DISPARITY IN THE MARGINAL RETURN ON EDUCATION

: ANOTHER FACTOR THAT DISCOURAGES CANADIAN

ABORIGINAL PEOPLE FROM ATTENDING UNIVERSITY?

by

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Abstract

As a special population group, Canadian Aboriginal people are always of interest to scholars and policy makers since the well-being of Aboriginal people was and is lower than the overall national well-being level. To improve Aboriginal people's well-being, improvement in education attainment is universally regarded as a prerequisite. From the 1600s onward, modern education and religious indoctrination has been imposed on Aboriginal societies by British governance, and later, the Government of Canada. For historical reasons, aboriginal people tend to keep themselves away from modern education, which has deferred their progress to a richer life. Also, government funding for Aboriginal post-secondary education has been insufficient. Under such a situation, Aboriginal people might still want to go to university in hopes of receiving a higher wage. But will Aboriginal people be discouraged when looking at the disparity in marginal return on education between different ethnic population groups?

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Introduction

1.1 Aboriginal People

It is well known that Canada is a country that consists of people belonging to different ethnic groups, and the group of Aboriginal people is called the "First Nation" since Aboriginal people regard themselves as the earliest residents of Canada. Technically, "Aboriginal" is a term used to describe anyone identifying himself or herself as a registered North American Indian, Métis or Inuit (living either on or off reserve). Also included are all those who reported being a Treaty Indian or a Registered Indian as defined by the Indian Act of Canada, as well as members of an Indian Band or First Nation. These groups include those people who reported both single and multiple identities. For example, a person who reported identifying as both North American Indian and Métis would be counted in both the North American Indian population and the Métis population. However, such persons are only counted once in the total Aboriginal Identity population. Aboriginal people make up about 3% of Canada's population in the 2001 Census.

The life of Aboriginal people has changed tremendously since British and French settlers arrived in Canada. Great effort was made to ensure that Aboriginal people would be absorbed into a European-based Canadian society. Historically, Aboriginal people's life style has been distorted and transformed by the influx of Western immigrants and their culture. Conflicts between Aboriginal people and Western incomers have brewed since the day Western people stepped on this broad land.

1.2 Review of the history of Aboriginal people's education

I. Primitive education vs. modern education

"Traditionally, education for Aboriginal people was mainly about learning values and practicing them. This is also referred to as traditional knowledge."[1] (Cathy

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[1] Traditional knowledge is a term used to describe a body of knowledge built by a group of people through generations living in close contact with nature

Richardson and Natasha Blanchet-Cohen, 2000) Elders played a central role in passing on the teachings. Elders were resource persons for a "person's relationship with self, family, community and Creator. They [deal] with the mental, emotional, and spiritual health of parents and children" (Hammersmith and Sawatsky 1995:80)

Obviously, European-style education was fundamentally at odds with First Nations' world view and traditional educational methods in that traditional learning was accomplished by observing adult role models for Aboriginal people. This style of education is sometimes referred to as "field-dependent," as opposed to the abstract or rote learning in Western society which is "field-independent." "The passing on of Aboriginal traditional knowledge was seen as a community effort in which every individual had a place in the circle." (Cathy Richardson and Natasha Blanchet-Cohen, 2000)

Viewing the natural environment as the classroom, and the land as the mother of the people, Aboriginal people's primitive education system has been incompatible with European-style education, and this inconsistency became the first factor that made Aboriginal people unwilling to attend school for the past hundreds of years.

II. Policy of indoctrination and assimilation

The introduction of European-style education to Aboriginal people in Canada can be traced back as far as the mid-1600s when schools operated by religious missions were first introduced in some regions. Some communities did not see the arrival of European missionaries until much later. Regardless of the timing, location or context, formal education was defined as:

Formal education was, without apology, assimilationist. The primary purpose of formal education was to indoctrinate Aboriginal people into a Christian, European worldview, thereby "civilizing" them (Royal Commission Report Vol. 3 1996:434).

So it is obvious that the introduction of European-style education was intended to

"civilize" Aboriginal people and designed to indoctrinate them into a western belief system. The missionaries did bring literacy to Aboriginal people. However, intent on saving souls, they actively set out to destroy the "heathen" practices of Aboriginal people. Just like what Jordan (1988) claimed "The early schools, which were run by missionaries, were a major force that acted to destroy the identity and culture of the indigenous people". Sticking to their own belief system and education methods, Aboriginal people naturally brewed a kind of resistant emotion against European-style education imposed on them due to its "vicious" intent.

Besides the missionary schools, a church-state run residential school system established as early as the 19th century became nightmare for Aboriginal children's. Residential schools grew fastest in the early 1920s and 1930s. Aboriginal children were displaced from their families into residential schools, where they were forbidden to speak their own language and practice their culture. Isabelle Knockwood, a First Nation woman's story evokes memories of the horrible practices and conditions that prevailed in residential schools:

> ...the biggest crime was running away. They [boys] were brought back in a cop car by the Royal Canadian Mounted Police. The boys' heads were shaved and they were kept in the dark closet, sometimes for several days and nights. They were strapped and fed only dry bread and water. In one case, the boys were tied to a chair and left there for two days...

Deeply hurting Aboriginal peoples' feelings, the government's policy of forced assimilation and indoctrination became the second factor that induced Aboriginal people to be resistant to formal education.

III. Government's control over Aboriginal education

Under the Indian Act (1876) the federal government was entirely responsible for control of on-reserve Aboriginal childrens' education. After almost a hundred years, in 1969, the federal government announced its "White Paper Policy" which sought to

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transfer the responsibilities for on-reserve Aboriginal education to the provinces. This policy induced protest from Aboriginal people and the resulting "Red Paper Policy" associated with a policy statement "Indian Control of Indian Education (1973)" which was regarded as a key document in the history of Aboriginal education. In 1973, "Indian Control of Indian Education" was accepted in principle by the federal government as a national policy.

The nature, freedom and autonomy of education were always favored by Aboriginal people. They thought they should take full control over their own affairs. Losing autonomy in education for hundreds of years may have become the third factor which drove Aboriginal people away from formal education.

IV. Racism

Over the past 100 years, Aboriginal students have faced an inordinate amount of psychological stress and identity conflict as a result of the education system. The sense of racism that have rooted in their minds for a long time to a large extent can be ascribed to the education system, such as the extremely negative influence of residential schools. "Many researchers and Aboriginal people themselves hold the view that there has been systematic and institutionalized racism by the Government of Canada" (Pauls, 1996)

Although Aboriginal people may admit that higher education could get them higher earnings, potential discrimination in the education system and labor market may keep them from acquiring higher education.

V. Post-secondary education

The above paragraphs draw a big picture of the history of Aboriginal peoples' education, and address historical reasons why Aboriginal people do not completely accept or sometimes even resist modern education. This paper focuses on university

education for Aboriginal people that could be studied in the light of this historical background. Apparently, something specific for university education should be presented. The "Indian Control of Indian Education" policy statement made special reference to the importance of post-secondary education:

Considering the great need there is for professional people in Indian communities, every effort should be made to encourage and assist Indian students to succeed in post-secondary studies (1973:13).

Similar to other levels of education, university education for Aboriginal people also suffered the problem of the loss of autonomy. As enacted by law in 1956, the federal government was responsible for the funding of Aboriginal students in post-secondary education. No coherent government program existed until 1977 when the "Appropriations Act", known as E-12 guidelines, allowed for funding for First Nation post-secondary education. The E-12 guidelines were replaced in 1989 with the post-secondary student assistance programs, which tightened eligibility and restricted funding for Aboriginal students. As a result of this policy, potential students were denied funding. This change in policy was condemned in the 1989 "Canadian Human Rights Commission Report":

The decision to restrain the growth in funding to attend post-secondary institutions seems ill-considered. We have underlined on several occasions that, given the importance of education, and particularly technical and post-secondary education, it would be worse than shortsighted not to guarantee every possible opportunity to able native persons to pursue their schooling at the post-secondary level (1990:16).

