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**An Analysis of Wage and Income Inequality
Dispersion and Polarization of Income
among Aboriginal and Non Aboriginal Canadians**

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An Analysis of Wage and Income Inequality: Dispersion and Polarization of Income among Aboriginal and Non Aboriginal Canadians

It is well established that Canadians of Aboriginal origin, whether narrowly defined as Status Indians or inclusive of all those claiming partial aboriginal origin, face economic disadvantages in the labour market. Until recently, economists have paid little attention to the labour market behaviour of Aboriginal Canadians. Part of the reason for this stems, undoubtedly, from the fact that Canadians of Aboriginal origin comprise only a small proportion of the overall population of Canada. The most recent work done on the wage and income levels of persons of Aboriginal origin and their labour force participation was commissioned by the Royal Commission on Aboriginal Peoples (George and Kuhn 1994; 1996). The principal findings of previous studies were based on the 1986 and 1991 censuses and the postcensal Aboriginal People's Survey, 1991.

While examining cross-group differences across is important, it is also essential to investigate differences within groups. In open societies, legitimate differences in earnings are viewed as being a healthy indication of meritocracy at work. Those with greater abilities or those who are more productive are expected to earn more than their counterparts. Unfortunately, a free market economy can also leave many people at a serious economic disadvantage. Furthermore, many economies are not always efficient, resulting in many "deserving" people not being rewarded proportionately. Historically, we have seen how large numbers of economically disadvantaged or economically disenfranchised people can result in social cleavages. Highly polarized societies tend to experience

many social maladies and it was in recognition of these problems that most liberal democracies introduced some form of welfare legislation in the late 19th and early 20th Centuries to provide an economic “safety net.” Many nations that ignored those problems were wracked by revolution.

Disparities can also result from illegitimate causes such as labour force and market discrimination. Canada, in line with many other countries, has sought to ameliorate those problems by introducing laws forbidding social discrimination and by implementing employment equity. Illegitimate sources of discrimination are based primarily on one’s ascribed characteristics (such as gender or race) as opposed to achieved characteristics (such as one’s willingness to work hard or to become more educated). While most members of a society might be willing to accept reasonable disparities based on achievement, they are far less tolerant of disparity based on illegitimate distinctions.

Canadian social policy over the last half of the Twentieth Century has focussed on attempting to remove barriers to economic success across social groups. Thus, the income differential across the Aboriginal/non Aboriginal divide has been the focus of substantial attention within government. What has not been the focus of much attention, however, is the disparity within Aboriginal communities. Ironically, as with some affirmative action policies in the United States, it would appear that some policy attempts to reduce inequity across groups has led to greater disparity within the Aboriginal community. Thus, some communities that were once relatively economically homogeneous are now experiencing groups of haves and have nots.

Hopefully, this situation will be transitory. Unfortunately, broadening income inequality may weaken the social cohesion of those communities. Social cleavages and a lack of community cohesion may also undermine the ability of a community to become self-sustaining or to generate

the initial level of economic activity that can result in greater success for all in the long run.

The primary concern of this investigation is to identify the extent and determinants of wage and income inequity among Registered or Status Indians. To provide a richer context for this analysis, we will also include non Status Indians, Métis and Inuit in some of the analyses. This study compares the extent of wage dispersion and polarization among these four subgroups of Aboriginal workers to that of Canadian workers of non Aboriginal origin. This study also raises the question about whether the greater proportion of Aboriginal persons who have zero income affects the amount of income dispersion among the various Aboriginal sub-populations. Furthermore, this analysis examines the total reported income of these four Aboriginal subgroups, to identify the effect of government transfers and other sources of income on income dispersion and polarization.

ISSUES, ASSUMPTIONS AND HYPOTHESES

First Nations communities experienced some dramatic changes between 1985 and 1996. There have been social, economic and political forces, within Canada as a whole, that have affected these communities. First Nation communities, too, have been engines of change. This swirl of activity has brought considerable pressure to bear on Aboriginal peoples, both on and off reserves. The courts, for example, have created change with their clarifications of the evolving relationships between Canada's public and private institutions and First Nations.¹ There has been confrontation between First Nations and various levels of Governments in Canada over Aboriginal title, access to lands,

¹ These cases include, among others, *Guerin v. Attorney General of Canada* (1985), *Sparrow v. Attorney General of Canada* (1990) and *Delgamuukw v. The Queen* (1997) and *Donald Marshall v. The Queen* (1999).

resources and governance.² In the past decade, Canada held the most extensive investigation of the conditions of First Nations ever done in our history with the establishment and report of the Royal Commission on Aboriginal Peoples (1996).

Changes have also taken place within First Nations communities; Bill C-31 was passed and implemented by the Parliament of Canada in the 1980s. It resulted in more than 105,000 individuals gaining Indian status, a process that for many First Nations communities has meant increased pressures on resources, particularly housing stock. It has also meant an intense debate over community membership, which has, occasionally, resulted in considerable political turmoil. In the midst of all these internal and external pressures these communities have seen the transfer of many health and social programs from the Federal Government to the local community (Government of Canada, 1999). These transfers have, at times, taxed community capacities even while broadening their horizons. Access to capital and the potential to break age-old cycles of dependency has emerged in some communities as private sector interests. Examples include resource companies and banks that have begun to work in partnership with First Nations (Sloan and Hill, 1995).

It is interesting to consider whether these forces have manifested themselves in changes in circumstances for First Nation communities, and for Aboriginals without status. For example, have there been changes in their labour market income? Has the differential in labour market participation between Aboriginals, in general, and First Nations persons in particular, and the general Canadian population narrowed? Finally, have the dispersion and polarization in the wages of First Nations persons in their communities and other Aboriginal peoples become more or less pronounced?

