Aboriginal Income Disparity in Canada

Key words: Income differences, Aboriginal persons

Krishna Pendakur, SFU
&
Ravi Pendakur, University of Ottawa

November 25, 2010

Abstract[1]

We investigate the earnings and income disparity faced by Aboriginal people in Canada from 1995 to 2005. We find that Aboriginal people face substantial earnings gaps in comparison with Canadian-born majority workers with similar characteristics (such as age and education). The estimated gaps are large: about 10 to 20 per cent for women and 20 to 50 per cent for men. However, these gaps eroded somewhat over 1995 to 2005. Among Aboriginals, registered Indians fare worst, persons with self-reported Aboriginal identity fare somewhat better, and persons with Aboriginal ancestry (but not identity or registry) fare better still.

[1] We wish to thank John Clement at Indian and Northern Affairs Canada (INAC) for his comments and help. We also wish to acknowledge the financial and logistic support of INAC.

1. Introduction

In Canada, more than 1.7 million people---more than 5 per cent of the population---report Aboriginal identity or ancestry. Almost 1.2 million people (about 3.8 per cent of the population) self-identify as Aboriginal persons (Census of Canada 2006). Aboriginal people are the focus of substantial policy attention – the federal government spends nearly 10 billion dollars per year on Aboriginal programs and affairs (Government of Canada 2007, p. 90). In spite of this, rates of economic success for Aboriginal people have generally been abysmal. Aboriginal policy consequently finds itself in the spotlight of public debates not only in Canada (e.g., Richards 2006) but also in the US (e.g., Jenkins 2007) and Australia (e.g., Tonkinson 2007).

While policy literature has been active, especially on education issues (e.g., Jenkins, 2007; Mendelson 2006; Walters et al 2004; Hull 2000), academic literature has also focused on issues such as fertility (e.g., Trovato 1987), and assimilation (e.g., Kuhn and Sweetman 2002). However, there has been little work assessing the labour market prospects and performance of Aboriginal people. In part this is because the relatively small size of Aboriginal populations results in the number of Aboriginal respondents on most publicly available micro-data sets being low, which poses a challenge for analysis (e.g.: Pendakur and Pendakur, 1998; Kuhn and Sweetman, 2002**).**[2]

In this paper, we use the entire (confidential) main bases of the 1996, 2001 and 2006 Censuses of Canada, each of which includes records for roughly 20 per cent of all households. We examine the labour market outcomes of Aboriginal people in Canada along several important dimensions. First, how do Aboriginal (Indian) legal registration, Aboriginal identity and Aboriginal ancestry play into patterns of earnings and income disparity? Are these different

types, or possibly degrees, of "Aboriginality" associated with different patterns of economic disadvantage, and how has this evolved over 1995 to 2005? Second, how does Aboriginal disparity vary across urban labour markets and over time, and does this variation correlate with the size of Aboriginal communities within cities?

The 2006 Census microdata do not include information on highest grade attainment for high-school dropouts (the question was not asked). However, we do have this information in the 2001 Census microdata. Thus, we use the 2001 data to examine two additional features of Aboriginal disparity that cannot be investigated with the newer data. First, given that education levels for Aboriginal people are on average low, and that more than one-third of Aboriginal people do not complete high school, does schooling allow Aboriginal workers to overcome earnings disparity? Second, to what degree does earnings disparity differ across the distribution?

We use regression methods applied to the labour market earnings and total incomes of Canadian-born workers. We run separate regressions for men and women, comparing Aboriginal to British-origin people in each case.[3] Our linear regressions condition on typical labour market controls, including age, education and place of residence. Our exploration of earnings disparity across the distribution uses analogous quantile regression methods.

We find that Aboriginal men and women face very substantial earnings disparity relative to British-origin persons with similar personal characteristics such as age and education. Further, we observe that within the Aboriginal population, registered Indians fare worst, persons

[2] We also note that many standard Statistics Canada surveys do not include First Nations reserves as part of the sampling frame.

[3] We use British as our comparison group because after controlling for personal characteristics such as age and education there is little difference in earnings across the majority groups (British, French or Canadian). Thus, we interpret our results as being the difference between any given Aboriginal group and the Canadian-born majority population. Using British as the comparison group also allows us to compare this study with past work we have done in the area of minority differentials (see Pendakur and Pendakur 2007, 2002 and 1998).

with self-reported Aboriginal identity fare somewhat better, and persons with Aboriginal ancestry (but not identity or registry) fare better still.

Although the levels of disparity are very severe, we do see some convergence in earnings disparity over time. For men, registered Indians and persons reporting Aboriginal identity saw substantial reductions in earnings gaps over the period 1995 to 2005. For women, the improvements for these groups were smaller, but still important.

We observe a great deal of variation in measured Aboriginal earnings disparity across Canadian cities. Past research has suggested larger co-ethnic populations can reduce the level of disparity for group members (Pendakur and Pendakur 2002). In this work, however, we find that this is not the pattern for Aboriginal people—indeed, it seems that the greater the size of an urban Aboriginal community, the worse the economic outcomes for its members.

It is well documented that the high school drop out rate for Aboriginal people is high (see for example: Richards and Scott 2009). However, we find that even those Aboriginals who attain high levels of education still face substantial earnings disparity. Indeed, we see little evidence of income convergence even at the highest levels of schooling.

That labour market disparity is important even for Aboriginal people with high levels of education suggests that glass ceilings may be one driver of economic disparity. However, our investigation of glass ceilings belies this. In fact, we observe something more like a "sticky floor" (see Dolado and Llorens 2004), wherein the most severe disparity is actually at the bottom of the conditional earnings distribution.

2. Previous Work

As stated, we examine labour market outcomes for seven groupings of Aboriginal people defined by their registry under the Indian Act, their self-reported identity, and their self-reported ancestry. Thus, we jointly consider an external— or legal—definition, an internal—or identity-based—definition, and a definition based purely on ancestry. Previous research based on Census data has focused on a broad Aboriginal category that lumps all these groupings together (George and Kuhn 1994; Drost 1994; Pendakur and Pendakur 1998; Kuhn and Sweetman 1998, 2002). Most of these studies use 1991 Canada Census data, though Drost (1994) uses the 1986 Census PUMF and Mendelson (2004) and Pendakur and Pendakur (2007) use the 2001 Census. Clatworthy et al. (1995) uses the 1991 Post-Censal Aboriginal Peoples Survey (APS) and associated 1991 Census PUMF data. These papers together establish that the incomes of Aboriginal people in Canada are extremely low relative to those of non-Aboriginal population, but they do not address the question of how this disparity varies across the groups that constitute the Aboriginal population, or how it varies over time.

