ABORIGINAL SECONDARY EDUCATION: NON COMPLETION AND RETURNS

by

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Abstract

I use 2001 Canadian Public Use Microdata Files (PUMF) Census data to assess two dimensions of Aboriginal educational attainment: (1) what proportion of Aboriginals fail to complete high school; and (2) what is the return to different levels of education for Aboriginals. I find that Aboriginals, for certain age groups, are two times more likely than non Aboriginals to leave high school before completion. Further, I find that in terms of high school completion within the Aboriginal population, registered Indians fare worst, band members better, those with self reported Aboriginal identity better still, and those with Aboriginal ethnic ancestry perform the best. I also find that the returns to high school education are higher for Aboriginals than for the white control group, and that this return varies significantly by Aboriginal group, gender, and census metropolitan area. Further, for certain Aboriginal groups the earnings return to schooling is greater than the income return, suggesting that government transfers reduce the incentive for Aboriginals to pursue further education.

Keywords: Aboriginal education; returns to schooling; high school non completion

Dedication

To Mom, Dad, and Nanny - the best parents and grandmother a girl could ask for.

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Introduction

Secondary education is vital in the building of a strong and able work force. Among Canada's unemployed, many are young people between the ages of 15 and 25 (Hull 2000). The high youth unemployment is reflective of the problems new labour market entrants face. The Canadian economy has evolved from one based largely on manufacturing and industry to one which increasingly depends on technology and information, making education more important than ever. Undoubtedly, the youth facing the greatest difficulties adapting to these changes are those who have failed to complete their secondary education (i.e. high school dropouts). In fact, a substantial number of dropouts do not participate in the labour market at all (Hull 2000).

In Canada, Aboriginals make up about 3% of the population, and the Federal government spends nearly 10 billion dollars per year on Aboriginal programs and affairs (Government of Canada 2007; Pendakur and Pendakur 2007). In spite of this social spending the general economic and social success of Aboriginal people has been very poor. Because of this, Aboriginal policy is often the highlight of public debates in Canada. The Department of Indian and Northern Affairs and the Prime Minister's Office have targeted Aboriginal education as a key issue for Canada (Gorman 1999).

In this paper, I use 2001 Canadian Public Use Microdata Files (PUMF) Census data to assess two dimensions of Aboriginal educational attainment: (1) what proportion of Aboriginals[1] fail to complete high school; and (2) what is the return to different levels of education for Aboriginals. I find that Aboriginals, for certain age groups, are two times more likely than non-Aboriginals[2] to leave high school before completion. Also, the returns to high school education are higher for Aboriginals than for the white control group. Further, I find significant variation in outcomes within the Aboriginal population, based on group classification, with the Registered Indian population consistently performing the worst. There is also variation by gender and census metropolitan area. Lastly, I find

[1]In the data Aboriginals are separated into four groups - Registered, band member, self reported Aboriginal identity, and Aboriginal ethnic ancestry or origin.

[2]Defined as not an Aboriginal or a visible minority.

that for certain Aboriginal groups the earnings return to schooling is greater than the income return, suggesting that government transfers lower the incentives for Aboriginals to pursue further education.

The Aboriginal literature has been very active in Canada, particularly with respect to education[3]. Canada's Aboriginal population bears a disproportionate share of the Nation's unemployment burden, with data from the 1996 Census indicating that the Registered Indian unemployment rate is at least twice as high as the unemployment rate for other Canadians (Hull 2000). Previous research suggests that this significant difference is largely due to low rates of secondary school completion and low incidence of post secondary education (Tait 1999; Hull 2000).

As a group, Aboriginals lag significantly behind the rest of Canada in educational attainment. In 1996, 37% of the Registered Indian population had attained "some post-secondary" education, a much smaller fraction than the 51% of the rest of the Canadian population (Hull 2000). This gap in educational attainment is even larger at the secondary level. In 1996, 67% of Canadians over the age of 15 who are no longer attending school (either full or part time) had completed high school, with or without further training (Hull 2000). Among the Registered Indian population in the same category, only 44% had completed high school (Hull 2000). This gives an Aboriginal-white high school completion gap of over 20%.