In April 1991, the Prime Minister announced a five-year spending plan but this was not sufficient. Still, many First Nation students are denied attending post-secondary education. Aboriginal students have been facing the problem of insufficient government funding for post-secondary study. According to the findings in this paper, government funding is suggested and the government should further eliminate the inequality in the labor market.

Colonial history left Aboriginal people with concerns and barriers when they consider university education. However, in order to live a better life, it is necessary for them to acquire higher education, especially university education. But when looking at the disparity in marginal return on education, Aboriginal people might again be discouraged. The positive, but possibly lower marginal return on education make Aboriginal people face an even more awkward situation. Choosing to attend university means taking steps to get higher payment in the future, but it might also mean choosing to be potentially discriminated against in an invisible way. Should difference in marginal return on education concern Aboriginal people? This paper will search for the answer to this question.

1.3 Educational attainment

The gap in educational attainment is radical in that it can contribute to gaps existing in other aspects of well-being. As important as it is, education has been called "the key that unlocks the door to the future" (RCAP 1996b:161). A sound formal education is increasingly important for participation in today's workforce and is often a key component of mental and intellectual well-being.

The educational attainment of Aboriginal people has been unsatisfactory for the aforementioned historical reasons. But during the past ten years, inspiring progress has been made according to the statistics. It seems that Aboriginal people have realized the importance of acquiring formal education. As for pre-university level of education, between 1996 and 2001, the proportion of Aboriginal people aged 25 to 64 who did not have a high school diploma went down from 45% to 39%. In 2001, it is obvious that the proportion of Aboriginal people with a trade certificate was higher than that in the non-Aboriginal working age population: 12.1% in the Aboriginal population compared to 10.8% in the non-Aboriginal population.

Aboriginal people have also improved at the post-secondary level. Between 1996 and 2001, the proportion of Aboriginal people with post-secondary qualifications

(trades, college and university certification combined) increased from 33% to 38%. Focused on non-reserve Aboriginals, census data for 1996 show that 34% of Aboriginal people aged 25 to 44 residing in non-reserve areas had completed post-secondary studies. By 2001, this figure had risen to 39%. The 2001 proportion for the total Canadian non-reserve population was higher at 55%.

The improvement made, however, cannot conceal the gap, when compared with educational attainment of the non-Aboriginal population. In 2001, 15.7% of the non-Aboriginal population aged 15 and over had a university degree, compared to 4.4% for the Aboriginal population. Comparing the educational attainment of Aboriginal people with that of the non-Aboriginal people suggests that there is still a long way to go for the former. The statistics suggest that Aboriginal people have improved more in pre-university education than in university education.

Figure 1 School attainment level of Aboriginal peoples
People reporting Aboriginal identity and non-Aboriginal population aged 15 and over, 2001
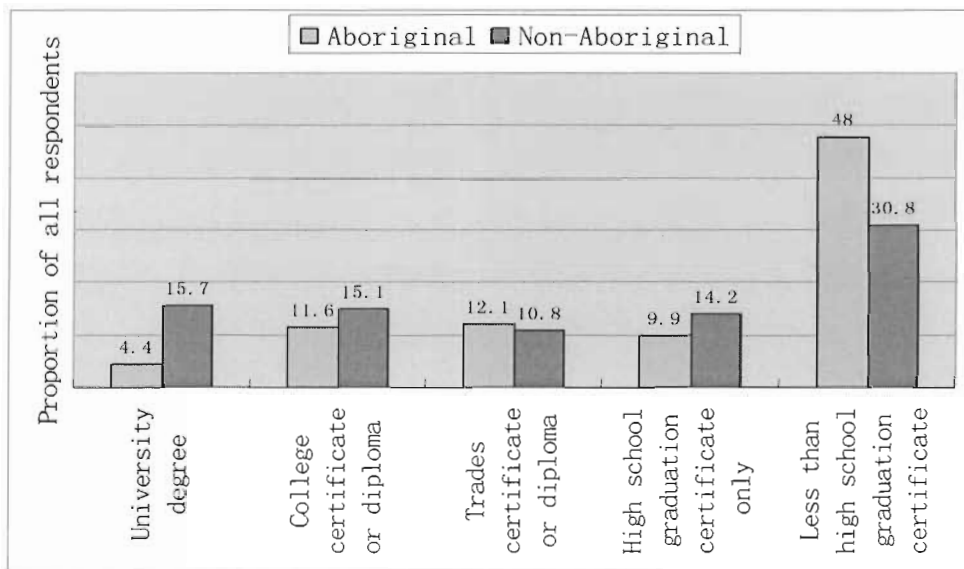
This histogram suggests that more Aboriginal people are gathering at "less than high school graduation certificate" level relative to Non-Aboriginal people. Translating this level into years of schooling, it is around "13 years or below".

1.4 Performance in the labor market: disparity in wage

Plenty of literature has explored how the gap in education has influenced performance in the labor market for Aboriginal people. Most of it focuses on unemployment in that unemployment is usually viewed as the most important indicator of the state of the labor market.

Instead of unemployment, the subject of this paper is how increased education could improve Aboriginal people's wages. It is well documented that education levels of a population are tied to economic characteristics. Those individuals who achieve higher levels of education are more employable and tend to earn more income, and is the foundation based on which the paper is developed. Before the 1970's, most of the discussion about the role of education in the economic development of Aboriginal societies had been done by specialists in the field of education. One of the earliest application of quantitative methods to analyzing the effect of education on income for Aboriginal people appeared in "Education and Economic Development: the Case of Indian Reserves in Canada (Paul Deprez, 1973)", in which a significantly positive correlation between educational levels and income per capita was not found. This seems to be at odds with my findings. Later, Krishna Pendakur and R. Pendakur (2005) examined the earning disparity faced by visible minority people at the top of the earning distribution. These papers inspired my interest in the marginal return on education.

Based on some facts, a positive relationship between wage and education for Aboriginal people may be doubtable due to unfavorable observations on unemployment. During 1991-2001, the unemployment rate of Aboriginal people relative to that of the non-Aboriginal labor force increased. Aboriginal unemployment rate went down from 24.5% to 19.1%, while total unemployment rate went down from 10.2% to 7.4%. According to Statistics Canada, relative unemployment rate went up from "240" to "258" during this ten years. In light of this lasting unemployment record and considering the gains made in Aboriginal education during

this period mentioned in the preceding section, the question is whether education could be a powerful engine for improved performance in the labor market in terms of income prospects. Could wage be increased by achieving university education for Canadian Aboriginal people?

According to my findings, for most of this period wage is significantly positively related to educational attainment at university level for Aboriginal people. And educational attainment is also highly related with Aboriginal people identity. So the positive marginal return on education could be a motivation for Aboriginal people to attend university for economic consideration.

But another problem may impair this seemingly obvious conclusion. Given the Aboriginal status, is the marginal return on education the same for Aboriginal and Non-Aboriginal people, or more extremely, for white?[2] Suppose the marginal return on education is significantly different between Aboriginal people and its counterpart groups, then it will give rise to the issue of inequality and thus the appeal of a higher wage resulting from increased education will be reduced, which means that Aboriginal people might be less motivated by an expected higher wage to go for university education than when facing no such inequity. As to this question, we will see that the disparity in the marginal return on education does indeed exist, but it should not be another factor that discourages Aboriginal people from going for university education due to its relatively small magnitude.