²Kanesatake (Oka), Ipperwash, the New Brunswick Fishery and Gustafsen Lake, for example.

REVIEW OF EARLIER STUDIES

Over the past decade, a series of studies has examined the mean earnings of Aboriginal peoples in comparison to the Canadian working age population. The studies centre on the use of the 1986 Census Public Use Sample File (PUSF) (George and Kuhn 1994), the 1991 Census Public Use Microdata File (PUMF) (George and Kuhn 1995; Pedakur and Pendakur 1996) and, more recently, the 1991 Census PUMF and postcensal Aboriginal Peoples Survey (Clatworthy 1995; Bernier 1997). The studies differ as to the population studied, but those studies that divide Aboriginals into different constituencies find considerable variation in wages and total income between Aboriginal groups and between each of the Aboriginal groups and the non Aboriginal population.

A study by Clatworthy (1995) found mean income for workers of aboriginal origin to be \$17,367 but they also found real variation between the different Aboriginal groups. Non Status Indians had a mean income of \$21,035, Registered Indians \$15,791, Métis, \$18,467 and Inuit, \$15,690. They conclude that while the gap for those with full time/full year employment (40+ weeks) is smaller than those with other employment statuses, the earnings of registered Indians and Inuit were behind all other Aboriginals and even further behind the Canadian labour force as a whole.

George and Kuhn (1995) draw similar conclusions in their report to the Royal Commission on Aboriginal Peoples. They argued that conditional on full time/full year work, earnings of Aboriginal persons are 10.4% below those of the non Aboriginal population. This represents a slight improvement over their findings from the 1986 PUSF, where the differential was 11.0% (George and Kuhn, 1995:28). They find that for men, between about 30% and 55% of the Aboriginal–non Aboriginal wage gap can be attributed to differences in all the relevant observable characteristics of native and nonnative persons in the 1991 PUMF. For women, this accounts for 90% of the

difference. Specifically, they find that for men, education and training accounts for 30% of the wage gap, and for women, up to 50% of the gap is explained by educational differences (George and Kuhn, 1995:31).

In the George and Kuhn study, labour force participation rates are based on whether a person “worked in the week of the census survey.” They indicated that 58.7% of Aboriginal persons were employed while 70.4% of non Aboriginal Canadians were employed for a difference of 11.4%. Interestingly, George et al. (1995) disaggregated their data and found that for “those indicating **only** aboriginal origins” and those with multiple origins, the rates are considerably different. The 11.7% gap consisted of a 4% gap for those with multiple origins, and a 25% gap for those of single Aboriginal ancestry (George, et al.1995: 22).³

Bernier (1997) reports that workers claiming Aboriginal origins earned \$6,500 less than Canadians as a whole in 1990. For those who identified with a First Nation in the Aboriginal People’s Survey the earnings were a further \$2,900 lower. She adjusted for transfers, but did not control for the fact that Status Indians on reserve pay lower taxes. She does note that the income taxes would differ by about \$4,000 on a \$20,000 income, which would reduce the effective gap to \$5,400 (Bernier, 1997: 3-4).

Bernier also reports a series of measures of inequality and concludes that all of the measures she uses show that a greater inequality and polarization in wages exist among Canadians reporting Aboriginal origins than among Canadian workers as a whole. She also finds that the more restrictive the definition of “Aboriginal,” the greater the inequality and polarization of their distributions of

³This strongly suggests that data on persons reporting multiple Aboriginal origins should be separated from cases where only a single Aboriginal origin is reported.

wages (Bernier, 1997: 4).⁴

In addition, Bernier conducts an analysis that includes persons with “zero wage and salary income” by adding into her sample those who had either a positive income from employment in 1995 or positive income from Employment Insurance. She finds that inequality and polarization for Aboriginal peoples actually increases when Employment Insurance benefits are added to wages. Greater polarization suggests that general government transfers are less effective in reducing inequality in Aboriginal communities than in the non Aboriginal population.

THE STUDY

This study has two primary objectives. The first is to estimate the level of income disparity that exists among both non Aboriginal and Aboriginal Canadians, especially those who are Registered Indians. The second objective is to determine whether a number of standard human capital elements account for the income variability among those groups. Again, because of difficulties in comparing the non taxed income of many Registered Indians with the pretax income of non Registered Indians, it is difficult to make direct comparisons across groups. Instead, the pertinent question is “Do the same factors that account for variability in income within one group account for variability in income within another group?” Further, we will also attempt to determine whether those factors that account for income variability, do so proportionately across different demographic groups.

⁴Bernier used the Gini coefficient, the coefficient of variance an exponential measure and the FWP index of polarization. Some of these measures differ from our own but indicate similar trends.

The Population: Whom to Include?

The primary focus of this study is on those who report themselves as Aboriginal in their response to the census. We concur with Bernier (1997) that four analytically distinct groups within the Census identify the Aboriginal population: Status Indians, non Status Indians, Métis and Inuit.⁵ We must recall that because of political problems, there has been a substantial undercount of peoples living on reserves in recent censuses. How that underenumeration might affect the results is not entirely obvious; however, most underenumerated reserves are in the more economically active areas of the country, such as southern Quebec and Ontario. This suggests that the census data might underestimate both labour force participation rates and incomes among Registered Indians.