Hill (1979) found that high school dropouts are unlikely to return to school and that leaving school before completion only modestly affects their earnings relative to employed graduates. There are several potential factors that go into the decision to leave school before completion. Research shows that some reliable indicators of who completes high school are family background characteristics, such as parental education and family income, as well as an individual's performance on intelligence tests and demonstrated reading ability (Oreopoulos 2006). Mare (1980) concluded that the decision to continue schooling at higher levels is most strongly influenced by parental education and encouragement. Rational students should make the decision to drop out based on the costs and benefits of schooling[4]. However, the economic profession has not given much attention to this problem[5], particularly within Canada. Because Aboriginals are such a small proportion of Canada's population, statistical analysis becomes difficult. Pendakur

[3]See, for example Drost (1994); Gorman (1999); Tait (1999); Hull (2000); and Walters, White, and Maxim (2004)

[4]The cost and return to schooling could both be influenced by a number of things: poor school quality and discrimination would the lower the return and increase the cost, for example

[5]See Koshal, Koshal, and Marino (1995) for a notable exception.

and Pendakur (2007) solve this problem by using Census data which multiplies a small percentage by nearly a million observations.

Theory

The empirical evidence shows that, on average between two groups, equal educational attainment leads to income equality; holding all else equal (Patrinos and Sakellariou 1992). However, when it comes to comparing Aboriginal and non Aboriginal wages, other things are often not equal. The literature gives a general consensus that there are significant differences in earnings among different ethnic groups (Patrinos and Sakellariou 1992; Pendakur and Pendakur 2007).

There are several candidate explanations for the Aboriginal-white wage gap: discrimination, human capital theory, and government. Darity (1982) suggests that there could be many other factors besides productivity and discrimination that contribute to wage differentials, such as cultural differences in lifestyles and work ethics. However, these contributing factors are extremely hard to quantify and are not addressed here.

2.1 Discrimination

The difference in educational attainment between Aboriginals and whites could exist due to discrimination. For example, Becker (1971) explained workplace segregation and racial earnings differentials as disequilibrium situations, because discrimination drives wages down, making it profitable for firms to hire the minority group. This process makes it unprofitable for employers to discriminate because it would lower long run profits. Becker's explanation has been criticized for its inability to account for persistent wage gaps between ethnic groups. Neoclassical theories of racial wage gaps rest on productivity differences between ethnic groups. These theories do not state why human capital accumulation differs across ethnic groups, but simply states that it should (Darity 1982).

Alternatively, Phelps (1972) and Arrow (1973) develop theories of statistical discrimination in which employers discriminate against certain groups of individuals. Phelps assumes that ethnic minorities, when compared to the majority, emit a noisier signal of productivity, so the resulting employer discrimination is rational. Arrow expands on this theory, showing that no such asymmetry restrictions are needed to produce the same

result. Even when groups were *ex-ante* identical and the employers were psychically unbiased, certain groups can experience discrimination in equilibrium since employer's *a-priori* beliefs can become self-fulfilling (Arrow 1973).

More recently, Fryer, Goeree, and Holt (2005) performed field experiments in classrooms where students ('workers') were randomly assigned one of two "colours." Each worker had to decide whether or not to invest in training; costs of investment were randomly determined, independent across workers, and known only to the individual. Workers were told that these costs would change from period to period. The costly investment increased the odds that workers would pass a pre-employment test, and thus, the likelihood of employment. Employers do not know if a worker has invested, they only observe workers' colour and test score, which were correlated with the investment decision. In the five period experiments, discrimination emerged quickly against one colour because of cost asymmetries in the second and third periods[6]. Employers hire every worker who receives a good test score, but are more liberal with the non-discriminated group members who receive mixed or bad scores. This suggests that employers use the test score (a proxy for whether or not a worker has invested in training) to guide hiring decisions, leading to discrimination that persists even when individuals of different colours have the *same* test score. These results support Arrow's (1973) findings that an employer's *a-priori* beliefs become self-fulfilling, leading to discrimination even when individuals are identical.

2.2 Human Capital Theory

The essential assumption in the human capital theory of education is that education raises an individual's productivity. In competitive labour markets, the wage is equal to the value of marginal product of labour, so an individual may invest in education in order to increase their future productivity and therefore future earnings. In the basic Mincer model (Mincer 1958), the direct costs of schooling are assumed to be zero, so the cost of one year of schooling is just the opportunity cost of foregone wages. If a person goes to work instead of school, the earnings of individual i would be $w_i(0)$. If they go to school instead, after one year of schooling their earnings increase to $w_i(1)$. The relationship between the value of their investment and its payoff can be expressed as a rate of return, b:

$$w_i(1) = w_i(0) + bw_i(0) = w_i(0)(1 + b)$$

[6]Investment costs are the same for both colours in the first period.

