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Research Paper

Minorities, Cognitive Skills and the Incomes of Canadians

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This paper represents the views of the authors and does not necessarily reflect the opinions of Statistics Canada.



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Abstract

This paper uses the Statistics Canada Survey of Literacy Skills in Daily Use (LSUDA) to investigate minority-white income differences and the role cognitive skills play in those patterns. Some minority groups have substantially lower (tested) levels of literacy and numeracy skills than whites and other more economically successful minorities, and in the case of certain male groups these differences play a significant role in explaining the observed income patterns. The ethnic-white income gaps are, however, much smaller for women, and the literacy and numeracy variables do not have much of a role to play in explaining those differences. Various policy implications are discussed.

Keywords: ethnic minorities, literacy, immigrants, earnings patterns

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I. Introduction

The cultural and racial make-up of Canada has changed dramatically over the last four decades, due to immigration. Until the mid-1960s, the main source of immigrants was the United Kingdom, Ireland, the United States and Italy, but by the late 1990s it had become Asia, with Hong Kong, India, the Philippines and China leading the way. The population of the country has steadily been reflecting these changed inflows.

Analysing the economic progress of immigrants has been the focus of a good deal of research.¹ A related, but somewhat less studied topic is the status of visible minorities or “people of colour” B those not of European (white) descent. The two topics are clearly linked, but also distinctly separate since many ethnic minorities are not immigrants (having been born in this country) and many immigrants are not ethnic minorities. Differences in earnings amongst ethnic minorities have been studied extensively in the United States since the 1960s, typically focussing on black/white, Asian/white or Hispanic/white comparisons. Only recently, however, have such analyses been done for Canada, principally because micro data sets containing detailed information on ethnic background have not been available.² The few that have been carried out have found distinct earnings disadvantages for visible minorities and aboriginals relative to whites.

In a related development, the shift in the source of immigrants has presumably made the lack of English or French language proficiency an increasingly important potential barrier to their social and economic assimilation. The lack of language skills for some recent immigrants is thus hypothesized to be a significant element of what appears to be the “declining quality of immigrants” in both this country and the U.S., which has led to lower earnings, increased dependence on social services, and a generally slower rate of socio-economic integration for more recent cohorts (Baker and Benjamin, 1994; Borjas, 1994). It is, however, necessary to point out this view is not held by all researchers in the field. De Silva (1997), using a male subsample of the Longitudinal Immigrant Database, finds a rapid convergence in earnings of different immigrant classes over time; refugees, who generally have a poorer command of English or French, initially experience an earnings disadvantage compared to independent immigrants, but then catch up fairly quickly.

The contribution of this paper is to report the results of an empirical examination of the incomes of visible minorities, aboriginal Canadians, and whites which is unique in that it takes into account not only education levels and other standard human capital measures, but also immigration status and literacy and numeracy (i.e., cognitive) skill levels. This is made possible by the identification of ethnicity and the availability of variables measuring individuals’ reading and mathematics abilities on the Survey of Literacy Skills Used in Daily Activities (LSUDA) micro data file used in the analysis.

We are thus able to examine the following questions: Are there significant differences in cognitive skills (literacy and numeracy), as well as education levels, among whites, aboriginals, and visible minorities? Are these skills generally related to individuals’ income levels? Do

¹ See reviews by Borjas (1994) and Benjamin, *et. al.* (1998, chapter 11).

² We define “whites” as individuals who are of European descent. All others, except aboriginals, are visible minorities. We follow the standard Statistics Canada definition for minorities, as discussed further below.

they explain any of the income differences between these groups? How do income differences between visible minorities and whites compare for immigrants versus those born in the country?

The paper is thus intended to contribute to our understanding of ethnic-related income differences in Canada and their relation to immigration status, and to help us better understand the role that literacy and numeracy (and perhaps by extension other cognitive skills and other types of human capital) affect these patterns—timely issues given the considerable size and influence of our immigration flows and the rising importance of human capital to the economic and social success of all Canadians, and perhaps immigrants above all. A number of policy implications of the findings are discussed.