Studies based on census data have consistently assessed the Métis and non Status Indians as having less income disparity and less polarization than the Status Indians who inhabit the First Nations communities.^{6,7} Research has also assessed Status Indian and Inuit populations as having

⁵Any comparative analysis of the 1991 and 1996 census is difficult because the 1991 Census PUMF collapses the Inuit and Métis into a single category. We do not have access to the individual data in the adult file that would allow us to aggregate this category. We did experiment with creating proxy values based on proportions of Inuit and Métis populations by province, but found the results to be unreliable analytically. Attempts to use the Aboriginal People's Survey public use file were unsuccessful since that the income data are reported in categories rather than as a continuous variable. The use of means based on category midpoints would undermine any dispersion analysis. Therefore we have resorted to reporting Métis and Inuit as a single category in the analysis of the 1996 data. Previous analyses of data on the Inuit and Métis indicate that they are not similar groups. The Métis have patterns of dispersion that are similar to non status Indians; and, the Inuit display patterns closer to Status Indians on reserve. We therefore have not produced tables based on the 1991 data and have chosen just to report previous studies findings.

⁶When we speak of registered Indians living in First Nations communities we are using data for *all* Registered Indians. This has been a common practice in earlier research (Bernier 1997:11fn.14).

⁷See George and Kuhn 1995 for an analysis of the 1991 Census PUMF, George and Kuhn 1994 for an analysis of the 1986 Census PUST and Bernier 1997 for an analysis of the Census 1991 and Aboriginal People's Survey.

the greatest inequities among all aboriginal groups (Bernier 1997; Clatworthy 1995). In terms of change, we had expected that given the policy interest in First Nation communities, and their relative deprivation, there would be the greatest change in this group.⁸

Income: Just What are We Measuring?

While it may appear relatively straightforward, measuring income using publically available data is not easy. The primary sources of data for this type of analysis are the various Public Use Micro Files (PUMFs) released by Statistics Canada from the recent censuses. For this particular study, our attention will be focussed on the 1996 data since that is the most recent year available. All of the data in the PUMF are self-report, including the income data.

While the income data appear substantial, there are two significant omissions or problems relevant to this study. First, both wage and salary and total income are reported in before tax dollars. This is significant since a large proportion of the Registered Indian population do not pay income taxes, making their overall reported income somewhat incomparable to other Canadians. Second, income is reported for 1995. Data on labour force participation, however, is based on the respondents' activities during a reference week in 1996. Since the labour force status of Aboriginal Canadians is more variable than for non Aboriginal Canadians, there is generally more discordance between having a reported wage and salary income or not and being in the labour force or not. The relatively large numbers of non Aboriginal Canadians in the PUMFs tend to moot this difficulty.

⁸ The population on which this study focuses is comprised of those persons who identify themselves as being of single Aboriginal origin—Status Indian, non Status Indian, Métis or Inuit. We excluded categories of “multiple background” as it is unclear where these cases best fit, and the numbers of cases involved is very small.

Unfortunately, the sample size among Aboriginal Canadians is sufficiently small as to highlight rather than mask those difficulties.

Since our primary interest is with labour force earnings, we decided to limit the population studied to those between the ages of 18 and 64 inclusive. Below age 18 the numbers are too small since most of the population is either in school or not part of the labour force. While some people continue to work beyond age 64, it is still the case that most people are in retirement.

The analysis on labour force income uses reported non zero wage and salary income for the year 1995. We made the assumption that anyone reporting wage and salary income was in the labour force regardless of their reported status for the reference week. Furthermore, income data were not available for those with zero reported income in 1995 but who indicated that they were labour force participants in the reference week. Thus, including those people in the analysis would bias any income estimates downward.

For total income, we used the total income variable in the PUMF which includes wage and salary income, various government transfers and other sources of income such as investment income. Most of the aggregate difference between wage and salary income and total income is accounted for by government transfers.

Overall, our attention is drawn toward for measures of income:

- reported non zero wage and salary income for 1995
- reported total income for those reporting non zero wage and salary income in 1995
- reported non-zero total income from any source
- reported total income from all respondents including those reporting zero income.

It should be recalled that the focus of this study is on individuals. Most studies of economic

disparity or inequality focus on family units, for obvious and valid reasons. While such studies provide greater insight into issues of purchasing power or quality of life, they do not address economic issues relating to labour market equity. Generally, individuals are hired by employers and not families.

Table 1 suggests that, overall, Aboriginal Canadians report wage and salary earnings that are lower than the non Aboriginal population. Status Indians earn \$10,325 less than non Aboriginals and they are the lowest earners of any of the Aboriginal subgroups. Non Status Indians fared the best with a deficit of only \$6,353, but all the groups show a much lower level of wage and salary income. Again, mean income (wages and salary only) includes those with a positive income for 1995 and it is not adjusted for different taxation rules.⁹

Another important difference across the groups is the percent of the population not reporting wage and salary income. While 27% of the non Aboriginal group reported no wage or salary income, 42 % of the Registered Indians reported no such income. The remaining three groups were clustered between these two extremes—the non Registered Indians at 37%, the Métis at 34%, and the Inuit at 31%.

All of the measures of inequality are consistent as to direction and relative magnitude (Table 1). Greater inequality of wage income exists within each sub group of Aboriginal population than for non Aboriginal Canadians. The measures of inequality among the groups Registered Indians, non

⁹ Status Indians have a tax advantage if they live on reserve and collect their income from work on reserve. This advantage is calculated by Bernier (1997:3) to be approximately \$4,000 on \$20,000 of income. We could not adjust for this because the data do not specify where income was earned.