If the individual goes to school for a second year. he or she gives up their earnings $w_i(1)$ and in the following year earns:

$$w_i(2) = w_i(1)(1+b) = w_i(0)(1+b)^2$$

In general, after s years of schooling, they earn:

$$w_i(s) = w_i(0)(1+b)^s$$

Taking logarithms and approximating yields:

$$\ln w_i(s) = a_i + bs_i$$

Adding a constant and an error term to the model gives the standard Mincer earnings equation[7],

$$\ln w_i(s) = a_0 + bs_i + [(a_i - a_0) + \epsilon_i]$$

and the difference in ability $(a_i - a_0)$ ends up in the error term.

2.3 Government Policy

The incentives to pursue education vary across individuals. Some researchers are of the belief that subsidies and financial rewards increase the incentive to educate among low income individuals (Dearden, Emmerson, Frayne, and Meghir 2003). Because Aboriginals make up a disproportionate share of Canada's low income population (Hull 2000), many think that increasing government transfers or education subsidies will increase educational investment, and therefore future income (Jankowski and Moazzami 1995; Gorman 1999).

Alternatively, government transfers may lower the incentives to invest in education via the moral hazard effect. Government transfers shield individuals from the consequences of investing in human capital. This effect is particularly important for Aboriginals, who receive sizable transfer payments regardless of education (Government of Canada 2007). The sizes of other transfers, such as welfare payments, are reduced with increased levels of human capital and income. These effects can create a disincentive for government transfer recipients to pursue education (Grogger 2005).

[7]The standard Mincer earnings equation is usually augmented with covariates such as gender, race, and experience. Current research uses a quartic in experience, itself often defined as experience = age − (years of schooling + 6)

Data and Methods

I use data from the 2001 Canadian PUMF files, which provides information on different ethnic populations. The Census categorizes Aboriginals into three large groups:

1. the Aboriginal identity population
2. the Registered Indian population
3. the Indian Band member population

The Aboriginal identity population is comprised of individuals who self-identify with at least one Aboriginal group, and/or who are members of a First Nation, and/or those who report being a Treaty or Registered Indian under the Indian Act. The Registered population is made up of individuals who report themselves as Registered Indians under the Indian Act. The Band members population consists of individuals who reported being a member of a First Nation or an Indian Band. In addition to these three categories, the Census also includes information on individuals who report having an Aboriginal ethnic origin or ancestry[8].

In an effort to compare Aboriginals to a homogeneous group, the control group is restricted to individuals who are not Aboriginal or a visible minority[9]. All individuals born outside of Canada, as well as those under the age[10] of 15, are dropped from the sample.

The PUMF files also include data on educational attainment. The particular variables of interest are school attendance (either full or part time, day or evening, attendance at a school, college, or university within the nine months prior to survey), in-school status (whether or not an individual is enrolled in school, either full or part time), high school diploma status (whether or not an individual has obtained a high school certificate, either

[8]The Aboriginal ancestry group does not exclude those who reported belonging to one of the three given Aboriginal categories.

[9]The census defines a visible minority as Filipino, Latin American, Southeast Asian, Arab, West Asian, Japanese, Korean, or multiple visible minorities.

[10]The Census only provides educational information for individuals over the age of 15.

Table 3.1: Ethnic Groups

Ethnic Groups		
Group	Observations	Percent of Sample
Registered	8,322	1.99
Band	8,152	1.95
Identity	14,054	3.36
Ancestry	20,208	4.83
White	392,144	92.77

Table 3.2: Total Years of School, by Ethnic Group

Total Years of School			
Group	Observations	Mean	Std. Dev.
Registered	8,362	10.76	3.43
Band	8,187	10.73	3.45
Identity	14,131	11.11	3.33
Ancestry	20,331	11.62	3.30
White	392,144	12.67	3.30

through graduation or a general equivalency exam, with and without further training), highest level of education, and total years of education (sum of the years or grades of schooling at the elementary, secondary, college, and university levels). The total years of education variable is given in intervals: less than 5 years, 5-8 years, etc. To make this data usable, the variable was recoded using the average[11].

[11] An ordered categorical variable is not an option because not all of the information is given in ranges.