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[2] White people are a proportion of Non-Aboriginal people

2 Data and Methodology

2.1 Data

The 2001 Census Public Use Microdata File (PUMF) on Individuals contains data based on a 2.7% sample of the population enumerated in the census. It provides information on the demographic, social and economic characteristics of the Canadian population. I regret the inability to disentangle on-reserve and off-reserve Aboriginal people. And this omission of on-reserve status might be the source of bias in that on-reserve and off-reserve Aboriginal people may be associated with different personal or work characteristics. For example, on-reserve Aboriginal people might have access to some special markets that off-reserve Aboriginal people do not have, and this could make Aboriginal people's wage biased upward.

When analyzing the marginal return on education, we use logarithm of wage as a dependent variable. The reason why we use wage rather than the variable "income" is because income involves not only wage, but also some types of transfer payment, and this is the case especially for particular groups of the population, such as Aboriginal people. Since transfer payments are independent of educational attainment, it will generate inaccuracy if we use income instead of wage.[3] And since we are interested in the marginal effect of educational attainment on wage, we drop the proportion of people who have no wage income, and those whose annual wages are less than $100 as well.

Educational attainment is divided into twelve levels as in Table 1 (people who did not report any level of education will be dropped). Thus, by "marginal return on education" or "marginal effect of education on wage", it means how much percentage change in wage (since we use logarithm of wage) would be induced by increasing one level of education, when we use different levels of education as independent variables. So educational attainment will be firstly used in the form of dummy variables in this

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[3] Based on sample data of 2001 Census of Canada, the correlation coefficient between "wage" and "total income" is 0.8592, which means they are positively highly correlated.

context, and by doing this we could focus on university education. We will then let educational attainment take the form of a numerical variable for stronger argument. When studying whether Aboriginal status influences educational attainment, educational attainment will take numerical form.

Since we want to rule out the effect of birth place on income, we drop the data of individuals who was not born in Canada. Also, different birth places within Canada are controlled for in that regional wage difference may exist and could possibly distort the results. The fact that Aboriginal people tend to reside in in several specific provinces and territories may lead to endogeneity if we do not control for birth place.

Work characteristics will also be controlled for. The reason is that Aboriginal people tend to be absent in specific fields, and over-represented in some other fields. Statistics of Census 2001 shows that Aboriginal people are notably absent from management services, finance and insurance, and professional, scientific and technical services:

This is not surprising since a large number of the jobs found in these sectors require university or college degrees, a requirement at odds with the Aboriginal population's lower school attainment levels. In contrast, Aboriginal people are over-represented in public administration, which includes local government such as Band administration, mining and oil and gas extraction, and construction. (François Lamontagne, 2004)

We will also control for official language knowledge, household size, and marital status. Age will be divided into five-year intervals and controlled for. People who are below 25 or above 64 years old are dropped.

2.2 Methodology

The analysis will be divided into mainly three steps. Firstly, the seemingly self-evident negative relation between aboriginal status and educational attainment will be supported by statistical evidence. In order to justify this relation, regression

Equation 1 is specified as following:

Years of Schooling = Aboriginal dummy + X+ u   *(1)*

In this Equation 1, we run OLS regression of education level (years of schooling) on the Aboriginal dummy variable and other control variables X, and u is the disturbance term. X here includes age, marital status, language knowledge, household size, birth place, and gender.

What needs to be mentioned is that education level here is not the set of 12 different levels we categorized in the previous data section. Here we will use "total years of schooling", which exists in the form of a numerical variable instead of those 12 education levels, so as to make the regression result more meaningful and interpretable (See Table 2 for information about years of schooling). Aboriginal dummy is assigned the value 1 if the respondent is Aboriginal, and 0 if otherwise. By running this regression we can obtain a general view about how Aboriginal status is correlated with educational attainment — is overall educational attainment (here, years of schooling)significantly lower for Aboriginal people?

Roughly speaking, years of schooling of Aboriginal people may tend to lag behind that of Non-Aboriginal people, but the disparity across different years of schooling may not be evenly distributed. Statistics suggest that education of Aboriginal people tends to lag more behind that of Non-Aboriginal people after post-secondary level, and less before post-secondary level. So it is sensible to infer that this disparity in education between Aboriginal and Non-Aboriginal people varies across the distribution of years of schooling. To justify this feature of lag, quantile regression techniques will be properly applied to Equation (1). The following is a brief introduction about quantile regression,

Regarding the quantile regression, for any given set of right-hand side conditioning variables, X, and left-hand side response variable, Y, the quantile regression finds parameters to fit the model:P [Y $\leq X\beta p$] = p. When p=0.50, this corresponds to median regression, whose parameters can be found by minimizing the

sum of absolute deviations of Y from the regression line Xβ0.5.   When p corresponds to a different quantile, the spirit of the optimization is still to minimize functions of absolute deviations, but the computations are via linear programming (Krishna Pendakur and R. Pendakur, 2005).

After obtaining β's for different quantile p, we can compare these different β's and conclude if Aboriginal people lag behind Non-Aboriginal people more at the top of the distribution of years of schooling, or more at the middle or bottom of the distribution. The findings here may serve as a reference for policy makers in terms of providing them with more comprehensive knowledge about the state of educational attainment of Aboriginal people.

For the second step we will focus on the marginal return on education for Aboriginal and Non-Aboriginal people. The regression Equation 2 to be used is:

Ln (Wage) = Education Level dummies + X' + ϵ   *(2)*

Here, X' is defined different than X in Equation (1). Other than all the variables that are included in X, X' also involves work characteristics (industry, weeks worked, full-time/part-time status and occupation). And ϵ is the disturbance term. The more mentionable difference is that now education levels are those 12 levels we categorized in the data section, which is not a numeric variable, but a set of dummy variables. Since educational attainment is categorized into 12 levels, 12 dummies for education levels are generated and one of them (less than grade 5) will be left out in the regression results as base level. By doing this, we could obtain coefficients for 11 dummies and interpret them as the percentage change in wage brought about by increasing educational attainment from the base level to any chosen level. Since all the coefficients of education dummies are comparable with the base level, they are also comparable to each other. If we compare the coefficient of a specific level of education with that of the nearest lower education level, we will get the percentage change in wage induced by increasing education from the nearest lower level to the chosen level, and thus we can derive a marginal return on education.

The same regression will then be applied to Non-Aboriginal people and white. The coefficients of education dummies will be obtained and interpreted the same way as with Aboriginal people. The comparison will illustrate if there are differences in marginal return on educational attainment between Aboriginal people and Non-Aboriginal or white people for each level of education. Since there might exist invisible racial discrimination related to Aboriginal status, it is of great interest whether the set of coefficients of educational attainment for Non-Aboriginal people is greater than that for Aboriginal people at each level of education. And since Non-Aboriginal people consist of other ethnic groups of people than white, such as visible minority people, so due to the same invisible racial discrimination as faced by Aboriginal people we might expect that the set of coefficients for Non-Aboriginal people will be less than that for white people at each level of education.

A problem at this step of the analysis is that we do not know if the differences in coefficients among different groups of people are statistically significant. So we need to bring the analysis into the third step where we will use two approaches to get around this problem.

The first approach is to substitute education dummies in Equation (2) with total years of schooling and the interaction between total years of schooling and a high school dummy, where the high school dummy is assigned value 1 when one person has less than high school graduation level of education, or assigned value 0 when he or she has graduated from high school. Then the Equation (2) will turn into:

Ln (Wage) = Years of Schooling + Interaction between Years of Schooling and High School dummy + X' + ε   *(3)*

The quadratic form of years of schooling and the interaction between high school dummy and years of schooling squared were tentatively included but were dropped at last since this inclusion made the coefficients of these two terms and the coefficients of years of schooling and the interaction between high school dummy and years of schooling all insignificant. This regression equation will be applied to Aboriginal and

Non-Aboriginal people separately.