Table 1: 1995 Wage and Salary Income, for Persons Reporting Income, Ages 18-64 Inclusive*

	Non Aboriginal	Registered Under Indian Act (Status)	Non Registered Indians	Métis	Inuit
Mean Income	\$27,188	\$16,863	\$20,835	\$19,529	\$17,537
Coefficient of Variation	83.9	94.8	90.6	89.5	101.3
Gini Index	0.44	0.50	0.48	0.48	0.53
Thiel Index	0.32	0.42	0.38	0.39	0.48
Atkinson Index**	0.17	0.22	0.21	0.21	0.28
Percent without Income	27%	42%	37%	34%	31%
N (Reporting Income)	358,228	4,391	830	1,973	355

* Calculated from 1996 Census of Canada PUMF; Aboriginal status based on “Aboriginal Self-Reporting” variable and “Registered or Treaty Indian Indicator.”

** Using a shape parameter of .5.

Status Indians and Métis, however, are not significantly different from one another.¹⁰ The most inequitable distribution of wages, however, is among the Inuit. This finding is consistent with previous studies. Bernier (1997:14) concludes that the Inuit work fewer hours for higher wages in the lower quintile of earners. She speculated this may relate to a heavy emphasis on artisan endeavours. While this may account for part of the difference, it cannot account for the entire gap. A more important factor is related, but somewhat different: the geography of being Inuit. The largest concentrations of Inuit are in the North, specifically the Northwest Territory, the Yukon and the new Nunavut. An examination of labour force participation rates in these geographic areas reveals that “living in the North raises the employment rates of non Aboriginal men and women and the non participation rates of Aboriginal Canadians” (George and Kuhn, 1995: 6). Wage premiums are paid to non Aboriginals for northern work, but they are not paid to Inuit in the region. The Inuit in the North report more “in-kind” income, from hunting and fishing, for example, but report fewer weeks of work for wages and salaries (George and Kuhn, 1995:6). Given that the northern areas do not permit migration for jobs, what we really are seeing is a geographical area that functions in some ways as do reserves in the South. Those working in the artistic production sector and the marketing of artisanal products report higher incomes and therefore create some dispersion and polarization in income. The salaries paid to Government employees who are Inuit also enhances the dispersion.

¹⁰Based on bootstrapped 95% confidence intervals.

Table 2: 1995 Total Income for Those Reporting Non Zero Wage and Salary Income, Ages 18-64
Inclusive*

	Non Aboriginal	Registered Under Indian Act	Non Registered Indian	Métis	Inuit
Mean Income	\$30,249	\$20,111	\$23,817	\$22,534	\$21,063
Coefficient of Variation	80.0	81.1	81.4	80.9	87.8
Gini Index	0.40	0.43	0.43	0.43	0.48
Thiel Index	0.28	0.31	0.31	0.30	0.36
Atkinson Index**	0.15	0.16	0.16	0.16	0.19
N	490,816	7,597	1,314	2,974	515

* Calculated from 1996 Census of Canada PUMF; Aboriginal status based on “Aboriginal Self-Reporting” variable and “Registered or Treaty Indian Indicator.”

** Using a shape parameter of .5.

An examination of the data on Status Indians reveals that they experience the next greatest inequality. Indeed, there are clear disadvantages from the perspective of the labour market in which Status Indians find themselves. First Nations communities are made up almost exclusively of Status Indians. The reserve is therefore a key part of the conditions that contribute to the kinds of inequities we observe. The various indices suggest some interesting relationships. The coefficient of variation is most sensitive to the upper tail in the income distribution. It is also the measure that shows us the greatest dispersion. All the indices show the same patterns but at different magnitudes. The non Aboriginal to Aboriginal comparisons show a seriously inequitable situation concerning polarization toward the bottom of the range for Aboriginals. There are no differences between categories of Aboriginal persons.

Table 2 addresses the question of whether other sources of income (again, primarily government transfers) affect income dispersion among those in the labour force. As might be expected, the mean income increases for each category although the size of the increase varies. In absolute terms, other sources of income add \$3,061 to the wage and salary income of non Aboriginal Canadians, \$3,275 to Registered Indians, \$2,982 to non Status Indians, \$3,005 to the Métis, and \$3,526 to the income of the Inuit. In percentage terms, this translates into increases of 11.3%, 19.5%, 14.1%, 15.4% and 20.1% respectively. These other income sources contribute most (both in absolute and percentage terms) to the incomes of Registered Indians and the Inuit.

The central question to this research, however, is how do other sources of income influence polarization, dispersion and wage gap among those in the labour force?¹¹ As a comparison of the

¹¹ Total income includes wages and salaries, income from self employment, investment income, pensions and annuities, other cash income, family allowances, Federal child tax credit, OAS, CPP, Employment Insurance Benefits and other government transfers.

measures of dispersion across Tables 1 and 2 shows, inequity decreases for all groups although the relative ranking among the five groups remains the same. If we focus on the Gini index, the shrinkage in inequality among Registered Indians is such that, as a group, there is only slightly more inequality among them than among non Aboriginal Canadians (.43 to .40 as opposed to .50 to .44). With the exception of Registered Indians, income inequality is reduced by about 9-10 percent. Among Registered Indians, the reduction is 14% suggesting that income outside wages and salaries has a substantial levelling effect on the community.

So far, our analysis has focussed on those who reported having some wage and salary income for 1995. As Table 1 shows, there are substantial numbers of people in all groups who reported no such income. Among Registered Indians, this group consisted of over 40% of the population. Those not reporting wage or salary income are a diverse lot. Some are students, some are unemployed, some choose to be housewives/husbands, some are disabled, and some have simply given up on finding active employment. For comparison purposes, it is interesting to see what happens when those people are added to the mix. Some will have income outside wages and salaries as a consequence of pensions, government transfers, investment income and so forth; others will have no such income.