2. Previous Research

Studies of the economic performance of minority groups in Canada almost always start with a human capital format and focus on white/visible minority or white/native earnings differences, with some authors including all three sets of variables in their analysis (Pendakur and Pendakur, 1998; Hum and Simpson, 1999). Examining the situation of visible minorities also necessarily means modelling the immigration process, since over half of the visible minority population was born outside the country.

In one of the first studies on the earnings of visible minorities, Christofides and Swidinsky (1994) use the 1989 Labour Market Activity Survey (LMAS) to find significant wage differences between whites and visible minorities, especially for women. Using the Blinder-Oaxaca decomposition technique they find that 76 percent of the wage gap between white and minority males cannot be explained by productivity (“endowment”) differences, and less than five percent of the white female-minority wage gap can be explained by such factors. Unfortunately, the LMAS database contains only a single dichotomous variable that indicates whether or not an individual is a visible minority, thus limiting Christofides and Swidinsky’s work in terms of what it tells us about the underlying earnings patterns and how different ethnic groups perform in the labour market.

More recently, Baker and Benjamin (1997) and Pendakur and Pendakur (1998) use 1991 Census data to again find significant earnings gaps between whites and non-whites not explained by the standard human capital model. The major difference between the two studies is that Pendakur and Pendakur (1998) employ much more disaggregated data and identify a number of individual ethnic groups. They also compare earnings between and within groups (e.g., white British versus white French earnings differences.) They conclude that visible minorities—especially men—whether born in or outside Canada, face substantial earnings penalties and that a significant portion of this gap may be due to economic discrimination.

The closest Canadian study to ours, however, is Hum and Simpson (1999). They use the master file of the Survey of Labour and Income Dynamics (SLID), which contains both detailed work history information and a variable identifying individual ethnicity, to examine six groups: blacks, Indo-Pakistanis, Chinese, non-Chinese Orientals, Arabs and Latin Americans, and aboriginal Canadians. Their principal finding is that although there are significant earnings gaps between whites and others, especially for men, almost all of these are first generation. In other words, there are significant differences between whites and minorities amongst the foreign-born, but

almost no differences amongst the Canadian-born population. The only exception is native-born black males, who earn significantly less than native-born whites.

The relative earnings of aboriginals—not officially classified as a visible minority group—have also been studied. George and Kuhn (1994) focus principally on natives off reserves and outside the Yukon and N.W.T. working full-time and full-year to find a rather small white-aboriginal male wage gap, about eleven percent, with the female gap about half that (6.5 percent). The gap varies with the specific definition of an aboriginal person (any aboriginal origins versus only aboriginal origins). Furthermore, using the Blinder-Oaxaca decomposition technique the authors find that about half this gap is explained by human capital variables, while the other half is unaccounted for. De Silva (1999) updates George and Kuhn’s study, although he looks at a wider population of whites and natives, which includes part-time and part-year workers and does not distinguish between natives living on and off reserves. His findings reinforce George and Kuhn’s in that even a larger portion of the white-native wage gap (55 to 80 percent, depending on the variables included) related to endowments (education, training, job skills, *etc.*), leaving only the smaller part to be potentially explained by direct labour market discrimination. Both studies strongly support the argument that education and training would be an important vehicle for reducing the earnings gap between whites and natives since the differences in endowments explain such a large percent of the overall gap.

Meanwhile, in a parallel literature on the “economics of cognitive skills”, a number of researchers have focussed on literacy and numeracy measures (independent of education and other human capital variables) in explaining earnings and employment differences amongst various population groups.³ In the United States, Rivera-Batiz (1990, 1992) and, Pryor and Schaffer (1999), and in Canada, Charette and Meng (1994, 1998), Finnie and Meng (2001a) and Green and Riddell (2001) have found that literacy and numeracy significantly influence the incomes and labour market status of both men and women.