Other papers have used smaller data sources, which are even more severely hampered by the fact that Aboriginal persons constitute only a small part of the Canadian population. In particular, Patrinos and Sakellariou (1992) use 1986 Labour Market Activity Survey data to decompose wage differentials between Aboriginals and non-Aboriginals in the Canadian labour market, and Wannell and Caron (1994) use data from the 1992 National Graduates Survey to examine earnings of 1990 post-secondary graduates for Aboriginals, visible minorities and whites. Despite Aboriginal persons constituting less than 3 per cent of the relatively small samples at their disposal, these authors still found significant wage disparity between Aboriginal and non-Aboriginal workers.

Other authors examining this disparity have pointed to the importance of location and identity. George and Kuhn (1994) establish great labour market disparity between Aboriginal and non-Aboriginal workers. Kuhn and Sweetman (1998) evaluate whether Aboriginal identity matters in the context of disparity and find that those persons with the "deepest" Aboriginal identity fare the worst in the labour market. Drost and Richards (2003) examine the incomes of Aboriginal persons and show that those living on-reserve fare poorly in comparison to their off-reserve counterparts. Through the current study, we are able to add to these findings and to demonstrate that these patterns have persisted into the new millennium.

Regression-based studies, such as Kuhn and Sweetman (1998) and Pendakur and Pendakur (2007), control for level of schooling. However, few studies have looked explicitly at the link between schooling and incomes for Aboriginals in Canada. Notable exceptions include Jenkins (2007), Mendelson (2006), and Hull (2000), which used census tables to look at the link between income and education for Aboriginals. Mendelson (2006) found that

> … on average the Aboriginal population suffers from higher unemployment, lower levels of education, below average incomes and many other indicators of limited socioeconomic circumstances. (p. 39)

Hull (2000) finds that registered Indians and those claiming Aboriginal identity faced far higher levels of unemployment than majority people. He also established that the employment rates of registered Indians show stronger improvement than those of non-registered Aboriginal people as education levels rise. Sharpe et al (2008) shows that differential educational attainment explains a large fraction of income differences among Aboriginal groups (though not between Aboriginal and non-Aboriginal groups). These papers provide a detailed picture of the relationship between schooling and average earnings in any given age-sex Aboriginal cohort. However, because they use exclusively tabular methods, they are unable to control for many variables. Our work

extends this research on income and education for Aboriginal people by using regression methods to assess similar questions.

A few recent studies have focused on differences in minority earnings outcomes across the conditional distribution (see, for example, Pendakur and Pendakur 2007; Dolado and Llorens 2006), These papers have asked whether glass ceilings are at work in determining the wages of minorities. In this paper, we extend that line of research to illuminate the conditional earnings distribution of our seven groups of Aboriginal people.

Very little research has focused on how Aboriginal labour market attainment varies across urban labour markets. To our knowledge, only Pendakur and Pendakur (2002) studied this, but that work used older data and aggregated our seven groups into one category. In sum, our current work extends previous study in this area in the following important dimensions: we consider three different types of "Aboriginality'" (registry, identity and ancestry); we estimate income-education profiles for these groups; we consider disparity across the conditional distribution; and, we assess how disparity varies across cities.

2. Data and Methodology

Our data are drawn from the master files of the 1996, 2001 and 2006 long form Censuses of Canada. We therefore have records for about 20 per cent of households in general, and nearly 100 per cent of households living on those Aboriginal reserves participating in the Census.[4] These databases are about 7 times larger than corresponding data drawn from the public-use microdata. From these observations, we select all people age 25 to 64 who are Canadian citizens

[4] In 1996, there were 77 incompletely enumerated reserves (reserves that did not take part in the census). In 2001, a total of thirty Indian reserves and Indian settlements were incompletely enumerated and in 2006 there were 22 incompletely enumerated reserves (Statistics Canada 2006: 27).

by birth resulting in 3 working databases consisting of nearly 2 million cases in each of the Census years, roughly 3 to 5 per cent of whom are Aboriginal persons.

We explore two aspects of income disparity. First we use OLS regressions to measure the difference in the conditional mean of log-earnings and log-total-income between Aboriginal and non-Aboriginal workers for Canada as a whole. Earnings regressions use the log of total earnings from wages and salaries as the dependent variable, and include only those people who work for someone else and whose primary source of earnings is from wages and salaries. Total income regressions use the log of total income from all sources as the dependent variable, and include everyone with positive incomes from any source, including wages and salaries as well as self-employment, investment and government transfer income. The total income measure does not net out taxes paid. Earnings and income are reported for the previous year, so we have income data on 1995, 2000 and 2005 from the 1996, 2001 and 2006 Census data, respectively.

Earnings regressions are comparable with previous research in the literature (e.g., Pendakur and Pendakur 1998, 2002, 2007) and allow the researcher to focus on possible labour market discrimination (which cannot easily be seen in transfer payments and self-employment income). Total income regressions are interesting because total income may tell us about material well-being, whereas earnings disparity may tell us about discrimination. In addition, because registered Indians have tax treatment and income-transfer structures which differ from other Canadians, total income regressions (in comparison with earnings regressions) allow us to see the overall effect of Aboriginal status on incomes.[5]

[5] Several caveats should be noted about total income measures for Aboriginal people. First, registered Indians living on-reserve receive significant in-kind services (such as housing) that other Aboriginal groups (e.g., off-reserve Aboriginals) must purchase with money income. Second, all registered Indians (but not other Aboriginals group members) are entitled to extended medical and dental benefits through Health Canada. Third, transfer income

Our investigation of Aboriginal income and earnings disparity focuses on seven categories of Aboriginal people differentiated along legal, identity and ancestry dimensions. The legal dimension is that of registry under the Indian Act; the identity dimension is illuminated by a question on self-reported Aboriginal identity, and the ancestry dimension is illuminated by self-reported ethno-cultural ancestry.