Table 3.3: Highest Level of Education by Ethnic Group

Highest Level of Education					
Highest Level	Registered	Band	Identity	Ancestry	White
High school	2,723	2,671	4.617	6,040	81,597
High school Diploma	710	675	1,386	2,302	61,658
Trade Certificate	348	335	564	788	15,403
Some University	340	332	548	773	13,035
University Degree	327	324	649	1,313	58,730

Table 3.4: Total Years of School by Education Category

Total Years of School by Category			
Category	Observations	Mean	Std. Dev.
High school	90,070	10.63	1.17
High school Diploma	65,251	11.92	0.85
Trade Certificate	16,362	11.30	1.54
Some University	13,640	15.03	2.30
University Degree	61,549	17.51	0.533

3.1 Non completion

The education literature has been very active in attempting to quantify the high school "dropout" or "non completion" rates. However there is little consensus on what actually constitutes a dropout rate, and there exists no standard method for calculation. There are many statistics computed in order to compare those who finish high school to those who do not, but three stand out due to their predominant use[12] (Kominski 1990). The statistics are: the high school non completion rate; the cohort graduation measure; and dropout pool estimates (Kominski 1990). The high school non completion rate is defined as the complement of the graduation ratio, that is the ratio of high school graduates in a given school year to the estimated number of 17 year olds at the beginning of that school year. The cohort graduation measure is related; it being the ratio of high school graduates to the number of ninth graders four years earlier. Finally, dropout pool estimates are based on the proportion of individuals in a given age group who are not enrolled in school and who do not have a high school diploma (Kominski 1990). Although each of these measures addresses some aspect of high school dropout behaviour, none answers the basic question of what proportion of high school students leave high school in a given year. This is largely because none of these measures is a flow variable (Kominski 1990).

3.2 Ability bias

When estimating the Mincer model with ordinary least squares researchers have been concerned about an ability bias: $cov(s_i, a_i) \neq 0$. In particular, they have worried that

[12]The three main statistics do not separate individuals wo complete high school via graduation and those who complete by taking a general equivalency exam because they are not distinguishable in the data. However, evidence suggests that high school equivalency is not at all equal to high school graduation (Murnane, Tyler, and Willett (2000).

the covariance is positive, meaning that years of schooling increase with ability. Many researchers use an instrumental variable for schooling in order to correct for the bias. If the instrumental variable strategy solved the bias, the IV estimates should be smaller than the OLS estimates. However, IV estimates are typically 30% higher than OLS (Card 1999). Card (1999) suggests that this is due to heterogeneity in the rate of return to schooling, not just heterogeneity in ability. He believes that treatments most often affect those who are likely to have low levels of schooling in the absence of the treatment, and therefore, higher than average rates of return to schooling. If this is the case than the IV estimates should be larger than the OLS estimates[13]. Card's method gives two kinds of heterogeneity in earnings: first, differences in ability; and second, differences in the rate of return. Differences in ability do not affect the choice of schooling because of the functional form of the human capital producation function (Card 1999). So it is the individuals who earn greater returns to schooling and have more steeply sloped schooling/earnings functions that should invest more in education. Therefore, the process of investing in human capital should not be assumed to be consistent across individuals.

[13]The local average treatment effect should be larger than the average treatment effect.

Analysis

4.1 High school non completion

The Aboriginal identifying data, along with the educational attainment information, allows the computation of age specific[14] high school non completion rates.