Table 3 reports total income for those between the ages of 18 and 64 reporting any positive income, and Table 4 includes all persons between the ages of 18 and 64, including those with zero income. As Table 3 illustrates, the percentage of persons with zero income is small, as most people with zero income from work would qualify for a transfer payment of some sort.

Overall, when those with any income (Table 3) compare favourably with those with wage and salary income (Table 1) in terms of inequality. Needless to say, the average income for each

group in Table 3 is slightly lower than the average income listed in Table 1. This is a consequence of those who have other than wage and salary income having less than those in the labour force.

Table 4, which includes all people between the ages of 18 and 64 regardless of income, indicates the impact of including those with zero income into the equation. Overall means drop (as is to be expected) although the relative ratios across the means remains similar to Table 1. The big difference, however, is the substantial increase in the indices of inequality reflecting the increased clustering at the low end of the distribution. Interestingly, the even with the inclusion of so many zero incomes, there are only small differences in inequality across the four groups.

The general pattern then, is one where regardless of which income measure we use, there are only small differences across the five groups regarding income dispersion. Across the four tables, the largest disparities occur when wage and salary income only is examined. Overall, though, the cross-group differences are more profound.

What remains to be examined, however, is whether the same factors account for income disparities within the groups. It is to this analysis that we now turn our attention.

Determinants of Income Inequality

Regression analyses were conducted in order to determine the relative impact of some factors known to affect income. Specifically, these factors are: age, sex, number of weeks worked during the year, work status—whether the person is employed part-time or full-time—level of education, skill level, industrial sector, and geographical area or region. Since our primary focus is on Status Indians, two regressions were conducted.

Table 3: 1995 Total Personal Income, for Persons Reporting Income, Ages 18-64 Inclusive*

	Non Aboriginal	Registered Under Indian Act	Non Registered Indian	Métis	Inuit
Mean Income	\$26,740	\$15,056	\$18,951	\$18,512	\$18,562
Coefficient of Variation	90.4	100.5	95.6	94.1	95.4
Gini Index	0.46	0.51	0.49	0.48	0.50
Thiel Index	0.36	0.44	0.40	0.39	0.42
Atkinson Index	0.19	0.23	0.21	0.21	0.22
Percent not reporting Income	6%	5%	6%	5%	8%
N (Reporting Income)	455710	7191	1233	2819	474

* Calculated from 1996 Census of Canada PUMF; Aboriginal status based on “Aboriginal Self-Reporting” variable and “Registered or Treaty Indian Indicator.”

Table 4: 1995 Total Personal Income, Ages 18-64 Inclusive*

	Non Aboriginal	Registered Under Indian Act	Non Registered Indian	Métis	Inuit
Mean Income	\$25,163	\$14,261	\$17,810	\$17,607	\$17,118
Coefficient of Variation	96.3	106	101.9	99.4	103.7
Gini Index	0.49	0.54	0.52	0.51	0.54
Thiel Index	0.42	0.50	0.47	0.44	0.50
Atkinson Index**	0.24	0.27	0.26	0.25	0.28
N	485115	7597	1314	2974	515

* Calculated from 1996 Census of Canada PUMF; Aboriginal status based on “Aboriginal Self-Reporting” variable and “Registered or Treaty Indian Indicator.”

** Using a shape parameter of .5.

The first analysis was on those identified as people with status in the PUMF, and the second included those who identified themselves as non Aboriginal in origin.

Table 5 presents a descriptive summary of the variables used, while table 6 presents the results of the regression analysis, illustrating some the possible reasons for variations in income.¹² As can be seen from table 5, there are substantial differences in the profiles of those reporting to have Status and the non Aboriginal population.

The regression analyses are conducted on the data available for persons who are non Aboriginal as well as for Registered Indians (First Nations peoples). The estimates allow a comparison of how education, skill level, job sector, gender and geography influence income variations within each of those groups.¹³

Overall, both models are statistically significant according to most standard criteria of significance ($\alpha=.01$). The variables considered account for a much larger proportion of the variance within the weekly wage and salary income of non Aboriginal as opposed to First Nations peoples. The R-squared value for the non Aboriginal sample is .304 indicating that 30.4% of the variance in log weekly wage and salary income is accounted for by the model. The corresponding R-squared value for the First Nations sample is .175 suggesting that 17.5% of the variance in log weekly income is explained by the model. These R-squared values are within the typical range found

¹²Only those with non zero wage and salary incomes between the ages of 18 and 64 years of age inclusive were included in the analysis. Because of the large number of non Aboriginal people in the PUMF, a further 20% random subset was selected to facilitate the analysis.

¹³ The dependant variable is the natural logarithm of average weekly income. The reasons for using a log are the following: (1) substantive parameters can be expressed as a percentage of income rather than absolute dollars; and (2) it reduces the technical problem of heteroskedasticity of the error terms.

in similar studies of individual income variability. The lower R-squared value for the First Nations sample indicates, however, that a larger proportion of the variation in the wage and salary income of First Nations peoples is accounted by factors exogenous to the current model.

The models contain three classifications of variables. The first group consists of the ascribed characteristics of age and sex. Standard human capital theory (Mincer, 1974; Becker, 1975) suggests that all else being equal, income displays a parabolic relationship with age. Personal income increases steeply in the early years of one's labour force life, flattens out in middle age, and then curves down slightly in one's later years. This pattern is reflected in the results of both regressions with the parameters for both age and age-squared being statistically significant at a .01 level of significance. The other ascribed characteristic, sex, is also statistically significant.