The second approach is to combine Aboriginal and Non-Aboriginal people into one regression equation by generating a dummy variable regarding Aboriginal status. In order to investigate if Aboriginal status could affect marginal return on education, an interaction term between aboriginal dummy and education dummies will be included. The Equation 3 is specified as follows,

Ln (Wage) = Education Level dummies + X' + Interaction between Aboriginal dummy and Education Level dummies + η   (4)

Here the aboriginal dummy is defined the same as that in Equation 1, and education level dummies and X' are defined the same as those in Equation 2. Disturbance term is represented by η. This regression analysis can offer a piece of important information. It will show if Aboriginal status would lead to a statistically significant difference in marginal return on educational attainment between Aboriginal and Non-Aboriginal people. If the difference is statistically significant, which means invisible discrimination is present in this context, Aboriginal people may be less motivated to attend university by the potentially higher wage than when facing no such discrimination.

3 Results

3.1 Disparity in educational attainment

Now we are going to show the result of regression for Equation 1. See Table 3. According to the OLS (Mean) regression, a difference of about 1.12 years of schooling can be observed. Generally speaking, the years of schooling of Aboriginal people will be about 1.12 years less than that of Non-Aboriginal people. Based on the T-statistic, this coefficient from OLS regression is statistically significant (t-statistic greater than 20), which means the difference of 1.12 years is statistically significant. However, except for average disparity, it does not say anything about the distribution of disparity in education between two groups of people, which could be answered by the results from quantile regression.

Two features in the results are prominent. First, across the deciles below 70%, there is a descending tendency of the values of aboriginal dummy coefficients. Second, above 70% decile, all the coefficients vanish. We will explain these two features in order to obtain more detailed knowledge about how the distribution of years of schooling varies across two groups of people.

The descending tendency of the coefficients of aboriginal dummy actually means that as total years of schooling go up, the disparity in years of schooling between Aboriginal people and Non-Aboriginal people is broadened. Below the 70% decile, Aboriginal people fall behind Non-Aboriginal people relatively less(about one year) before the 30% percentile, and more after 30% percentile, and most at 60% percentile (about 2.5 years). This means that the state of Aboriginal people's educational attainment is more satisfactory at lower levels of education (years of schooling), and becomes less satisfactory as years of schooling accumulate in that the disparity lagged behind Non-Aboriginal people's educational attainment increases in years of schooling. The median person observed has the total years of schooling as 15.5 years, which means this median person should presumably have obtained over high school

graduation education level.[4] Technically, quantile regression at the percentile of 50% represents the "median regression". So it is reasonable to claim that the coefficient derived from the 60% and over percentile quantile regression could approximate to the disparity in educational attainment between Aboriginal and Non-Aboriginal people after high school graduation level. In this sense, educational attainment of Aboriginal people lags behind that of Non-Aboriginal people less before high school graduation level (according to coefficients Aboriginal dummy from 20%, 30% and 40% quantile regression), than after high school graduation level, or say, postsecondary level (according to coefficients of Aboriginal dummy from 60% and over quantile regression).

Another feature is that above 70% percentile, all the coefficients of Aboriginal dummy vanish. An intuitive explanation is that the disparity in years of schooling disappears at high level of education. However, based on the ascending tendency of the coefficients before 70% percentile, this may not be an advisable explanation. Even though the disparity shrinks or vanishes, the coefficients should not be all the way equal to zero after 70% quantile regression. A more legitimate explanation is that since data of years of schooling are only divided into 9 categories, we lack sufficient variation in years of schooling. Above a certain percentile (around 65%), all the persons observed have the same years of schooling —— 19.5 years. Without any variation in years of schooling after 19.5 years of education, it is not surprising to get zero as coefficients after the certain percentile, since after that all the Aboriginal people and Non-Aboriginal people will have the same 19.5 years of education, regardless of how many actual years of schooling each individual has acquired.

According to the small standard errors, the validity of the results from quantile regressions is weakened by the lack of variance. But the tendency that Aboriginal peoples' educational attainment lags behind that of Non-Aboriginal people more at the top of the distribution of years of schooling is still obvious.

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[4] If everything went well with him

3.2 Marginal return on education

3.2.1 Test with education dummies (Equation 2)

Now that we have obtained knowledge about the disparity in educational attainment for Aboriginal people, we will now turn our interest to the marginal return on education for Aboriginal people and the comparison of marginal return on education between Aboriginal, Non-Aboriginal, and white people. Here we first estimate Equation 2 with levels of education that are defined the same as those in data section, which have 12 levels. Results are shown in Table 4.

The coefficients of education dummies in Table 4 show how much percentage increase in wage could be expected by accumulating education from "Less than Grade 5" to a chosen level for each group of people. For example, the coefficient of "Grades 9 to 13" for Aboriginal people means that if an aboriginal person increases her education from the level "Less than Grade 5" to the level "Grades 9 to 13", she would probably earn about 14% more (this is not statistically significant according to t-statistics). What is the marginal return on education here? If we compare the coefficients of "Grades 9 to 13" with that of "Grades 5 to 8" for Non-Aboriginal people, we can conclude that if an average Non-Aboriginal person increases her education from the level "Grades 5 to 8" to the level "Grades 9 to 13", she would probably earn 11.5% more (19% minus 7.5%), which means the marginal return on education between these two levels is positive. In this sense, Table 4 does not give the actual "marginal return on education" we are looking for, so we need to figure out the differences between the coefficients of education dummies for each group of people in order to get the marginal return on education, which is shown in Table 5.

Features observed in table 5

Feature 1. The part of the table in bold shows the marginal return on university education. For Aboriginal people, 5 out of 8 differences in bold are positive, therefore it is rewarding for Aboriginal people to invest in university education due to the

positive marginal return on education. It makes sense that Aboriginal people are potentially attracted by these positive differences to attend university. But things are not so simple.

Feature 2. Horizontally, 6 out of 8 numbers in bold are less for Aboriginal people compared to Non-Aboriginal people. It suggests that it is likely for Aboriginal people to expect a lower marginal return on university education than Non-Aboriginal people given a specific level of education.

Figure 2 Marginal return on education
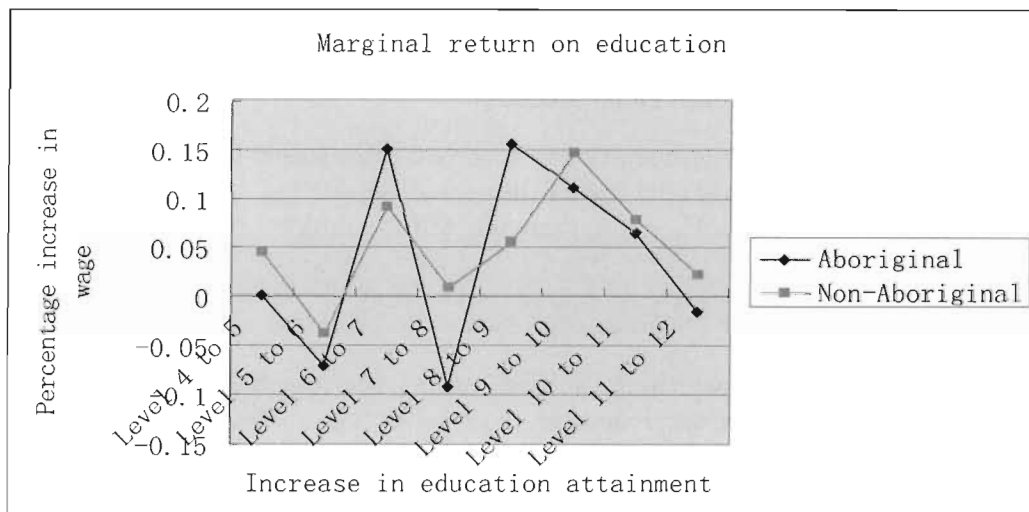
This observation of lower marginal return on university education for Aboriginal people is where our concern stems from, since we may be worried about a potential racial discrimination in the labor market. Consequently Aboriginal people might be less attracted by the higher expected wage to attend university because they may think that even if the marginal return on education is positive for them, it is a discriminated one.