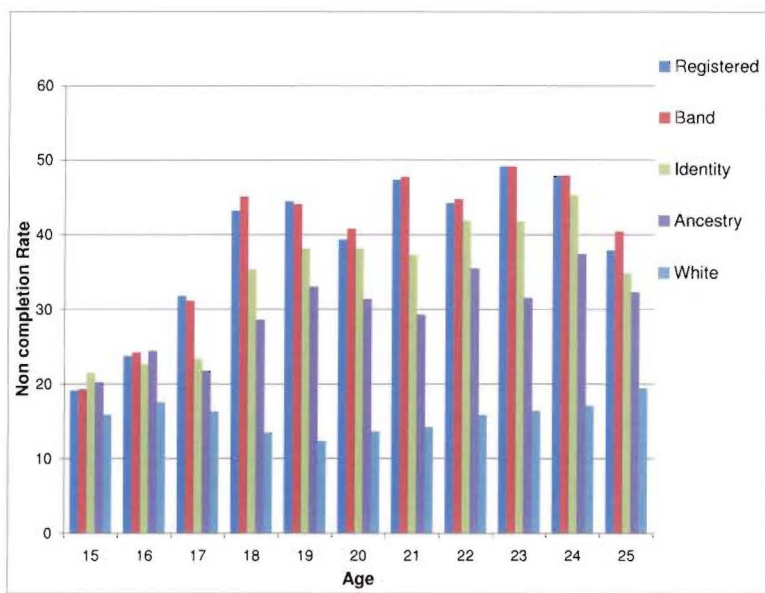

Figure 4.1: Female Non Completion

High school non completion by gender and ethnic group is displayed in figures 4.1 and 4.2. The difference in high school completion between Aboriginals and whites is striking. Whites are, for certain ages, twice as likely to complete high school. Given the social spending on Aboriginals in Canada (Government of Canada 2007), as well as the programs in place to ensure their education (Gorman 1999) the obvious question to ask

[14] According to Hull (2000), the relevant drop out pool is individuals between 15 and 25.

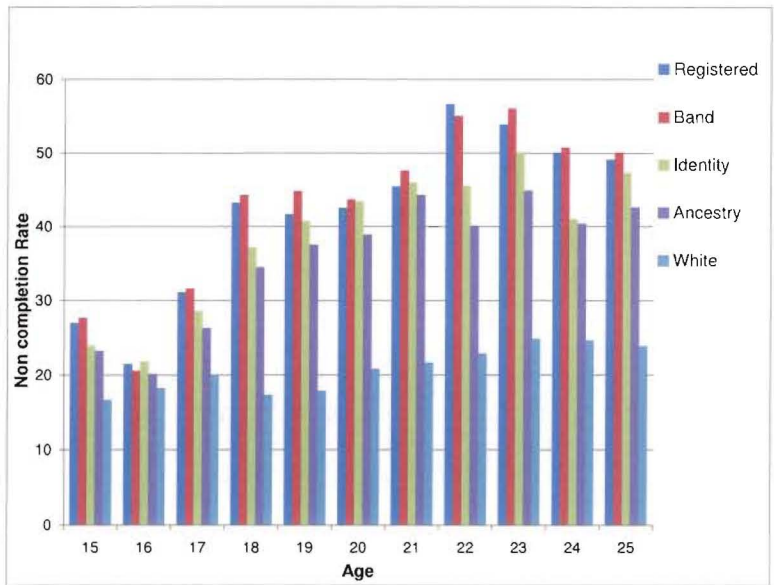

Figure 4.2: Male Non Completion

is why. Why is this particular group of people so much more likely to leave high school before completion?

4.2 Estimating returns to schooling

Regressing log income on years of education estimates the income return to schooling. That is, the coefficient on years of schooling can be interpreted as the slope of log-income with respect to a year of schooling; the percentage change in income associated with an additional year of education. This rate of return is made up of two components: first, the individuals who obtain further education may have higher ability or productivity than those who choose not to seek further schooling; and, second, education increases individuals' potential productivity and therefore income. Interpreting the estimated return from a human capital approach focuses on the second effect, and interpreting it from a sorting perspective focuses on the first. Both effects are important, but cannot be distinguished using Census data.

The regressions are run by gender and ethnic group[15], and have log-income or log-earnings for all persons as the dependent variable. On the right-hand side, schooling

[15]The four Aboriginal categories and the white control group.

consists of five continuous variables (constructed using total years of education, a variable recoded using the average of an interval): years of high school for those who did not complete high school; years of school for those who did complete high school[16] and did not attend any post-secondary; years of schooling for those who have completed high school and have a trade certificate but no further post-secondary education; years of post-secondary for those who have some university schooling but not post-secondary certificate or diploma; and years of post-secondary for those who have a university degree (Bachelor's, Master's, or PhD). The majority of previous research treats education as a continuous variable which restricts the return to be linear across years of education (Walters, White, and Maxim 2004). Grouping education into categories allows heterogenetity in the return to schooling, and captures variability in outcomes that exist among individuals with different types of education. This separation allows the estimation of returns to different *pieces* of education.

