in the region. The last column of Table 10 shows the percentage of full-time workers in each education category. We can observe that nobody in our sample with less than Grade 5 education had full-time employment. Moreover, the majority, or about 63%, of those who held full-time employment had above Grade 11 education. Therefore, information provided in Table 10 provides strong support for the hypothesis that the level of income and employment of the Native population in Northwestern Ontario is positively correlated with the level of educational attainment. In fact, national and provincial statistics show a similar link between education and income. Table 11 provides information on the average annual income of individuals in the Province of Ontario and

**Table 9: Population 15 Years and Over by Highest Level of Schooling (Percentage)**

<b>Grade</b>	<b>Native Population</b>	<b>Ontario</b>	<b>Canada</b>
0 to 4	4.21	2.45	2.76
5 to 8	17.75	9.06	11.13
9 to 10	40.87	12.10	12.50
11 to 13	17.75	28.29	26.53
Trades	1.40	3.44	3.98
University	4.34	22.22	20.77
Community College & Other Non University Education	13.67	22.45	22.32
<b>Total</b>	<b>100.00</b>	<b>100.00</b>	<b>100.00</b>

Source: 1 Statistics Canada (1991a)

**Table 10: Average Annual Employment Income by Education  
Native Population of Northwestern Ontario  
(Full-Time Workers)**

<b>Education</b>	<b>Income</b>	<b>% of Individuals</b>
Grade 0 - 4	n/a	0.00
Grade 5 - 8	20,576.92	9.42
Grade 9 - 10	26,763.16	27.54
Grade 11-13	28,244.68	34.06
Post Secondary Education	28,837.50	28.98
<b>Total</b>	<b>27,286.23</b>	<b>100.00</b>

Canada based on their level of education. Table 11 clearly shows that the

**Table 11: Annual Income by Education (1991)**

Education	Annual Income (\$)	
	Ontario	Canada
0 to 8 years Secondary and some	17,822	16,280
Post-Secondary	23,374	22,421
University Degree	46,532	42,991

Source: Statistics Canada (1991b)

level of education and income are positively correlated. Therefore, lower than national and provincial educational attainment among the Native population is directly related to their low level of income. This implies that a higher level of education and training is required in order to enhance the standard of living of the Native population in Northwestern Ontario.

## Conclusion

In this study we estimated the average annual income and the degree of income inequality for Native males and females in Northwestern Ontario and we compared those with the national and provincial levels. We observed that the average annual income of the Native population in Northwestern Ontario is significantly below the provincial and national levels. We also showed that the degree of income inequality among the Native males and females is greater than the national and provincial levels. In addition, we found that the unemployment rate among the Native people of the region is about four times greater than the national and provincial rates. The level of education among the Native population was shown to be significantly lower than national and provincial levels. We saw that the level of income is positively associated with the level of education. The analysis of this paper provided support for the hypothesis that the lower income among the Native population is directly related to their level of employment and educational attainment. Therefore, a higher level of training and education may offer a solution to the high incidence of low income among the Native population of Northwestern Ontario.

### Notes

1. For example, see Buse (1982).
2. This choice of the comparison group is primarily due to the lack of availability of comparable regional data from the 1991 Census.
3. This is identical to the definition used by Statistics Canada in defining total income.
4. Gini coefficient varies between zero and unity depending on the extent of income inequality. In the case of perfect income equality Gini coefficient is equal to zero and it increases as the degree of inequality increases.
5. It is clear that this procedure underestimates the true inequality level, because it puts the inequality within each income bracket equal to zero.
6. The conditional mean of the Pareto distribution given that income exceeds  $Y$ , is equal to  $m = (a / a - 1)Y$ . Income distributions in Table 3 do not have thick upper tails which implies values for  $a$  to be greater than 2. We assume  $a$  to be equal to 4 which defines mean income in the open interval to be a multiple  $4/3$  of the lower limit of this interval which is equal to \$46,666.7. For more on the use of Pareto distribution see Theil (1967).
7. Using the information provided by Statistics Canada (1991c). We also estimated average annual income for Native people in Canada and Ontario to be equal to \$13,771.95 and \$16,241.82, respectively. We have to note that the income intervals used by Statistics Canada are too wide, reducing the accuracy of the average estimates.
8. Data on average annual income of individuals in the Province of Ontario and Canada are taken from Statistics Canada (1991b).
9. Our estimate of the unemployment rate among the Native population of Northwestern Ontario is within the range of the estimates reported by Statistics Canada (1991c) for the Native populations of Newfoundland (48.9%), Yukon Territory (36.4%), Saskatchewan (31.8%), Prince Edward Island (31.5%), New Brunswick (31.5%), and Manitoba (30.3%).
10. There is an extensive literature relating the level of employment and income to various labour market characteristics of individuals. For example, see George and Kuhn (1994). A complete assessment of the causes and sources of variation in employment and income requires regression analysis which is beyond the scope of this paper. Our current research shows that variability in education is the most important factor explaining a significant portion of the variability of income among the Native population in Northwestern Ontario. This

explains our hypothesis that there exists a positive association between employment and income and the level of schooling. In the present paper, we attempt to examine whether the available data supports or rejects this association. The econometric analysis of the causes of income differential among the Native population of the region will be done in a separate research.

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