But our evidence for discrimination is not so strong so far when we take a look at the significance of the coefficients of education dummies. In Table 4, above Level 4

there are 7 coefficients that are statistically insignificant at 5% significance level out of all 9 coefficients for Aboriginal people. And the analysis also suffers from the problem that even if those coefficients are significant, it is not technically valid to conclude that the differences between Aboriginal and Non-Aboriginal people are significant. Thus two approaches will be used to get around these problems.

3.2.2 Test with total years of schoolings (Equation 3)

Table 6[5] shows the results of regression equation 3. The way we utilize Equation 3 is to differentiate Ln(wage) with respect to total years of schooling (YoS).

$\partial Ln(wage) / \partial YoS = \alpha + \beta *$ high school dummy , where α is the coefficient of YoS, and β is the coefficient of the interaction between YoS and high school dummy.

β is negative for both Aboriginal and Non-Aboriginal people, and this is as expected. When one has less than high school graduation level of education, the dummy takes on the value 1, and the derivative in this case is supposed to be less than when the dummy takes on the value 0. It means people with high school graduation or higher level of education will expect a higher marginal return on education.

The topic of the paper focuses on the university education for Aboriginal people; therefore the group of people of interest is those who have got at least a high school graduation certificate. So the high school dummy should take on the value 0, and the derivative simplifies to $\partial Ln(wage) / \partial YoS = \alpha$. Now we can compare α for the two groups of people. α is equal to 0.02123 and 0. 02866 for Aboriginal and Non-Aboriginal people respectively, and they are both statistically significant. In average if an Aboriginal people increase one year of university education, she could expect 2.12% increase in wage, and the corresponding increase in wage for a Non-Aboriginal people is 2.87%. It works out to 0.74% difference in the marginal return on university education. For example, if the yearly pay is forty thousand dollars,

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[5] The complete version of Table 6 and Table 7 is in the Appendix B

the increase in the yearly pay will only be differenced by less than 300 dollars if an Aboriginal people and a Non-Aboriginal people both accumulate one more year of university education, which seems to be too small a number to matter. What is more important is that α is not significantly different between two groups of people according to the t-test at 10% significance level. Based on this 0.74% difference, which is small in magnitude and statistically insignificant, it is reluctant to conclude the invisible discrimination in the marginal return on university education will be another concern for Aboriginal people when they decide to attend university.

In this section, up till now we have found positive marginal return on university education for Aboriginal people. But this positive marginal return on university education is sometimes dwarfed by that of Non-Aboriginal people. However, the small magnitude of the disparity in marginal return on education suggests that Aboriginal people should not be bothered by it. In order to make it more convincing, the following approach would serve as a supplement to the analysis, and further prove that our conclusion is sensible.

3.2.3 Combining Aboriginal and Non-Aboriginal, and examining the interaction term

Following the last subsection, we will continue examining if the potential discrimination matters when Aboriginal people make their decision to achieve university education. In this section the data for Aboriginal and Non-Aboriginal people will be tentatively combined. And the interaction between education level dummies and Aboriginal dummy will be properly created. The Goldfeld-Quant test is applied in this regard, which is introduced in the Appendix.

To examine how the Aboriginal identity could affect marginal return on education, interaction terms between Aboriginal dummy and education level dummies will be included into Equation 2. After this modification, Equation 2 is now converted into Equation 4 that we have defined in Data and Methodology section:

Ln (Wage) = α *Education Level dummies + β *Interaction between Aboriginal dummy and Education Level dummies + X' + η   *(4)*

Now the coefficient of each education level dummy is (α + β *Aboriginal dummy). Since we are interested in the marginal return on education, we need to figure out the difference in the coefficients of education level dummies between any two adjacent levels of education, and then compare these differences between two groups of population. What is noticeable is that α will be cancelled out when comparing two groups of people, and thus the difference in marginal return on education relies on β. So we only need to figure out the differences in β between levels of education.

See table 7. The numbers in bold are the differences in β, those that make marginal return on university education different for the two groups of people. When the difference in β is positive, the Aboriginal people will expect to experience a higher marginal return on education, and when the difference in β is negative, the Aboriginal people will expect to experience a lower marginal return on education. Out of the eight differences in β we care about, three of them are positive, while five are negative. It implies that the possibility that Aboriginal people experience relatively lower marginal return on university education is only a little higher. And the sum of the three positives numbers is 0.0733 lower than the sum of those five negative numbers. If we spread out this 7.33% across the 8 levels of education, it would be less than 1% between two levels of education, which means Aboriginal people would face less 1% disparity in the marginal return on education at university level. Again, it proves that there is no obvious discrimination in the marginal return on education against Aboriginal people.

Conclusion

With the coming of westerners, the pastorally peaceful life of Canadian Aboriginal people was interrupted. Losing the autonomy, Aboriginal people had to be indoctrinated into the western culture system and forced to accept a European style education. Facing the racism and punishments, the Aboriginal students felt upset and frustrated in missionary and residential schools. All of these, along with Aboriginal people's deep belief in primitive education, stirred resistant emotion of Aboriginal people against formal university education. Historically Aboriginal people tended to refuse to receive formal university education. What makes it worse is that funds from the government for Aboriginal people's university education have always been insufficient to support a satisfactory number of Aboriginal students, which was an unfavorable situation Aboriginal people had faced. So history has left Aboriginal people with a real question: facing these concerns and difficulties, should they spend on university education?

According to my findings, Aboriginal people do lag behind Non-Aboriginal people a great deal in university education. And we find that it is profitable for Aboriginal people to pursue university education since they can expect a higher wage by doing this. However, racism may make this induced increase in wage for Aboriginal people dwarfed by that for Non-Aboriginal people, and this may again frustrate Aboriginal people. Fortunately, in this paper sufficient statistical proofs show that the Aboriginal status does not matter as far as the increase in wage induced by achieving university level education. So the discrimination should not be taken into account or given much emphasis when Aboriginal people make the decision to pursue a university education. We rule out the effect of racism on marginal return on education.

Now that the well-being of Aboriginal people is not satisfactory, the most efficient way for Aboriginal people to catch up with Non-Aboriginal people is by

acquiring higher education, especially university education according to my findings. Up to now, we have dug out the answer to the question the history left to Aboriginal people. Aboriginal people should get rid of those many cultural, historical and racial concerns, and try to spend more on university education. The governments should also increase funding to help Aboriginal people get out of this predicament.

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Tables

Table 1 Twelve levels of education

Level	Description	Counts
1	Less than Grade 5	14,056
2	Grades 5 to 8	49,390
3	Grades 9 to 13	138,894
4	Secondary (high) school graduation certificate	91,053
5	Trades certificate or diploma	22,605
	College:	
6	Without trades or college certificate or diploma	41,694
7	With trades certificate or diploma/college certificate or diploma	121,420
	University:	
8	Without certificate, diploma or degree	28,393
9	With university or college certificate or diploma	38,627
10	With bachelor or first professional degree	68,615
11	With certificate or diploma above bachelor level	10,346
12	With master/doctor degree	20,868

Table 2 Total years of schooling6[6]

Description	Corresponding years of schooling	Counts
Less than Grade 5 or no schooling	2.5	14,496
5 to 8 years of schooling	6.5	52,757
9 years of schooling	9	29,918
10 years of schooling	10	52,989
11 years of schooling	11	51,362
12 years of schooling	12	127,554
13 years of schooling	13	71,220
14 to 17 years of schooling	15.5	184,101
18 or more years of schooling	19.5	61,564

Table 3 Selected coefficients for years of schooling on aboriginal dummy and other control variables (personal characteristics).