Individuals are restricted to one of the five types of years of schooling, and dummy variables indicate which of the categories an individual belongs to. The control variables are: experience[17], marital status (four categories: single, widowed, married, separated, or divorced), number of household members, official language knowledge (four categories: French, English, both, or neither), and Census metropolitan area (a dummy variable equal to one if an individual reports living in a Census metropolitan area, zero otherwise). Census metropolitan areas represent Canada's largest cities and are included in the regressions in an attempt to control for size of the area of residence.

$$\begin{aligned}\log(\text{income}) &= \beta_0 + \beta_1 \text{HS} + \beta_2 \text{HSDiploma} + \beta_3 \text{Trade} + \beta_4 \text{University} \\ &+ \beta_5 \text{Degree} + \beta_6 \text{Experience} + \beta_7 \text{Maritalstatus} + \beta_8 \text{HHMembers} \\ &+ \beta_9 \text{Language} + \beta_{10} \text{CMA} + \beta_{11} \text{Female} + \epsilon\end{aligned}$$

[16]This includes individuals who have completed high school via a General Equivalency Diploma because they are not distinguishable in the data.

[17]Experience is included in the regression to control for age and is defined as: experience = age − (years of schooling + 6)

Results and Discussion

Figures 5.1 and 5.2 report the coefficients on the years of schooling variables, which are interpreted as returns to schooling. The magnitudes of the coefficients vary significantly across the two dependent variables. In general, the coefficients estimated using log income are larger than the estimates obtained using log earnings. This suggests that the component of income which does not come from wages and salaries[18] increases the return to schooling, and should therefore increase the incentive to pursue further education. This supports the theory that education can be increased by financial incentives (Dearden, Emmerson, Frayne, and Meghir 2003). However, for Registered Indians, individuals with an Aboriginal ethnic ancestry and those with an Aboriginal identity the return to university years of schooling estimated with log earnings is higher than the return estimated with log income; for other categories still, the numbers are about the same. This implies that other sources of income[19] do not increase the incentive for Aboriginals to obtain university education. Interestingly, individuals in the white control group face a higher return to schooling estimated with log earnings than with log income for all types of education with the exception of a university degree. This finding supports the moral hazard effect of social assistance; because government transfers shift the consequences of not investing in human capital away from the individual, the presence of transfer payments lowers the incentives to obtain education.

Consider first the coefficients for high school years of schooling for those individuals who ultimately did not complete high school. This group does not include high school dropouts who later went on to receive a GED. Since nearly half of Aboriginal people never finish high school, the return to high school education is very important for this population. In the white control group, for both men and women, the return estimated with log income is larger than the earnings return. This implies that the combination of transfers, investment, and other sources of income increase the return to schooling,

[18]This is made up of government transfer payments, investment income, employment insurance, child tax benefits, and pension income.

[19]Primarily comprised of government transfers.

and consequently, the incentive to pursue high school education. The same pattern of higher income returns persists for the Aboriginal groups, with the exception of females who reported an Aboriginal ethnic ancestry. This suggests that the transfer system (and investment income) does not increase the incentive to obtain education for women with Aboriginal ancestry. The income returns are significantly higher for Aboriginals than for whites, suggesting that they should be more likely to complete some years of high school without graduating.

Consider now the returns to post-secondary years of schooling for those who have some university education (but no degree or diploma). For each group of Aboriginals males, the earnings returns are larger than the income returns. This suggests that, for Aboriginal males, the joint effect of government transfers, investment, and other income is to lower the incentive to invest in post-secondary education. For white males and females the income returns are larger than the earnings returns, implying that sources of income other than wages and salaries increase the incentive to pursue post-secondary schooling. Further, the returns to post-secondary education for whites is larger than the returns for Aboriginals. This finding contrasts sharply with the result for high school education, where the returns for Aboriginals was much higher than the returns for whites.

The difference between log income and log earnings is largely due to government transfers. Figure 5.3 shows the regression results with this difference as the dependent variable. This difference significantly lowers the return to high school years of schooling for individuals with an Aboriginal ethnic ancestry and for whites. However, it significantly increases the return to obtaining a university degree for the Aboriginal ancestry group. This implies that government transfers are effective in increasing the incentives for Aboriginals to pursue post-secondary education and ineffective in increasing the incentives for them to stay in high school. This pattern persists with respect to the control group.

It seems that Aboriginals in most groups do not face low returns to high school education or to post-secondary education. This contradicts the education investment pattern observed in Canada in which Aboriginals are far less likely to obtain education. This presents a puzzle that cannot be explained by returns to schooling, suggesting that there must be some other factors causing Aboriginals to leave high school before completion.