We identify two categories of self-reported legal Registered Indian status:

1. Registered Aboriginals living on-reserve;
2. Registered Aboriginals living off-reserve.

The 2001 census includes an *identity* question that asks: "Is this person an Aboriginal person, that is North American India, Métis or Inuit (Eskimo)?" (Statistics Canada 2006b: 10) There are three tick-boxes for "North American Indian," "Métis," and "Inuit" as responses. Persons reporting registry under the Indian Act without ticking one of the boxes have an imputed (positive) response to the identity question. Thus, in these data, every registered Indian has Aboriginal identity, but not vice versa. All registered persons are captured by the two categories listed above. We create three categories of unregistered persons with self-reported Aboriginal identity as follows:

3. North American Indian (including multiple responses);
4. Métis;
5. Inuit (Eskimo).

The five categories above capture all people with reported or imputed Aboriginal identity. Our last two categories capture people who have Aboriginal ancestry but not Aboriginal identity, and

---

through welfare programs is very important on reserves, and somewhat important off reserves. Finally, as with other rural populations, home and subsistence production is an important part of consumption for Aboriginal people

are derived from responses to the question "To which ethnic or cultural group(s) did this person's ancestors belong?" Respondents may write up to six responses to this question. We use the first two responses to identify people who reported:

6. Single Aboriginal ancestry but not Aboriginal identity;
7. Multiple origin Aboriginal ancestry (for example Aboriginal origin and British origin) but not Aboriginal identity.

Taken as a whole, the above categorisation allows us to differentiate those classified as Aboriginal for policy and program purposes (*registry*) from those who self-identify as Aboriginal people (*identity*) from those who neither register nor self-identify (*ancestry*). Registry under the Indian Act is associated with considerable policy and program attention. Persons with Aboriginal identity (but not registry) receive little or no targeted government financial support but nonetheless self-identify as Aboriginal. Thus, these people see themselves as Aboriginal even though the state does not formally recognize their Aboriginal status through financial transfers. Finally, the Aboriginal ancestry category captures those people who acknowledge at least some Aboriginal heritage but do not self-identify as Aboriginal.

Our regressions control for seven personal characteristics:

- age (eight categories), with 25-29 years old as the left-out category;
- education (varying numbers of categories, see our discussion below), with high-school completion as the left-out category;
- marital status (five categories), with single as the left-out category;
- number of household members less 1;
- knowledge of English and/or French (three categories), with English only as the left-out category;
- twelve area-of-residence categories (ten Census Metropolitan Areas or CMAs, a small CMA identifier and a non-CMA identifier), with non-CMA as the left-out category;

living in remote locations.

- forty-two ethnic origin controls including the seven categories of Aboriginal people. The left-out category for ethnic origin is single-origin British. As noted above, differences across majority groups (British, French or Canadian) are small, so it is reasonable to interpret the differences as those between the Aboriginal groups of interest and the majority population.

Regressions controlling for personal characteristics can be thought of as comparing the earnings of Aboriginal and British-origin persons with the same education level, age, marital status, number of household members, knowledge of English and French and area-of-residence. These variables are equal to zero for a *reference person*, defined as a 25-29 year old single unilingual English high-school education British-origin person living outside a CMA

In our investigation of how education plays into income disparity, we estimate log-income regressions for each Aboriginal group. However dealing with education variables poses a challenge in these data. In 2006, the Census moved to a new collection strategy for its education variable. In particular, since only a small fraction of the overall population did not complete high-school, Statistics Canada decided to stop collecting information on highest grade attainment for high-school non-completers. Unfortunately, for the subpopulation of Aboriginal people, this was a costly decision. Approximately one-third of Aboriginal people do not complete high-school. Consequently, in comparison with previous Census waves, the 2006 data may suffer from endogeneity bias induced by a correlated missing regressor – highest grade attainment for dropouts is a missing regressor which is highly correlated with Aboriginal status. For this reason we limit our exploration of education related differentials to the 2001 microdata. This form of endogeneity is likely an even larger problem at the bottom of the conditional distribution (for a discussion of endogeneity in quantile regression models, see Angrist and Chernozukhov 2008), and so we limit our quantile-regression based investigation of glass ceilings and sticky floors to the 2001 microdata as well.

We use two coding structures for education. When education is used as a control variable to assess earnings differentials over time between Aboriginal and British Origin groups, we include 12 categories of highest-level-of-schooling matched to 2006 census categories (these are: less-than-high-school, high school completed, and 10 categories of post-secondary attainment). We chose these categories to ensure comparability over our 10 year period of study. When education is used as a regressor-of-interest or as a control variable in quantile regressions, we use 21 categories of highest-level-of-schooling. These are: less than 5 years, 7 dummies for grades 5 to 11, grade 12-13 (without completion), high school completion (including graduate equivalency), and 11 categories of post-secondary attainment. The left-out category is high school completion.

3. Results

Table 1 shows the frequencies and average log-earnings and log-income for all persons in the samples, for British-origin persons, and for our 7 Aboriginal groups.[6] These numbers are weighted, so that they represent population-level estimates. British-origin persons are the reference (comparison) group in all regressions. We present averages of logs, because our regressions below use logged dependent variables.

We draw two conclusions from Table 1. First, Aboriginal populations in Canada are large and rising. For example, in the income sample comprised of people with positive total income aged 25 to 64 and born in Canada, the men and women in the 7 groups together total

[6] The frequencies are weighted counts, which represent (to the nearest 5), the estimated population-level frequencies of these Aboriginal groups. We note that in our estimation samples, Aboriginal people have higher representation because the sampling rate on reserves was 100% on participating reserves, whereas off-reserve the sampling rate was 20%. However, the weighted counts presented in the Table "undo" the unequal sampling probabilities, so that the Tables give numbers that are representative of the population aged 25-64 and born in Canada. British-origin workers have among the highest earnings of all the 37 ethnic groups in our categorisation.

nearly 245,000 people in 1995. This amounted to about 3.2 per cent of the total population in the income sample. By 2005, this fraction had grown to just over 5 per cent. This growth in population is especially evident for the registered Indian groups between 1995 and 2000.[7]

Second, all 7 Aboriginal groups have comparatively low income and earnings. Table 1 shows the log of earnings from wages and salaries and the log of total income from all sources for men and women by British origin and Aboriginal group status. For small differences (e.g., less than 0.20), differences in the average log of income or earnings can be interpreted as approximately equal to proportionate differences in average income or earnings. For example, the average of 1995 log total income for British origin women is 9.81. For women with multiple-origin Aboriginal ancestry, it is 9.64, suggesting that they earn about 17 per cent less than British-origin women (9.81-9.64=-0.17).[8] We see for both women and men, all Aboriginal groups have lower earnings and income than British-origin people. In our regression analysis below, we will see that this is true even when controlling for important characteristics like age and education, implying that Aboriginal people are poorer than can be explained by their low education levels and relative youth compared to the majority population.