Standard errors of coefficients are in parenthesis

Obs.	OLS	Quantile Regression					
187867		20%	30%	40%	50%	60%	70%
Coefficients of Aboriginal dummy	-1.118 (.05333)	-1 (5.85e-09)	-1 (7.75e-09)	-1.12 (.0712)	-2 (7.89e-25)	-2.5 (3.93e-26)	0 (3.29e-25)

Table 4 Selected coefficients for Ln(wage) on 12 education level dummies and other control variables by ethnic groups – Equation (2)

Levels of education	Coefficients of education level dummies		
	Aboriginal	Non-Aboriginal	White
1. Less than Grade 5 **(base level)**	Adjusted R^2 = 0.515	Adjusted R^2 = 0.4677	
2. Grades 5 to 8	.175678	.0750248	.0855
t-stat	(0.73)	(2.02)	(18.93)
Std. Err.	(0.242)	(0.037)	(0.045)
3. Grades 9 to 13	.1403692	.1905002	.2192
t-stat	(0.61)	(5.48)	(5.18)
Std. Err.	(0.23)	(0.035)	(0.042)
4. Secondary (high) school graduation certificate	.188885	.2684464	.29817
t-stat	(0.81)	(7.73)	(7.06)
Std. Err.	(0.232)	(0.035)	(0.042)
5. Trades certificate or diploma	.1898656	.3134402	.34597
t-stat	(0.79)	(8.76)	(7.91)
Std. Err.	(0.24)	(0.036)	(0.044)
6. Without trades or college certificate or diploma **(College level)**	.1193104	.2749875	.3046
	(0.51)	(7.83)	(7.09)
t-stat	(0.23)	(0.0351)	(0.043)
Std. Err.			
7. With trades certificate or diploma/college certificate or diploma	.2713184	.3667661	.4031
	(1.18)	(10.59)	(9.56)
t-stat	(0.23)	(0.0346)	(0.042)
Std. Err.			
8. Without certificate, diploma or degree **(Univ. level)**	.179537	.3743235	.4246
t-stat	(0.76)	(10.47)	(9.59)
Std. Err.	(0.24)	(0.0357)	(0.044)
9. With university or college certificate or diploma	.3359032	.4285454	.4725
t-stat	(1.43)	(12.22)	(11.00)
Std. Err.	(0.235)	(0.0351)	(0.043)
10. With bachelor or first professional degree	.4477491	.5753001	.618
t-stat	(1.90)	(16.51)	(14.51)
Std. Err.	(0.236)	(0.035)	(0.043)
11. With certificate or diploma above bachelor level	.5283482	.653688	.6696
t-stat	(1.97)	(17.87)	(14.66)
Std. Err.	(0.268)	(0.037)	(0.046)
12. With master/doctor degree	.5131114	.6750536	.7096
t-stat	(1.98)	(18.93)	(16.08)
Std. Err.	(0.26)	(0.036)	(0.044)
# of observations	2595	143081	74639

Table 5 Marginal return on education with 12 levels of education (Selected coefficients)

	Aboriginal	Non-Aboriginal	White
Level 1 to level 2	0.175678	0.0750248	0.085534
Level 2 to level 3	-0.03531	0.1154754	0.133665
Level 3 to level 4	0.048516	0.0779462	0.078966
Level 4 to level 5	0.000981	0.0449938	0.047809
Level 5 to level 6	-0.07056	-0.0384527	-0.04133
Level 6 to level 7	**0.152008**	**0.0917786**	**0.098454**
Level 7 to level 8	**-0.09178**	**0.0075574**	**0.021482**
Level 8 to level 9	**0.156366**	**0.0542219**	**0.04791**
Level 9 to level 10	**0.111846**	**0.1467547**	**0.145345**
Level 10 to level 11	**0.065362**	**0.0783879**	**0.051755**
Level 11 to level 12	**-0.015237**	**0.0213656**	**0.03996**

Table 6 Results of Equation 3 (Selected coefficients)

Coefficients	Aboriginal	Non-Aboriginal
Total years of schooling	0.021227 t-stat = 4.03 Std. Err. = 0.0052696	0.02866 t-stat = 41.30 Std. Err. = 0.000694
Interaction between total years of schooling and high school dummy	-0.005914 t-stat = -1.81 Std. Err. = 0.0032706	-0.0116328 t-stat = -24.25 Std. Err. = 0.0004797

Table 7 Estimate of Equation 4 (Selected coefficients of interaction terms)

Coefficients of interaction terms, β	Coefficients	t-statistics	Difference in β
Grades 5 to 8 * Aboriginal dummy	0.076363	0.98	0.076363
Grades 9 to 13 * Aboriginal dummy	-0.09581	-3.07	-0.1721728
Secondary (high) school graduation certificate * Aboriginal dummy	-0.09295	-2.25	0.0028634
Trades certificate or diploma * Aboriginal dummy	-0.14005	-1.97	-0.0471067
Without trades or college certificate or diploma (College level) * Aboriginal dummy	-0.1938	-4.47	-0.0537462
With trades certificate or diploma/college certificate or diploma * Aboriginal dummy	-0.130701	-4.78	**0.0630981**
Without certificate, diploma or degree (Univ. level) * Aboriginal dummy	-0.214286	-3.59	**-0.0835843**
With university or college certificate or diploma * Aboriginal dummy	-0.120397	-2.37	**0.0938885**
With bachelor or first professional degree * Aboriginal dummy	-.1448613	-3.01	**-0.0244643**
With certificate or diploma above bachelor level * Aboriginal dummy	-.1308771	-1.08	**0.0139842**
With master/doctor degree * Aboriginal dummy	-.1662813	-1.57	**-0.0354042**

Joint F-test of interaction terms F (11, 145576) = 8.32

Appendices

Appendix A: Goldfeld-Quant test

To legitimately combine Aboriginal and Non-Aboriginal people into one regression model, we need to examine the similarity between the distributions of disturbance terms in Equation 2 for the two groups of people. That means we estimate Equation 2 for Aboriginal and Non-Aboriginal people separately, and test the similarity between distributions of the error terms derived from the regressions for two groups of people. The classic Goldfeld-Quant test will be applied in this context. A brief description of Goldfeld-Quant test:

Goldfeld-Quant test assumes that the observation can be divided into two groups (the first group with large variances and the second with small variances), then check whether or not disturbance variances of the groups are different systematically. So, we have to identify a variable to be used to separate data. F distribution requires that disturbance variances are normally distributed. (Jeeshim and KUCC625, 2003)

In our context, the variable used to separate data is actually the Aboriginal dummy variable. Hypotheses are specified as following:

H_0: No heteoskedasticity between two groups of people

H_1: $\sigma_i^2 = \sigma^2 x_i$ (Heteoskedasticity exists between two groups, x_i here is Aboriginal dummy variable)

H_0 actually means disturbance variances of two groups are independent of the Aboriginal dummy variable, and H_1 holds if otherwise. To combine two groups into one regression model, null hypothesis should not be rejected. The following steps are normal process of Goldfeld-Quant test:

First, sort the observation based on x_i (We have finished this step).

Second, separate the observations into two groups so that the first group has a bigger variance.

Third, run OLS separately to estimate $e_1' e_1$ (SSE_1) and $e_2' e_2$ (SSE_2).

Fourth, compute $\dfrac{e1'e1/(n1-K)}{e2'e2/(n2-k)} \sim F(n1-K, n2-K)$, where K is the number of

regressors including an intercept; n1 and n2 are numbers of observations for two

groups, and $e_1'e_1$ should be greater than $e_2'e_2$ for the test.