First Nations counterparts earn approximately 16% less.¹⁴ This could indicate that there is slightly less gender discrimination in wages being experienced by First Nations women, but, more likely, it is due to there being generally less differential between men and women at the lower end of the income distribution. In other words, this is probably an income floor effect at work.

The second group of variables we consider are what might be termed human capital characteristics. Age is sometimes included in this category when it is used as a proxy variable for experience. In this study, however, we have chosen to consider age as an ascribed characteristic. On the other hand, education and occupational skill level have been identified as central indicators of

¹⁴All categorical variables were "effect" coded. This means that the coefficients can be interpreted as percentage differences above or below the overall mean, *ceteris paribus*. Since the parameter for women in the non Aboriginal sample is approximately -.12, this means that women earn about 12% less than average while men earn approximately 12% more. Consequently, women earn about 24% less than men. A further consequence of "effect" coding is that all of the parameter values for a given categorical variable are constrained to sum to zero, i.e., $\sum b_i = 0$.

Table 5: Descriptive Summary of Variables Used in Income Analysis.

Variable	Registered Indians	Non Aboriginal
Mean log weekly income	5.83	6.11
Age	35.03	37.87
Weeks worked	34.34	42.76
Sex (Percentages)		
Female	48.05	47.24
Male	51.95	52.76
Education (Percentages)		
Less than grade 5	2.11	.83
Grades 5-8	9.92	4.02
Grades 9-13	25.37	15.71
High School Graduation	9.40	15.46
Trade Certificate/Diploma	4.96	3.95
Some University	32.77	29.62
University Graduates	15.47	30.41
Work Status (Percentages)		
Full Time Work	78.88	79.70
Part Time Work	21.12	20.30
Skill Level (Percentages)		
Level IV	22.33	12.93
Level III	35.07	35.76
Level II	26.65	27.58
Level I	15.95	23.74
Industrial Sector (Percentages)		
Primary Industries	9.59	4.28
Manufacturing	7.64	15.24
Construction	7.88	5.10
Transport & communications	6.19	7.61
Commercial activities	14.07	29.74
Government	21.14	6.95
Education	8.07	7.74
Health and social services	12.36	10.02
Accommodation	6.83	6.63
Other Services	6.22	6.68
Region (Percentages)		
Atlantic	4.98	7.89
Quebec	9.87	24.32
Ontario	21.55	38.38
Prairies	36.73	16.28
British Columbia	22.62	12.86
Yukon & NWT	4.25	.26
N	4,214	70,491

Table 6: Wage and Salary Income Regression Results

Variable	Registered Indians		Non Aboriginal Peoples	
	Parameter Estimate	t-value	Parameter Estimate	t-value
Intercept	4.4785	27.02	4.3634	120.01
Age	0.0574	6.11	0.0732	38.83
Age-squared	-0.0005	4.49	-0.0007	31.06
Weeks worked	-0.0027	2.75	-0.0037	15.28
Sex				
Female	-0.0818	4.72	-0.1243	36.05
Male	0.0818		0.1243	
Education				
Less than grade 5	-0.3161	3.31	-0.2085	7.21
Grades 5-8	-0.0439	0.93	-0.1504	10.01
Grades 9-13	0.0363	1.04	-0.0349	3.83
High School Graduation	0.0084	0.17	0.0257	2.82
Trade Certificate/Diploma	0.0606	0.98	0.0761	5.26
Some University	0.0608	1.88	0.1018	12.77
University Graduates	0.1939		0.1903	
Work Status				
Full Time Work	0.2912	14.67	0.3266	75.32
Part Time Work	-0.2912		-0.3266	
Skill Level				
Level IV	-0.1965	6.60	-0.2025	27.21
Level III	-0.0976	3.87	-0.1225	23.56
Level II	0.0758	2.80	0.0449	8.07
Level I	0.2184		0.2801	
Industrial Sector				
Primary Industries	0.1498	3.02	-0.0060	0.42
Manufacturing	0.2711	5.08	0.1243	14.96
Construction	0.1105	2.05	0.0547	4.18
Transport & communications	0.1139	1.96	0.1932	17.76
Commercial activities	-0.0990	2.42	-0.0401	6.33
Government	0.0071	0.20	0.1848	16.26
Education	0.0103	0.20	0.0015	0.14
Health and social services	-0.0636	1.42	0.0568	5.70
Accommodation	-0.3221	5.79	-0.3259	27.76
Other Services	-0.1780		-0.2433	
Region				
Atlantic	-0.1909	3.21	-0.1519	10.91
Quebec	0.0713	1.60	-0.0514	4.37
Ontario	0.0538	1.57	0.0298	2.63
Prairies	-0.1344	4.61	-0.0635	5.18
British Columbia	0.0200	0.59	0.0675	5.31
Yukon & NWT	0.1801		0.1695	
R2	0.1810		0.305	
Adjusted R2	0.1750		0.304	
N	4,213		70,491	

Women earn approximately 24% less than men in the non Aboriginal community, while their human capital.

Education has been divided into the seven categories. At the lower end of the educational scale, less than grade 5, there is a very high penalty in terms of wages—approximately 32% less than the average for all education levels. For those in the non Aboriginal group there is a lesser penalty (21%); however, the return to increased education is rapid for First Nations persons, where even small increments in education brings income up to the average for First Nations. Break-even income for non Aboriginals does not occur until high school graduation. This pattern indicates two things. First, the educational levels in the First Nations population continue to be considerably lower than for the non Aboriginals (see, George and Kuhn, 1995, for 1990 analysis), but their return for years of education is relatively high. The highest level of education, university graduation, returns about 19% above the average level of income for both the Aboriginal and non Aboriginal populations. The gap in wages suggests that there may be some discrimination even at this level of training.