[7] We note that the increase in the Aboriginal population is much higher than expected due to two things. First, the Aboriginal population, unlike the rest of the Canadian population is in the middle of a baby boom, thus with each census period there is a substantial increase in the number of young Aborginal men and women entering the labour force. Second Bill C-31, (passed in 1985) meant that Aboriginal women who had lost their status by marrying outside the group could reclaim that status. Although the bulk of claims took place in the late 1980s and 1990s, there is still a residual effect resulting in a marked increase in people claiming Aboriginal identity (Anderson 2004).

[8] It is typical to interpret coefficients in log-dependent variable regressions as above. However, for larger differences, this approximation does not work as well. For example, the average of log total income is 10.28 and 9.46 for British-origin and registered Indian men, respectively, yielding a difference in the logs of (9.46-10.28= -0.82). This might suggest that registered Indian men have 82 per cent lower income than British-origin men (i.e., they yield only 18 per cent the income of British-origin men). However, the proportionate difference in total income, which corresponds with this difference in log income, is in fact exp(9.46)/exp(10.28)-1=-0.56, indicating that registered Indian men in fact have incomes about 56 per cent lower than majority men. For simplicity of interpretation, we report the proportionate difference in income or earnings associated with the estimated differences in log income or log earnings on all regressions (tables 2 to 4) expressed in decimal form (i.e.: .50=50%).

3.1 Total Income and Earnings Disparity

To begin our investigation of income and earnings disparity, we first present overall earnings and income gaps by regressing the log of income or earnings on personal characteristics and group status. Income regressions use the entire population of either men or women reporting positive income from any source. Earnings regressions use only those men or women who report positive earnings from wages and salaries. The coefficients on group membership may be taken as indicators of overall earnings and income disparity under the restriction that the returns to education (and all other characteristics) are the same for all groups (a restriction we relax in table 3). For ease of interpretation, we report estimated proportionate differences and their standard errors.[9] Reported figures can therefore be interpreted as percent differences in income between the group of interest and the control group (British single origin).

For Table 2, the comparison group is people reporting only British origin. However, as noted, there is no significant difference in earnings between people who respond British, French, Canadian, or combinations of these three groups. Thus, we take our results to indicate disparity between Aboriginal and majority origin respondents.

We see four related patterns in Table 2. First, with one exception,[10] we find that regardless of type of income, sex or Aboriginal group, the differential between majority and Aboriginal Canadians is always negative and statistically significant at conventional levels. The

[9] Where the proportionate difference of the coefficients is defined as $\exp^{(b)-1}$, and their standard errors are equal to $\text{sqrt}(\exp^{b})*\text{se}(b)$. We do not report t-statistics or p-values for significance tests for two reasons: first, virtually everything is statistically significant; and second, they add unnecessary clutter since these objects are easily computed from the information in the tables.

[10] That exception is Inuit women. Compared to majority origin women, Inuit women have total incomes of about 27% more than majority women. We find throughout this work that the Inuit face quite different patterns.

degree of disparity is very large. The estimated proportionate gaps are on the order of 10 to 20 per cent for women and 20 to 50 per cent for men.

Second, there is a rough rank-ordering in the income and earnings attainment of our various categories of Aboriginal people. Looking at men, we see that registered Indians face the greatest disparity in all three Census periods. The proportionate earnings and income gaps for registered men living on-reserve are on the order of 50 per cent. Among non-registered men, those reporting North American Indian (NAI) or Métis identity face somewhat less, but still very substantial, disparity. The proportionate earnings and income gaps for NAI men are approximately 20 per cent. Finally, those reporting multiple-origin Aboriginal ancestry, but not Aboriginal identity, face relatively small earnings and income gaps on the order of 10 per cent.

Turning to women, the rank-ordering is not quite as stable. However, in 2001 and 2006, the rank-ordering looks similar to that of men: women registered under the Indian Act fare worst, followed by unregistered women reporting Aboriginal identity, followed by women reporting Aboriginal ancestry.

These findings add nuance to those of Drost and Richards' (2003) who conclude that although incomes are very low for urban Aboriginal people, incomes for those on-reserve—most of whom live outside of cities—are even lower. We corroborate this finding for registered Indian men, who have much higher earnings and incomes off-reserve than on-reserve, but find the opposite for registered Indian women (who perform slightly better on- than off-reserve).

One might argue that registry, and especially on-reserve registry, is correlated with remoteness of residence, concluding that the extreme disparity observed for registered Indians is really due to the isolation of many reserves. However, when we run regressions by city, so that

we are considering exclusively urban Aboriginals (some of whom live on urban reserves), a similar pattern of disparity emerges. Thus, although remoteness exacerbates the income disparity faced by registered Indians, it does not explain it.

The results for two of our groups are somewhat puzzling. For women, Inuit have *higher* incomes and earnings than British origin women, whereas for men, Inuit have much lower incomes and earnings than those with British origins. We do not have an explanation for this pattern, but we do note that the Inuit live mainly in the far north of Canada in very small communities, and so face quite different labour market conditions than do other Aboriginal people.

The least disadvantaged group of Aboriginal people is comprised of people who report multiple-origin Aboriginal ancestry but who neither report registry under the Indian Act nor self-identify as Aboriginal. However, this group still faces disparity of approximately 10 per cent for both women and men. From a comparison of these findings, it appears that even a little "Aboriginality" is associated with very poor labour market outcomes.