SSE of Regressions of Equation 2 for two groups of people

	e' e (SSE)	n	K	K-n	e' e / (n-K)
Aboriginal	1491.22921	2595	87	2508	0.594589
Non-Aboriginal	70205.65541	143081	87	142994	0.490969

Based on the above results, the corresponding Goldfeld-Quant statistic we derive

equals to 0.825729. The critical value of the 5% significance level is F (0.05, 2595,

143081) = 1.046540668, at ten percent level is F (0.1, 2595, 143081) = 1.036080485.

Therefore, we cannot reject the null hypothesis at both five and ten percent level. This

is a sufficient evidence to legitimately combine Aboriginal and Non-Aboriginal

people into Equation 2 with a subtle adjustment — including an interaction between

Aboriginal dummy and education level dummies into Equation 2.

Appendix B: Complete regression results

Complete version of Table 6 (Equation 3)

Ln(wage) on years of schooling, interaction between years of schooling and high school dummy, and other control variables		Aboriginal			Non-Aboriginal		
		Adjusted R^2 = 0.5137			Adjusted R^2 = 0.4586		
Variables		Coef.	Std. Err.	t-stat	Coef.	Std. Err.	t-stat
Marital status "divorced" left out	legally married and not separated	0.149	0.051	2.94	0.096	0.007	14.41
	separated, but still legally married	0.018	0.075	0.24	0.008	0.011	0.75
	never legally married– single	-0.056	0.053	-1.06	-0.049	0.007	-6.85
	widowed	0.001	0.128	0.01	0.010	0.019	0.53
Knowledge of official languages "English only" left out	French only	0.031	0.150	0.21	-0.053	0.010	-5.48
	both English and French	0.125	0.050	2.49	0.031	0.007	4.61
Age 25<=age <=29 left out	30<=age<=34	0.023	0.050	0.46	0.129	0.007	18.61
	35<=age<=39	0.070	0.052	1.33	0.215	0.007	30.98
	40<=age<=44	0.174	0.055	3.13	0.257	0.007	36.34
	45<=age<=49	0.170	0.061	2.8	0.272	0.007	36.47
	50<=age<=54	0.099	0.068	1.45	0.290	0.008	36.22
	55<=age<=59	0.314	0.084	3.76	0.260	0.009	27.67
	60<=age<=64	0.179	0.105	1.7	0.205	0.012	16.62
Household size "one person" left out	two persons	-0.074	0.053	-1.4	-0.044	0.007	-6.75
	three persons	-0.021	0.056	-0.38	-0.060	0.007	-8.56
	four persons	-0.010	0.059	-0.17	-0.038	0.007	-5.19
	five persons	-0.016	0.070	-0.24	-0.047	0.009	-5.28
	six persons	0.004	0.082	0.05	-0.063	0.014	-4.68
	seven or more	-0.143	0.119	-1.2	-0.147	0.024	-6.17
Years of schooling	Total years of schooling	0.021	0.005	4.03	0.029	0.001	41.3
Interaction term	Interaction between total years of schooling and high school dummy	-0.006	0.003	-1.81	-0.012	0.000	-24.25

Metropolitan area "Halifax" left out	Québec	-0.109	0.203	-0.54	0.042	0.016	2.61
	Montréal	0.020	0.169	0.12	0.081	0.014	5.87
	Sherbrooke and Trois-Rivières	0.573	0.379	1.51	0.012	0.019	0.61
	Ottawa - Hull	0.231	0.157	1.47	0.158	0.014	11.28
	Oshawa	0.198	0.213	0.93	0.184	0.018	10.33
	Toronto	0.340	0.147	2.32	0.251	0.012	20.23
	Hamilton	0.228	0.164	1.39	0.168	0.015	11.05
	St. Catharines - Niagara	0.201	0.183	1.1	0.075	0.017	4.35
	Kitchener	0.220	0.193	1.14	0.121	0.017	7.27
	London	0.228	0.172	1.33	0.092	0.016	5.57
	Windsor	0.380	0.195	1.95	0.232	0.018	12.72
	Sudbury and Thunder Bay	0.168	0.152	1.1	0.105	0.018	5.74
	Winnipeg	0.095	0.140	0.68	0.048	0.015	3.21
	Regina and Saskatoon	0.208	0.150	1.39	0.040	0.016	2.48
	Calgary	0.184	0.148	1.24	0.154	0.014	11.11
	Edmonton	0.093	0.142	0.65	0.124	0.014	8.89
	Vancouver	0.332	0.143	2.33	0.212	0.013	16.08
	Victoria	0.187	0.167	1.12	0.110	0.018	6.12
Full-time or part time weeks worked in 2000	part-time weeks worked	-0.711	0.045	-15.86	-0.707	0.006	-115.7
Industry "Agriculture, forestry, fishing and hunting" left out	Mining and oil and gas extraction	0.222	0.234	0.95	0.488	0.032	15.4
	Utilities	0.251	0.270	0.93	0.355	0.032	11.25
	Construction	0.096	0.223	0.43	0.106	0.027	3.97
	Manufacturing	-0.010	0.221	-0.05	0.187	0.026	7.25
	Wholesale trade	-0.285	0.226	-1.26	0.120	0.026	4.58
	Retail trade	-0.319	0.222	-1.44	-0.127	0.026	-4.9
	Transportation and warehousing	0.095	0.223	0.42	0.103	0.026	3.89
	Information and cultural industries	0.015	0.237	0.06	0.232	0.027	8.59
	Finance and insurance	-0.078	0.234	-0.33	0.216	0.026	8.2
	Real estate and rental and leasing	-0.198	0.249	-0.8	-0.013	0.029	-0.46
	Professional, scientific and technical services	-0.223	0.229	-0.97	0.142	0.026	5.45

	Administrative and support, waste management and remediation services	-0.353	0.222	-1.59	-0.131	0.026	-4.93
	Educational services	-0.080	0.225	-0.35	0.053	0.026	2.03
	Health care and social assistance	-0.214	0.222	-0.96	-0.081	0.026	-3.08
	Arts, entertainment and recreation	-0.201	0.242	-0.83	-0.102	0.029	-3.52
	Accommodation and food services	-0.548	0.226	-2.42	-0.271	0.027	-9.97
	Other services (except public administration)	-0.340	0.223	-1.53	-0.158	0.027	-5.91
	Public administration	0.034	0.220	0.16	0.216	0.026	8.35
Occupation[7] "Senior management occupations and Other management occupations" left out	business and finance	-0.282	0.064	-4.38	-0.301	0.007	-44.37
	natural and applied sciences	-0.041	0.094	-0.44	-0.151	0.009	-17.25
	health, registered nurses and supervisors	-0.196	0.104	-1.88	0.041	0.012	3.51
	social science, government services and religion	-0.218	0.080	-2.72	-0.158	0.009	-16.92
	art, culture, recreation and sport	-0.390	0.120	-3.26	-0.375	0.013	-29.53
	Wholesale, technical, insurance, real estate sales specialists, and retail, wholesale and grain buyers	-0.315	0.065	-4.83	-0.364	0.007	-51.17
	Contractors and supervisors in trades and transportation	-0.378	0.069	-5.44	-0.314	0.008	-38.55
	Occupations unique to primary industries	-0.232	0.132	-1.76	-0.395	0.022	-17.8

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[7] Some of the occupations specified in the Census are integrated in this paper