An examination of level of skill reveals that, at the lowest skilled levels (Level IV and III), there is a substantial, but slightly lower, penalty to First Nations as compared with non Aboriginals.¹⁵ Income for the higher skilled jobs produces a slightly lower return for Status Indians.

The third group of variables considered relate to structural factors. Here we have identified weeks worked, industrial sector and region. The weeks worked parameter is slightly negative,

¹⁵This study uses the categories identified by Statistics Canada in its assessment of occupations (Statistics Canada, 1994). Specifically these groupings are: Level I—senior managers, middle and other managers, and professionals; Level II—semi-professionals and technicians, supervisors, foremen/women, administrative and senior clerical workers, sales and service personnel, and skilled crafts and tradespeople; Level III—clerical workers, sales and service workers, and semi-skilled manual workers; Level IV—sales and service and other manual workers.

showing that all else being equal, employers must pay a slight premium to workers who work fewer hours. Put another way, this parameter indicates that employers get a “quantity discount” when they purchase more rather than fewer of a workers hours. This factor is significant for both samples, although the weeks worked premium is slightly larger for First Nations employees in comparison to non Aboriginal employees (-.37% vs. -.27%).

The patterns of returns across industrial sectors varies a great deal between the groups. In the primary sector jobs, for example, First Nations persons secure a 15% above average income, but Government jobs for non Aboriginals deliver 18% above their group average, but are at the average for First Nations. This latter finding indicates that the government jobs for First Nations are less highly remunerated than the government jobs being secured by members of the non Aboriginal community. Employment in the areas of health and social services displays the same pattern.

Income advantages and disadvantages also differ by region. Both First Nations and non Aboriginal peoples experience disadvantages in the Atlantic region, -19% and -15%, respectively. However, the most striking finding is for the Prairie region where First Nations income is a full 13% below their mean, and non Aboriginals are only 6% below their mean.

As a Table 6 indicates, the overall profiles of First Nations and non Aboriginal people differ significantly along several of the dimensions included in this analysis. One question we might pose is, What would the average income of Status Indians be if they had the same profile as non Aboriginal Canadians? One way of addressing this question is to apply the parameter estimates in the regression equation for First Nations people to the descriptive profile of non Aboriginal people.

This exercise suggests that, overall, if Registered Indians had the same socio-demographic profiles as non Aboriginal people, then their average *weekly* income would likely increase by about

15% above the current level. Based on the current data, non Aboriginal Canadians earn approximately 29% more than Registered Indians. If Registered Indians had the same socio-demographic profile as non Aboriginal Canadians, that gap in income would be reduced such that non Aboriginal Canadians would earn just 13% more than Registered Indians.

DISCUSSION AND CONCLUSIONS

There are eight major conclusions to be drawn from this study.

1. The earnings of Aboriginal Canadians are much lower than the earnings of non Aboriginals.
2. Status Indians are the lowest earners among the Aboriginal sub-groups examined in the study.
3. Wage and income disparities in First Nations communities are slightly greater than among non Aboriginals.
4. Transfer payments play some role in moderating the level of disparities among those who identify as Registered Indians; however, they do little to narrow the apparent gap across groups.
5. When we compare the results of our study to the previous analyses from 1991, we find very little change. In terms of the wage gap both the relative difference—Aboriginal and non Aboriginal—and the intra-Aboriginal relationships have remained.
6. In the calculation of differences in income disparities, the treatment of persons with zero income heightens the disparity within all groups. Its impact in cross-group comparisons, however, is immaterial; that is, it makes little difference whether they are involved or

excluded.

7. Overall, most of the factors that account for income variability among non Aboriginal Canadians accounts for income variability among the Registered Indian population. The relative impact of those variables does differ, however, with some factors (such as sex) having less of an impact on income among Registered Indians than non Aboriginal Canadians and some factors having a greater impact.
8. A substantial part of the difference between the earnings of Registered Indians and non Aboriginal Canadians is a consequence of different socio-demographic structures. By imposing the socio-demographic profile of non Aboriginal Canadians on the parameters in the Registered Indian equation, we find that the average income gap between the two groups is reduced from about 25% to 13%.

In general, the findings of this study differ little from those conducted previously. The “big” issues remain the same. Canadians of Aboriginal origin have lower participation rates within the formal economy than non Aboriginal Canadians. Furthermore, Canadians of Aboriginal origin—especially Registered Indians and the Inuit—earn less than their non aboriginal counterparts. It is also the case that there are somewhat greater degrees of disparity among Aboriginal than non Aboriginal Canadians with the disparity being higher among the Registered Indians and the Inuit.

Perhaps the main contribution of this analysis is the observation that a substantial portion of the income gap between Registered Indians and non Aboriginal Canadians is a consequence of differences in their socio-demographic profiles. That is to say, Registered Indians tend to be younger, less well educated, and concentrated in lower skilled jobs than their non Aboriginal counterparts.

These are all factors that contribute to lower earnings.

While it is possible to extend this research into a number of areas—such as a more detailed analysis of the relative impact of transfer payments—there are several hurdles that impede our progress. Clearly, the omission of many underenumerated First Nations communities in the census is a problem.