The third pattern relates to how total income disparity compares to earnings disparity. Some of the public debate in Canada has focused on the fact that registered Indians have access (in principle) to a large set of public transfer programs. Thus, earnings disparity may overstate the true economic disparity faced by this group. However, we see in Table 2 that proportionate income and earnings disparity are both approximately 50 per cent for registered on-reserve men. For women, the relative size of these disparities is different in different years. Thus, for men, we conclude that public transfers are not substantially mitigating the disadvantage that we observe, and for women, we see no clear pattern.

Fourth, there are several striking patterns in the evolution of disparity over time. We see a fairly robust pattern of declining overall earnings disparity for these Aboriginal groups from 1995-2005. Looking first at on-reserve registered Indians, proportionate earnings disparity for both men and women was about 5 percentage points lower in 2005 than in 1995. For registered off-reserve Indians, earnings disparity also declined. For men, this decline was very large, amounting to an improvement in the gap by about 12 percentage points. For women, there was a decline of similar magnitude between 2001 and 2006, but it was preceded by an increase between 1996 and 2001.

For the identity groups, we also see a very substantial reduction in earnings disparity over time. For NAI men and women, the proportionate disparity fell by about one-third, and for Métis men and women, it fell by about half.

In contrast, for persons reporting multiple-origin Aboriginal ancestry (but not Aboriginal identity) earnings disparity was unchanged for women over the period, and declined (marginally statistically significantly) by about 3 percentage points for men over the period.

The evolution of total income disparity was similar in that it showed convergence between Aboriginal and non-Aboriginal incomes, but some differences stand out. In particular, for registered Indians living on-reserve, whereas *earnings* disparity got smaller over time, *income* disparity got bigger over time. For both men and women, total income disparity grew by 13 percentage points over 1995-2005. This pattern over time strengthens the view that transfers did not undo earnings disadvantage for these people. In fact, although earnings converged for registered Indians living on reserve, incomes for these people diverged from those of the majority.

3.2 Patterns Across Cities

In this subsection, we examine Aboriginal earnings disparity in twelve urban labour markets. There are two important reasons to consider urban Aboriginal people in a city-specific way. First, from the material above, it is clear that registered Indians living on-reserve face the most severe earnings and income disparity. However, since reserves are often far from cities and their associated economic activity, one might argue that this disparity is really about location. In this subsection, we show that this is not the case: on-reserve registered Indians living in large cities face severe economic disparity. Second, Aboriginal people are distributed quite unevenly across Canadian cities. Other research on the economic outcomes of the ethnic minorities in Canada concludes that ethnic minority people perform better in cities with large numbers of co-ethnic residents (Pendakur and Pendakur 2002). This suggests a favourable enclave effect, wherein large urban ethnic enclaves improve the outcomes of their members. In this subsection, we show that this is not the case for Aboriginal people; indeed, Aboriginal people living in cities with large numbers of Aboriginals tend to fare particularly poorly.

Table 3 presents selected proportionate earnings gaps from regressions like those for earnings in Table 2, but run separately by sex in each of twelve Canadian cities. These cities include the 10 CMAs that are included as dummy variables in Table 2, plus Regina and Saskatoon, which are part of the "small CMA" dummy variable used in Table 2. We report estimates for two of our Aboriginal groups: registered Indians living on- and off-reserve.[11] We note that many of these estimated proportional differences are imprecise as a result of small sample sizes for some cities, but most estimates have standard errors less than 0.15.

[11] Estimates for other groups are can be obtained via the Canadian Public Policy website online edition of this article.

The top panel shows earnings disparity for registered Indians living on-reserve in cities. Empty cells in Table 3 indicate cities with no reserves (or non-enumerated reserves). All these estimates are significantly negative or insignificantly different from zero. For example, in Toronto in 2006, registered on-reserve men and women faced gaps of 39 and 36 per cent, respectively. In Vancouver, these gaps for men and women were 38 and 16 per cent, respectively.

However, some cities with reserves have very few reserve residents. Even considering only those cities and years where there are enough on-reserve people[12] to get tight standard errors, disparity ranges from 16 to 66 per cent for women and 38 to 64 per cent for men. Thus, neither statistical imprecision nor remoteness is the sole driver of the extremely severe earnings disparity we observe for registered Indians living on-reserve.

We note that the improvement over time observed at the Canada-wide level in Table 2 is also seen at the city level. Although the estimated proportionate differences are a bit more uneven, possibly due to the increased standard errors, there is an overall trend towards either stable or declining earnings gaps over time for both men and women. For example, in Vancouver, the estimated gap for women declined from 35 per cent to 16 per cent in 1996 and 2006, respectively. For men, this gap declined (though not quite statistically significantly) from 46 per cent to 38 per cent in 1996 and 2006, respectively.

Looking at registered Indians living off-reserve (bottom panel of Table 3), we see that for both men and women, the estimated disparity is relatively high in the prairie cities of Winnipeg, Saskatoon, Regina and Edmonton, which have very large Aboriginal populations. The estimated

[12] The CMA boundary of Calgary changed between 2001 and 2006 in a way that pushed Calgary's reserve outside the CMA boundaries in 2006. Thus, there is no estimate for on-reserve Indians in Calgary in 2006.

disparity for women in these cities ranges from 16 to 33 per cent in 2006. The estimated disparity for men in these cities ranges from 27 to 41 per cent in 2006.

For Montreal, Toronto and Vancouver, we see less disparity. For women, the estimated gaps range from 12 to 19 per cent in 2006, and for men they range from 17 to 30 per cent in 2006. Whereas other research in Canada has found that ethnic minorities have better economic performance in the presence of large numbers of co-ethnics, we do not see such a pattern for any group of Aboriginal people. In fact, what we see suggests the opposite. In Winnipeg, where Aboriginal peoples constitute more than 11 per cent of the population, Aboriginal disparity is amongst the most severe of any of the twelve cities studied. However, in Toronto, where Aboriginal persons make up only 1 per cent of the population, Aboriginal disparity is amongst the least severe of the twelve cities studied.

3.3 Income, Earnings and Education Levels

Table 2 shows the average differentials in both total income and earnings faced by different groups of Aboriginal men and women as compared to men and women of British origin, controlling for schooling and other characteristics. However, the return to schooling might be different for Aboriginal versus non-Aboriginal people for at least two reasons. First, it is well known that Aboriginal people have on average lower education levels. This could be connected to low returns to education, in comparison with the returns to education for majority people. Second, because transfer programs focus on registered Indians and because such transfers typically have higher incidence for poorer persons, the total income return (including transfer income) could potentially be lower for registered Indians than for majority people.