	Supervisors, machine operators and assemblers in manufacturing	-0.424	0.097	-4.39	-0.404	0.011	-35.82
Weeks worked in 2000 "<=5 weeks" left out	6 to 10 weeks	0.639	0.142	4.51	0.607	0.026	23.53
	11 to 15 weeks	0.978	0.145	6.77	0.961	0.025	38.31
	16 to 20 weeks	1.202	0.134	8.95	1.294	0.023	56.76
	21 to 25 weeks	1.525	0.146	10.45	1.494	0.024	61.79
	26 to 30 weeks	1.778	0.132	13.43	1.669	0.022	75.12
	31 to 35 weeks	1.872	0.149	12.55	1.750	0.024	72.61
	36 to 40 weeks	1.960	0.127	15.41	1.885	0.021	88.17
	41 to 45 weeks	2.300	0.143	16.08	2.026	0.022	91.3
	46 to 50 weeks	2.270	0.122	18.59	2.154	0.020	106.9
	>=51 weeks	2.369	0.117	20.24	2.232	0.020	112.71
Sex	male	0.207	0.039	5.34	0.237	0.004	53.31
Constant	constant	7.652	0.302	25.33	7.623	0.037	205.44

Complete version of Table 7 (Equation 4)

Ln(wage) on education dummies, interaction between education dummies and Aboriginal dummy, and other control variables		Adjusted R^2 = 0.4677		
Variables		**Coefficients**	**Std. Err.**	**t-stat**
Marital status "divorced" left out	legally married and not separated	0.091	0.007	13.86
	separated, but still legally married	0.009	0.011	0.83
	never legally married– single	-0.054	0.007	-7.65
	widowed	0.017	0.018	0.89
Knowledge of official languages "English only" left out	French only	-0.047	0.010	-4.81
	both English and French	0.018	0.007	2.79
Age	30<=age<=34	0.126	0.007	18.44
25<=age	35<=age<=39	0.213	0.007	31.19

<=29 left out	40<=age<=44	0.257	0.007	36.75
	45<=age<=49	0.269	0.007	36.55
	50<=age<=54	0.283	0.008	35.67
	55<=age<=59	0.258	0.009	27.7
	60<=age<=64	0.204	0.012	16.64
Household size "one person" left out	two persons	-0.038	0.006	-5.87
	three persons	-0.050	0.007	-7.21
	four persons	-0.030	0.007	-4.09
	five persons	-0.039	0.009	-4.36
	six persons	-0.053	0.013	-3.99
	seven or more	-0.137	0.023	-5.9
Highest level of schooling "Less than Grade 5" left out	Grades 5 to 8	0.076	0.037	2.06
	Grades 9 to 13	0.191	0.034	5.57
	Secondary (high) school graduation certificate	0.269	0.034	7.83
	Trades certificate or diploma	0.314	0.035	8.87
	Without trades or college certificate or diploma	0.275	0.035	7.93
	With trades certificate or diploma/ With college certificate or diploma	0.367	0.034	10.73
	Without certificate, diploma or degree	0.374	0.035	10.58
	With university or college certificate or diploma	0.428	0.035	12.36
	With bachelor or first professional degree	0.575	0.034	16.7
	With certificate or diploma above bachelor level	0.653	0.036	18.06
	With master's degree/ With earned doctorate	0.675	0.035	19.14
Metropolitan area "Halifax" left out	Québec	0.071	0.016	4.49
	Montréal	0.109	0.014	7.99
	Sherbrooke and Trois-Rivières	0.044	0.019	2.32
	Ottawa - Hull	0.176	0.014	12.7
	Oshawa	0.211	0.018	11.92
	Toronto	0.262	0.012	21.3
	Hamilton	0.189	0.015	12.56
	St. Catharines - Niagara	0.102	0.017	6.02
	Kitchener	0.138	0.017	8.35
	London	0.114	0.016	6.96
	Windsor	0.254	0.018	14.03

	Sudbury and Thunder Bay	0.131	0.018	7.29
	Winnipeg	0.055	0.015	3.75
	Regina and Saskatoon	0.050	0.016	3.1
	Calgary	0.166	0.014	12.03
	Edmonton	0.137	0.014	9.92
	Vancouver	0.226	0.013	17.34
	Victoria	0.123	0.018	6.9
Full-time or part time weeks worked in 2000	part-time weeks worked	-0.707	0.006	-117.45
Industry "Agriculture, forestry, fishing and hunting" left out Industry "Agriculture, forestry, fishing and hunting" left out	Mining and oil and gas extraction	0.594	0.034	17.65
	Utilities	0.485	0.034	14.21
	Construction	0.244	0.030	8.21
	Manufacturing	0.316	0.029	10.88
	Wholesale trade	0.249	0.029	8.47
	Retail trade	0.010	0.029	0.33
	Transportation and warehousing	0.240	0.029	8.13
	Information and cultural industries	0.352	0.030	11.71
	Finance and insurance	0.329	0.029	11.14
	Real estate and rental and leasing	0.112	0.032	3.57
	Professional, scientific and technical services	0.248	0.029	8.49
	Administrative and support, waste management and remediation services	0.489	0.058	8.44
	Educational services	-0.002	0.029	-0.07
	Health care and social assistance	0.147	0.029	4.97
	Arts, entertainment and recreation	0.052	0.029	1.75
	Accommodation and food services	0.026	0.032	0.83
	Other services (except public administration)	-0.134	0.030	-4.46
	Public administration	-0.032	0.030	-1.08
	Mining and oil and gas extraction	0.333	0.029	11.46
Occupation "Senior management occupations and Other	business and finance	-0.272	0.007	-40.29
	natural and applied sciences	-0.138	0.009	-15.86
	health, registered nurses and	0.046	0.012	3.96

management occupations" left out	supervisors			
	social science, government services and religion	-0.192	0.009	-20.65
	art, culture, recreation and sport	-0.365	0.013	-29.08
	Wholesale, technical, insurance, real estate sales specialists, and retail, wholesale and grain buyers	-0.332	0.007	-46.96
	Contractors and supervisors in trades and transportation	-0.275	0.008	-33.89
	Occupations unique to primary industries	-0.304	0.022	-13.54
	Supervisors, machine operators and assemblers in manufacturing	-0.365	0.011	-32.7
Weeks worked in 2000 "<=5 weeks" left out	6 to 10 weeks	0.607	0.025	24.1
	11 to 15 weeks	0.957	0.025	38.98
	16 to 20 weeks	1.287	0.022	57.67
	21 to 25 weeks	1.491	0.024	62.94
	26 to 30 weeks	1.670	0.022	76.73
	31 to 35 weeks	1.752	0.024	74.16
	36 to 40 weeks	1.888	0.021	90.15
	41 to 45 weeks	2.032	0.022	93.41
	46 to 50 weeks	2.156	0.020	109.28
	>=51 weeks	2.233	0.019	115.2
Sex	male	0.232	0.004	52.71
Interaction term between Aboriginal dummy and education level dummies	Grades 5 to 8 * Aboriginal dummy	0.076	0.078	0.98
	Grades 9 to 13 * Aboriginal dummy	-0.096	0.031	-3.07
	Secondary (high) school graduation certificate * Aboriginal dummy	-0.093	0.041	-2.25
	Trades certificate or diploma * Aboriginal dummy	-0.140	0.071	-1.97
	Without trades or college certificate or diploma (College level) * Aboriginal dummy	-0.194	0.043	-4.47
	With trades certificate or diploma/college certificate or diploma * Aboriginal dummy	-0.131	0.027	-4.78
	Without certificate, diploma or	-0.214	0.060	-3.59

	degree (Univ. level) * Aboriginal dummy			
	With university or college certificate or diploma * Aboriginal dummy	-0.120	0.051	-2.37
	With bachelor or first professional degree * Aboriginal dummy	-0.145	0.048	-3.01
	With certificate or diploma above bachelor level * Aboriginal dummy	-0.131	0.121	-1.08
	With master/doctor degree * Aboriginal dummy	-0.166	0.106	-1.57
Constant	constant	7.481	0.051	147.13

Joint F-test of interaction terms F (11, 145576) = 8.32