The PUMF files do not separate on- and off-reserve Aboriginals so the difference in the rate of return to schooling for these two groups cannot be identified. However, there is some evidence that the high rate of return to years of high school education is driven

by off-reserve Aboriginals; that on-reserve Aboriginals face a much lower return than whites (Pendakur and Pendakur 2008). Several important factors may drive the sharp difference in the returns to years of high school between on- and off-reserve Aboriginals. First, off-reserve Aboriginals are much more likely to live in cities and since the regressions did not control for size of area of residence, but rather for residence in the largest cities in Canada, this may not be an adequate control for the remoteness of typical reserves. Second, off-reserve Aboriginals may be different from those who live on a reserve, since living on a reserve is a choice that some people make and others don't. Those who choose to leave reserves are different from those who stay, and if that difference is correlated with other factors that have to do with labour market productivity, than a difference in the return to schooling may result. Pendakur and Pendakur (2008) found that for men, the off-reserve return to a year of high school is nearly triple the on-reserve return.

There is no reason to believe that on- and off-reserve Aboriginals are a homogeneous group that face the same opportunities or have the same incentives. Schools on reserves may be inherently different from schools non on reserves. Reserves are generally remote and removed from urban centers, perhaps making teaching at these schools very unattractive. If this is the case, schools on reserves may only attract low quality teachers. Further, the availability of schooling on reserves may be limited, which could alter the cost of attending school.

On-reserve Aboriginals face severe credit constraints because ownership is so limited. It is possible that the best and brightest leave reserves in order to pursue a different lifestyle. Because reserves are likely to be reluctant to lose their best and brightest, Aboriginals who do want to leave may face social sanctions. That is, leaving a reserve may not be costless.

Besides controlling for the difference in quality between on- and off-reserve schools, school quality in general should be accounted for. Schools within the came city are not comparable to each other (see, for example, the Fraser Institute Report Card Series).

Further, whether or not an individual lived in a Census metropolitan area (Canada's largest cities) is a significant contributor to earnings and income. Given data constraints, it was not possible to fully control for size of area of residence, but further research in this area should be done (see Pendakur and Pendakur - Minority Earnings Across the Distribution 2007).

5.1 Robustness

The results are robust to changes in the control group. That is, changing the white group to a group of individuals who report a British ethnic origin has an insignificant effect that does not change the main result. Aboriginals of each group have a higher return to high school years of education than individuals with a British ethnic origin. Since the British ancestry group is likely to include non-white individuals (though no Aboriginals), this suggests that general discrimination against visible minorities is not an issue. However, it is possible that Aboriginal specific discrimination does exist.

The results are also robust to changes in the total years of schooling variable. Recoding the variable using the maximum of the interval produces insignificant changes in the coefficients. Further, changing the 'pieces' of education (dropping doctorates from the degree category, adding a college diploma category, and dropping the trade certificate category) has little effect.

Dependent Variable: log income

	(1)	(2)	(3)	(4)	(5)
High school	0.24***	0.23***	0.22***	0.22***	0.11***
	(0.032)	(0.033)	(0.02)	(0.018)	(0.003)
High school diploma	0.085	0.11	0.13**	0.12**	0.09***
	(0.098)	(0.1)	(0.06)	(0.044)	(0.005)
Trade certificate	0.049	0.06	0.07**	0.07***	0.069***
	(0.042)	(0.044)	(0.03)	(0.025)	(0.005)
University	0.029	0.037	0.038	0.02	0.03***
	(0.047)	(0.047)	(0.033)	(0.03)	(0.006)
Degree	0.091	0.098	0.08	0.05*	0.053***
	(0.07)	(0.07)	(0.034)	(0.03)	(0.004)
Female	-0.16***	-0.16***	-0.16***	-0.33***	-0.52***
	(0.036)	(0.036)	(0.036)	(0.02)	(0.0036)
Constant	8.68***	9.33***	8.96***	9.41***	9.89***
	(0.73)	(0.48)	(0.41)	(0.19)	(0.13)
Experience	yes	yes	yes	yes	yes
Area of residence	yes	yes	yes	yes	yes
Marital status	yes	yes	yes	yes	yes
Household members	yes	yes	yes	yes	yes
Official language	yes	yes	yes	yes	yes
Observations	7914	7740	13396	19337	379965
R^2	0.14	0.14	0.15	0.16	0.17