Alternatively, one might expect that because Aboriginal people are the target of federal and provincial government preferential hiring programs, the extreme disparity observed on average for Aboriginal people would be less severe for those Aboriginals with high levels of education. In this case, the total income return to education, at least at high levels of education, would be higher than for majority people. In this section, we examine the earnings-schooling profiles and income-schooling profiles for registered Indians, NAI and Métis people.

Table 4 shows selected coefficients (not proportionate differences) from the estimate income- and earnings-education profiles from regressions on 2001 Census data which control for personal characteristics. We present estimates for: the constant term, which gives the estimated log-earnings (log-income) of a reference person with a high-school certificate; grade 10 (without a high-school certificate); some non-university post-secondary but with no certificate; post-secondary with a trades certificate; some university but with no certificate; and a completed Bachelor's Degree.[13]

We refer to these as "naïve" income and earnings returns to schooling because they do not account for the fact that schooling is a decision made by individuals. Thus, these returns "add up" the effects of an individual getting more education and the fact that those who choose to get more education might be more productive (economically) than those who choose not to.

The estimated constant term shows differences in log-earnings and log-income between high-school educated Aboriginal people and high-school educated British-origin people that are broadly similar to the differences shown in Table 2. For example, the constant terms for

[13] Detailed coefficient estimates and standard errors (including those for Inuit, single and multiple Aboriginal origin, and for all 21 education levels) are available on the Canadian Public Policy website online edition of this article.

Aboriginal men in both income and earnings regressions are all much lower than those for British-origin men. For women, this pattern is weaker, but still evident in the constant terms in their earnings regressions.

We can evaluate the naïve return to high-school completion relative to dropping out in grade 10 by looking at the estimated grade 10 coefficients. If these coefficients are larger (in absolute value) for Aboriginal than for British-origin people, this would indicate that Aboriginal people have higher naïve returns to schooling at that level of education. For British-origin women, the income- and earnings-returns are 0.26 and 0.33 log-points, respectively. Aboriginal women have estimated returns that are statistically indistinguishable from these numbers, which means that, Aboriginal women do not have different naïve returns to high-school completion than British-origin people.

Turning to men, we see that the income- and earnings-returns to completing high school relative to dropping out in grade 10 are 0.28 and 0.20 log-points, respectively. In contrast, registered off-reserve men have much higher income- and earnings-returns, of 0.50 and 0.40 log-points, respectively. Métis men show a similar pattern, though of smaller magnitude.

Registered on-reserve men show an interesting contrast: their earnings return to high-school completion is larger than that of British-origin men, but their income return is smaller.

Turning to the BA column of the Table, we can evaluate the naïve returns to a completed Bachelor's Degree relative to high-school only. For British-origin women, a completed Bachelor's Degree is associated with an income return of 0.54 log-points and an earnings return of 0.63 log-points. Among the Aboriginal groups, all but Métis women have lower income returns to a completed BA, but no Aboriginal group has a much lower earnings return.

The pattern for men is somewhat different: registered on-reserve men have higher income and earnings returns to a completed BA than British-origin men, but other Aboriginal groups have lower income and earnings returns than their British-origin counterparts.

Examination of the some university with the no certificate column allows us to examine the importance of "sheepskin effects" for Aboriginal people. British-origin women with some university (but no university certificate) have income and earnings about 0.20 log points higher than British-origin women who have only high school. Thus, even "half a BA" is worth a considerable amount for this group. This is true for NAI and Métis women as well. However, for registered women, the income and earnings returns of university education with no certificate are insignificantly different from zero.

This pattern is evident, though weaker, for men as well. British-origin men with some post-secondary education but no certificate have income and earnings about 0.10 log points higher than those with just high school. But, registered off-reserve and Métis men have income and earnings returns that are zero or even negative.

Overall, we draw 3 conclusions from this discussion of the naïve returns to education. First, Aboriginal people face returns to education that are in the main similar to those of the majority population. Education is associated with higher incomes for Aboriginal people, just as is the case for non-Aboriginal people. This belies the notion that Aboriginal people don't get any economic benefit from education. On the other hand, given the enormous size of Aboriginal income disparity, the small differences between the income- and earnings-education profiles of Aboriginal and non-Aboriginal people are not sufficient to undo that overall disparity. Thus, even highly educated Aboriginal people face substantial income disparity.

Second, for Aboriginal women, income returns to a Bachelor's degree are smaller than for their British-origin counterparts, but earnings returns are not. It is well-known that the total income returns to education are smaller than the earnings returns to education. This is due to many factors, including heterogeneity across people in their labour force attachment, and the redistributive nature of the tax/transfer system. The point here is that, broadly speaking, for Aboriginal women, the difference between income and earnings returns is amplified in comparison with that difference for British-origin women.

That returns are low for men and women who are registered under the Indian Act, and thus eligible in principle for large social transfers, suggests that transfers may play a role in reducing the return to education. We note that although all registered Indians are eligible for some social transfers, those living on reserve are eligible for much larger and more varied transfers than those living off reserve (for example, free housing). But, that this pattern is observed for the identity groups (who are not registered), suggests that such an interpretation be taken with a large amount of salt.

Third, we see some evidence of sheepskin effects for registered Indians (and for Métis men), wherein the returns to an incomplete university degree are near zero.

3.4 Earnings Disparity across the Conditional Distribution

Our work so far has looked at the degree to which there are differences in the conditional mean of earnings for Aboriginal compared to British origin workers. Here, we will focus on the degree to which there are differences in the conditional quantiles of earnings, for example, differences in the top decile of earnings conditional on personal characteristics. Pendakur and Pendakur (2007) and Albrecht et al. (2003) examine the conditional quantiles of labour market

outcomes to assess the relevance of glass ceilings to minority workers and to women, respectively. These papers investigate whether or not disparity is greater at the top of the distribution than at the bottom, taking such a pattern to indicate the presence of a "glass ceiling." As we detail below, we find that Aboriginal workers exhibit the opposite pattern, termed a "sticky floor'" in the literature on conditional wage distributions (e.g., Dolado and Llorens 2004). We use quantile regression to estimate the conditional p^{th} quantile of log earnings attributable to Aboriginal group membership conditional on observable characteristics (see Buchinsky 1998a for a review of these methods in an economics context). 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. When *p* corresponds to a different quantile, the spirit of the optimization is to minimize asymmetrically weighted functions of absolute deviations. Because quantile regression can be computationally expensive with large samples, we use 20 per cent of workers from British, French and Canadian origins and 100 per cent of workers from all other ethnic groups in all reported estimates. However, because the variance of estimated differentials between groups depends most strongly on highest variance component, sampling majority workers does not much increase the variance of our coefficients of interest.