The unavailability of after-tax income estimates for both Aboriginal and non Aboriginal Canadians is also an important issue. That group identified as Registered Indians contains some who pay income taxes and some who do not. This not only muddies the estimates of the meaning of earnings for this group but it also makes cross group comparisons difficult. Estimates of earnings in after-tax dollars would go a long way to clarifying the analysis.

Another major limitation is the inability to identify residential status. That is, we cannot determine who actually resides in a First Nations community and who does not. While most Registered Indians appear to live on reserve lands, we know that many do not. Since many reserve lands are outside major labour markets, it is difficult to know how much of the difference in income among Registered Indians and others is a consequence of being Aboriginal, and how much is a consequence of living on reserve.

BIBLIOGRAPHY

- Atkinson, Anthony B. 1970. On the measurement of income inequality. *Journal of Economic Theory*, 2: 244-263.
- Atkinson, Anthony B. 1996. Income distribution in Europe and the United States, *Oxford Review of Economic Policy*, 12:15-28.
- Becker, G. 1975. *Human Capital; a Theoretical and Empirical Analysis, with Special Reference to Education (2nd Ed.)*. New York: Columbia University Press.
- Bernier, Rachel. 1997. *The Dimensions of Wage Inequality among Aboriginal Peoples*. Ottawa: Statistics Canada, Research Paper Series No. 109, Analytical Studies Branch.
- Clatworthy, J. 1995. *Patterns of Employment, Unemployment and Poverty. Royal Commission on Aboriginal People: People to People, Nation to Nation*. Ottawa: Minister of Supply and Services Canada.
- George, P., P. Kuhn, and Arthur Sweetman. 1996. Patterns of employment, unemployment and poverty. A comparative analysis of several aspects of the employment experience of Aboriginal and non Aboriginal Canadian using 1991 PUMF. *Royal Commission on Aboriginal People: People to People, Nation to Nation*. Ottawa: Minister of Supply and Services Canada.
- George, P. and P. Kuhn. 1994. The size and structure of Native-white wage differentials. *Canadian Journal of Economics*, 27: 20-42.
- Government of Canada. 1999. *Ten Years of Health Transfer First Nation and Inuit Control*. Ottawa: Health Canada.
- Gusenleitner, M., R. Winter-Ebner, and J. Zweimüller. 1996. The Distribution of Earnings in Austria 1972-1991. Working Paper #9614, Economics Department, University of Linz.
- Mincer, J. 1974. *School Experience and Earnings*. New York: National Bureau of Economic Research.
- Royal Commission on Aboriginal People: People to People Nation to Nation. 1996. Minister of Supply and Services Canada.
- Sloan, Pamela and Roger Hill. 1995. *Corporate Aboriginal Relations: Best Practice Case Studies*. Toronto: Hill Sloan Associates Inc.
- Statistics Canada. 1994. *User Documentation for Public Use Microdata File on Individuals, 1991 Census*. Ottawa: Statistics Canada, No. 48-039E

Thiel, Henri. 1967. *Economics and Information Theory*. Amsterdam: North-Holland.

Wolfson, M. 1995. Divergent inequalities: theory, empirical results and prescriptions. Ottawa: Statistics Canada, Research Paper Series No. 66, Analytical Studies Branch.

APPENDIX

INDICATORS OF INEQUALITY

A series of assessments of inequality was carried out utilizing different measures of inequality and dispersion. It is well known that comparing income distributions may lead to different conclusions about the direction of change and the ranking of compared groups if the Lorenz Curves cross (Gusenleitner *et al.* 1996). If multiple measures that are sensitive to the different aspects of the income distribution are consistent, this represents a reasonable test that the curves do not cross and therefore one can draw conclusions about comparative ranking (see, Wolfson 1995).

We chose the Gini-index, which is sensitive to differences in the middle of the distribution, the Atkinson index, which is sensitive to differences in the lower tail of the distribution (Atkinson 1970 and 1996), and Thiel's measure of entropy which gives more weight to differences in the upper tail of the distribution (Thiel 1967). We also employ the Coefficient of Variation, a measure that is sensitive to differences at the top end of the distribution because it was used by others (e.g., Bernier 1995) in previous assessments of dispersion.

Formulae for indices of inequality

Coefficient of variation

The coefficient of variation is defined as the standard deviation, s , divided by the mean of the distribution, \bar{x} .

$$C = \frac{\sqrt{s}}{\bar{x}}$$

Gini Index

We used the computational formula for the Gini Index, which is given as

$$G = 1 + (1/n) - [2/(n^2\mu)] \sum_{i=1}^n (n-i+1)y_i$$

Theil's Entropy Index

The standard formula for Theil's Entropy Index is given as

$$T = (1/n) \sum_{i=1}^n (y_i / \mu) \log_{10} (y_i / \mu)$$

Atkinson Index of Inequality

The Atkinson index is actually a family of indices based on a presumed social welfare transfer function. The index is influence by a parameter, ϵ , where ϵ represents the proportionate value of \$1.00 of income transferred from a higher income earner to a lower income earner. In this analysis, ϵ was set to 1, thus making it conformable to the Gini Index.

$$A_\varepsilon = 1 - \left[\left(\frac{1}{n} \sum_{i=1}^n (y_i / \mu)^{1-\varepsilon} \right)^{1/(1-\varepsilon)} \right], \text{ when } \varepsilon \neq 1, \varepsilon \geq 0, \text{ and}$$
$$= 1 - \exp\left[\left(\frac{1}{n} \sum_{i=1}^n \ln(y_i / \mu) \right) \right], \text{ when } \varepsilon = 1.$$