Standard errors in parentheses
*significant at the 10% level
**significant at the 5% level
***significant at the 1% level

(1): Registered
(2): Band
(3): Identity
(4): Ancestry
(5): White

Figure 5.1: Returns to Schooling (Log Income)

Dependent Variable: log earnings

	(1)	(2)	(3)	(4)	(5)
High school	0.12***	0.11***	0.14***	0.18***	0.17***
	(0.04)	(0.04)	(0.03)	(0.02)	(0.005)
High school diploma	-0.05	-0.006	0.05	0.07	0.12***
	(0.1)	(0.1)	(0.07)	(0.05)	(0.007)
Trade certificate	0.016	0.02	0.05*	0.06**	0.09***
	(0.04)	(0.044)	(0.03)	(0.03)	(0.007)
University	0.048	0.03	0.06	0.03	0.04***
	(0.05)	(0.05)	(0.04)	(0.03)	(0.007)
Degree	0.008	0.03	0.04	0.02	0.032***
	(0.07)	(0.07)	(0.045)	(0.03)	(0.004)
Female	-0.34***	-0.35***	-0.4***	-0.43***	-0.49***
	(0.04)	(0.042)	(0.029)	(0.02)	(0.0045)
Constant	9.2***	8.87***	9.44***	8.74***	9.7***
	(0.48)	(0.86)	(0.6)	(0.31)	(0.27)
Experience	yes	yes	yes	yes	yes
Area of residence	yes	yes	yes	yes	yes
Marital status	yes	yes	yes	yes	yes
Household members	yes	yes	yes	yes	yes
Official language	yes	yes	yes	yes	yes
Observations	4616	4483	8517	13216	258976
R^2	0.15	0.15	0.17	0.18	0.18

Standard errors in parentheses
*significant at the 10% level
**significant at the 5% level
***significant at the 1% level

(1): Registered
(2): Band
(3): Identity
(4): Ancestry
(5): White

Figure 5.2: Returns to Schooling (Log Earnings)

Dependent Variable: (log income - log earnings)

	(1)	(2)	(3)	(4)	(5)
High school	-0.02	-0.01	-0.01	-0.02*	-0.006***
	(0.02)	(0.02)	(0.01)	(0.01)	(0.002)
High school diploma	0.003	-0.001	-0.02	-0.03	-0.003
	(0.06)	(0.07)	(0.04)	(0.03)	(0.004)
Trade certificate	0.018	0.02	0.02	0.02	-0.14***
	(0.025)	(0.03)	(0.02)	(0.015)	(0.003)
University	-0.02	-0.003	-0.02	-0.009	0.013***
	(0.03)	(0.03)	(0.02)	(0.02)	(0.004)
Degree	0.05	0.04	0.02	0.03*	0.01***
	(0.04)	(0.04)	(0.02)	(0.01)	(0.002)
Female	0.24***	0.24***	0.18***	0.16***	0.08***
	(0.02)	(0.02)	(0.02)	(0.01)	(0.002)
Constant	0.16	0.85*	0.6*	0.2	0.45***
	(0.8)	(0.5)	(0.3)	(0.16)	(0.14)
Experience	yes	yes	yes	yes	yes
Area of residence	yes	yes	yes	yes	yes
Marital status	yes	yes	yes	yes	yes
Household members	yes	yes	yes	yes	yes
Official language	yes	yes	yes	yes	yes
Observations	4615	4482	8516	13214	258891
R^2	0.05	0.05	0.04	0.03	0.04

Standard errors in parentheses
*significant at the 10% level
**significant at the 5% level
***significant at the 1% level

(1): Registered
(2): Band
(3): Identity
(4): Ancestry
(5): White

Figure 5.3: Returns to Schooling (Log Income - Log Earnings)

Conclusion

Using PUMF data I find that Aboriginals are much more likely to leave high school before completion than non Aboriginals. However, their decision to drop out is not guided by either one of the income or earnings return to years of high school education. In fact, I show that Aboriginals face a higher return to years of high school education than whites do. Further, because this result persists using a non-homogeneously white control group (individuals who report a British ethnic ancestry), the large differential in high school completion cannot be explained by general discrimination against visible minorities. Lastly, government transfers and other forms of income seem to reduce the Aboriginal population's incentive to pursue higher education, as the earnings return to education is higher than the income return.

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