Table 5 shows estimated proportionate earnings disparity, controlling for personal characteristics, at the 20th, 50th, 80th and 90th percentiles. To minimize clutter, asymptotic

standard errors are not presented, but are available on request. Standard errors at the 20th, 50th, and 80th percentiles are similar in size to their analogs in Table 2, but are roughly twice as large at the 90th percentile.

Here, we use only the 2001 Census data on earnings in 2000. We focus on these data because the missing information on highest grade attainment in the 2006 Census data presents a severe endogeneity problem at the bottom quantiles of the conditional distribution. This is because, even if the endogeneity is small for a mean regression (as in Table 2), one would expect the correlation between the missing regressors and earnings to be strongest at the bottom of the distribution. We see the greatest disparity at the bottom of the distribution and since the 2001 Census data do not suffer from this missing regressor problem, we do not suspect that endogeneity is driving the findings reported below.

These regressions are estimated for workers whose major source of income is wages and salaries and who have positive earnings. In most cases, we find that the disparity faced by Aboriginal workers is greatest at the bottom quintile of the conditional distribution and smallest at the top quintile and decile of the conditional distribution. This means that the mean regression may be somewhat misleading: disparity at the mean is much smaller in many cases than disparity at the bottom.

For women at the bottom quintile of conditional earnings, the estimated disparity ranges from no disparity for those reporting single-origin Aboriginal ancestry to 36 per cent for registered women living off-reserve. In contrast, at the top decile of conditional earnings, the estimated disparity ranges no disparity for women reporting single-origin ancestry to 15 per cent

for registered women living on-reserve. An interesting outlier here is Inuit women, who face great disparity at the bottom of the distribution but nearly as great advantage at the top.

For men at the bottom quintile, the estimated proportionate differences range from 18 and 12 per cent for men reporting single- and multiple-origin Aboriginal ancestry, respectively, to 64 per cent for registered men living on-reserve. At the top decile, the estimated proportionate differences range from 2 and 5 per cent for people with Aboriginal ancestry to 33 per cent for registered men living on-reserve. Thus, taking men and women in all seven groups together, we see that the disparity at the bottom is two to three times as severe as that at the top of the conditional distribution.

One may read these results in terms of the within-group inequality of members of these Aboriginal groups. When disparity at the bottom is larger than that at the top, the distribution of earnings for the Aboriginal group is stretched and pushed towards low earnings compared with the distribution of earnings in the majority population. This is broadly consistent with findings on Aboriginal inequality in Richards and Vining (2004). They find (without conditioning on characteristics) that incomes are low, but inequality high, for Aboriginal people. The combined view from our OLS and quantile regressions shows the same picture, even as we condition out observable characteristics.

How do we explain these patterns in the conditional earnings distribution of Aboriginal people? Like the OLS regressions reported in Tables 2 and 3, the quantile regressions reported in Table 5 control for observed characteristics, but not for unobserved characteristics. If unobserved characteristics were correlated with quantiles, then this would "explain" the variation in disparity across the quantiles. (That is, quantile regression models may suffer from

endogeneity, just like ordinary regression models, see Angrist et al 2006.) One possibility here is that unobserved productive characteristics like work experience, job tenure and job competence (conditional on age and education, etc) are higher for those in the upper quantiles, and indeed, they are what push individuals into those upper quantiles. This explanation is based on unobservable variables, so we cannot test it, but it may well be part of the story.

As noted above, the pattern we see, where disparity is greatest at the bottom of the conditional distribution, has been called a "sticky floor" by Dolado and Llorens (2004) among others. Their story is based on a different correlated unobserved variable: they interpret the pattern in terms of differential labour market attachment at the bottom and top of the distribution. In their view, workers at the bottom of the conditional distribution have weak labour force attachment and low earnings for that reason.

We see an alternative explanation in our context. In Canada, Aboriginal people are an explicit target group for preferential government employment via the Employment Equity Act (1988, 1998). If government employers seek out Aboriginal workers, they may "cream" the distribution for those with highly productive unobserved characteristics and offer them highly paid government jobs. In this case, disparity would be diminished, but only at the top of the conditional distribution. However, if this were a primary driver of sticky floors, we would also expect government employers to cream the distribution based on observed characteristics, such as education. But, as discussed above, there is little evidence that Aboriginal income disparity is much smaller for highly educated Aboriginal workers.

4. Conclusion

We find that Aboriginal men and women face severe earnings and income disparity relative to British origin persons in Canada. Further, within the Aboriginal population, registered Indians fare worst, persons with self-reported Aboriginal identity fare somewhat better, and persons with Aboriginal ancestry fare better still. However, even those in the last category face disparity on par with the most disadvantaged non-Aboriginal ethnic minorities in Canada (see Pendakur and Pendakur 2002, 2007, 2010). We also find that the economic prospects of Aboriginal people living in cities with large Aboriginal populations are worse still. That is, the beneficial enclave effects noted for other ethnic groups in Canada's cities do not seem to apply to Aboriginal people and may even work to their harm.

Our analysis of the returns to education and of disparity across the conditional distribution is similarly depressing. Although Aboriginal incomes do rise with increased education, we find that even those Aboriginal people with high levels of education face considerable economic disparity. However, the sticky floor pattern we observe suggests that policy attention is most needed at the bottom of the conditional distribution.

However, not all the news is bad. We see an overall trend towards decreasing earnings and income disparity for Aboriginal people over 1995-2005. This decreasing disparity is observed for almost all Aboriginal groups, for both men and women, mostly consistently over time, and in most cities.

5. References

Agocs, C. 2002. "Canada's employment equity legislation and policy, 1987-2000: The gap between policy and practice." *International Journal of Manpower* (2002) 23 (3): 256–76. http://www.emeraldinsight.com/ijm.htm.

Albrecht, J., A. Bjorkland and S. Vroman. 2003. "Is there a glass ceiling in Sweden?" *Journal of Labor Economics* 21 (1): 145–77.

Anderson, E. 2004. "A Select and Annotated Bibliography Regarding Bill C-31, Indian Registration and Band Membership, Aboriginal Identity, Women and Gender Issues". Ottawa: Department of Indian and Northern Affairs Canada. http://www.collectionscanada.gc.ca/webarchives/20071127002921/http://www.ainc-inac.gc.ca/pr/ra/sab/index_e.html

Angrist, Josh and Victor Chernozhukov, and I. Fernández-Val. 2006. "Quantile regression under misspecification, with an application to the U.S. wage structure." *Econometrica* 74(2): 539-563.

Buchinsky, M. 1994. "Changes in the US wage structure, 1963–1987: Application of quantile regression." *Econometrica* 65 (1): 109–54.

Buchinsky, Moshe. 1998. "Recent advances in quantile regression models: A practical guideline for empirical research*." Journal of Human Resources* 33 (1): 88–126.

Dolado, J. J. and V. Llorens. 2004. "Gender wage gaps by education in Spain: Glass floor vs glass ceilings." *CEPR Discussion Paper 4203*.

Drost, H. 1994. "Schooling, vocational training and unemployment: The case of Canadian Aboriginals." *Canadian Public Policy* 20 (1, March 1994): 52–65.

Drost, H. and J. Richards. 2003. *Income on- and off-reserve: How Aboriginals are faring*. Toronto: CD Howe Institute.

George, P. and P. Kuhn. 1994. "The size and structure of native-white wage differentials in Canada." *The Canadian Journal of Economics* 27 (1, Feb. 1994): 20–42.

Government of Canada. 2007. Budget plan 2007. Ottawa: Minister of Supply and Services. http://www.budget.gc.ca/2007/pdf/bp2007e.pdf.

Hull, J. 2000. *Aboriginal post-secondary education and labour market outcomes Canada, 1996.* http://epe.lac-bac.gc.ca/100/200/301/inac-ainc/aboriginal_ps_edu-e/pse_e.pdf.

Jenkins, A. 2007. "Indigenous post-secondary institutions in Canada and the U.S." *Higher Education Perspectives* 3 (1): 1-27.

Kuhn, P. and A. Sweetman. 1998. *Assimilation and economic success in an Aboriginal population: Evidence from Canada*. http://www.ciln.mcmaster.ca/papers/cilnwp18.pdf.

Kuhn, P. and A. Sweetman. 2002. "Aboriginals as unwilling immigrants: Contact, assimilation and labour market outcomes." *Journal of Population Economics* 15 (2002): 331–55.

Mendelson, M. 2004. *Aboriginal people in Canada's labour market: Work and unemployment, today and tomorrow.* Toronto: Caledon Institute. http://www.caledoninst.org/Publications/PDF/471ENG.pdf.

Mendelson, M. 2006. *Aboriginal peoples and post-secondary education*. Toronto: Caledon Institute.

Mincer, J. 1974. *Schooling, Experience, and Earnings*. New York: Columbia University Press.

Patrinos, H. and C. Sakellariou. 1992. "North American Indians in the Canadian labour market: A decomposition of wage differentials." *Economics of Education Review*(11 (3):257–66.

Pendakur, K. and R. Pendakur. 1998. "The Colour of Money: Earnings Differentials Across Ethnic Groups in Canada." *Canadian Journal of Economics*, 31(3): 518-548.

Pendakur, K. and R. Pendakur. 2002. "Colour My World: Has the Minority-Majority Earnings Gap Changed Over Time?" *Canadian Public Policy* 28(4): 489–512.

Pendakur, K. and R. Pendakur. 2007. "Minority earnings across the distribution." *Canadian Public Policy* 33 (1): 41–62.

Pendakur, K. and R. Pendakur. 2010. "Colour By Numbers: Minority Earnings Disparity" forthcoming, *Journal of International Migration and Integration*.

Richards, John. 2006. *Aboriginal policy: Creating choices.* Toronto: CD Howe Institute. http://www.sfu.ca/mpp/pdf_news/800-04%20creating.choices-10may.pdf.

Richards, J. and M. Scott. 2009. Aboriginal Education: Strengthening the Foundations. Ottawa: CPRN.

Richards, J. and A. Vining. *Off-Reserve Aboriginal Education*. Toronto ON: CD Howe Institute, http://www.cdhowe.org/pdf/commentary_198.pdf, *Commentary* 198.

Sharpe, A., J. Arsenault, and S. Lapointe. 2008. "The Potential Contribution of Aboriginal Canadians to Productivity and Output Growth in Canada: An Update to 2006-2026", paper presented at CEA 2008.

Statistics Canada. 2001. *Aboriginal peoples of Canada, 2001 Census*. Cat. No. 97F0011XCB2001001. Ottawa: Statistics Canada.

Statistics Canada. 2006a. Aboriginal Peoples Technical Report, 2006 Census. Catalogue no. 92-569-XWE. Ottawa: Statistics Canada.

Statistics Canada. 2006b. 2006 Census Questionnaire (2b). Catalogue no. 3901_Q2_V3-eng. Ottawa: Statistics Canada.

Tonkinson, Robert. 2007. "Aboriginal "difference" and "autonomy" then and now: Four decades of change in a western desert society." *Anthropological Forum* 17(1, March 2007): 41–60.

Trovato, F. 1987. "A macrosociological analysis of native Indian fertility in Canada: 1961, 1971, and 1981." *Social Forces* 66 (2, Dec. 1987): 463–85.

Walters, D., J. White and P. Maxim. 2004. "Does postsecondary education benefit Aboriginal Canadians? An examination of earnings and employment outcomes for recent Aboriginal graduates." *Canadian Public Policy* 30 (3, September 2004): 283–301.

Wannell, T. and N. Caron. 1994. *A look at employment-equity groups among recent postsecondary graduates: Visible minorities, Aboriginal peoples and the activity limited.* 11F0019MPF No.69. Ottawa: Statistics Canada. http://www.statcan.ca/english/research/11F0019MIE/11F0019MIE1994069.pdf.