While not Canadian in scope, the papers in this literature that are overall closest to ours are Raudenbush and Kasim (1998) and Neal and Johnson (1996). The former use the U.S. National Adult Literacy Survey (NALS), a survey similar to the one used here, to find important differences in cognitive skills between ethnic groups (white, African, Hispanic and Asian Americans), even among persons with the same educational background, and that these skill differences help explain the associated employment and earnings patterns. In fact, after controlling for education, literacy, and other background effects, the Hispanic/white American male wage gap essentially disappears; this is not, however, the case for the African/white wage gap. Neal and Johnson (1996), meanwhile, control for cognitive skills by using the Armed Forces Qualification Test (AFQT) as an independent variable. In their wage regressions the AFQT variable reduces the black-white male wage gap from 24 to 7 percent and the comparable female wage gap from 18.5 percent to zero.

3. *The Data*

Our study uses the master file of the Survey of Literacy Skills Used in Daily Activities (LSUDA) database. It has previously been used by a number of Canadian researchers to link cognitive

³ The finding that cognitive skills affect incomes may not be totally independent of education since literacy and numeracy may be potential indicators of quality of education. This is especially important when examining earnings differences amongst ethnic groups.

skills to incomes (see references above). Critical to our analysis, individuals' reading and arithmetic skills were tested, in the language of choice (English or French), and scored from 0 to 500.⁴ As important, the master file version of LSUDA indicates the individual's ethnic background, thus allowing us to carry out our analysis of incomes, cognitive skills, and ethnicity.⁵

The entire LSUDA file consists of a weighted survey of 9,455 Canadian residents, aged 16 to 69 in 1989. Following Hum and Simpson (1999) we restrict our sample to non-students. We then use two different samples. The first, and larger, is used to estimate the determinants of literacy and numeracy ($n = 3,973$ men and 5,028 women). When we then focus on incomes, the samples are further limited to individuals who had positive weeks worked and positive incomes in the year (1989) in question (3,152 men and 3,035 women).⁶ Weighted estimates (based on the underlying sample stratification scheme) are reported throughout.

Table 1 reports the definitions and means of the variables for the two samples used in our analysis to estimate the literacy and numeracy models and the income models.⁷ In addition to the usual human capital and labour market variables are the key ethnicity identifiers. Specifically, we are able to identify native (aboriginal) Canadians, Chinese, Mid-Easterners, blacks, non-Chinese Asians (mostly those from the Indian sub-continent), Latin Americans, and people of multiple ethnic backgrounds, the latter including those who claimed more than one of the above heritages.⁸ Approximately 7.5 percent of our sample identify themselves as a member of a specific visible minority group, about 3 percent are aboriginal Canadians, and 3 percent are of mixed origin.^{9,10}

⁴ Unfortunately, the reading and arithmetic scores are not as independent from each other as we would like because in order to complete some of the numeracy questions a competency in literacy had to be demonstrated (see Charette and Meng, 1998, pp. 497-8 for a discussion of the problem). For a further discussion of the LSUDA database see Statistics Canada (1991a, 1991b).

⁵ Statistics Canada (1996) has developed an updated version of LSUDA, the International Adult Literacy Survey (IALS). While the IALS has some advantages over LSUDA, such as date of the survey (1994), we use the older survey principally because of the small IALS sample size ($N=5,660$). See Green and Riddell (2001) for a discussion and detailed analysis of the IALS data base.

⁶ Those individuals who did not explicitly state whether they were born in Canada (native-born) or born outside the country (immigrant) were also deleted from our samples. Immigrants whether educated in Canada or elsewhere are included in the foreign-born population. For an analysis of immigrants who were educated and socialized in Canada, see Li (2001) or Finnie and Meng (2001b).

⁷ We also included AGE2 (AGE squared), TEN2 (TENURE squared) and YRIC2 (YRIC squared) as independent variables in our analysis.

⁸ A person with a multiple ethnic background does not mean they claim, for example, Irish and Scottish heritage (both "white"), but rather, white and Asian—that is, some combination of the categories used here.

⁹ More detailed breakdowns are provided in the data, but we aggregated (as appropriate), to the categories shown in order to have sufficient sample sizes to carry out the analysis. While a more detailed breakdown of the ethnic background variable would be preferred, the small sample sizes do not warrant it.

¹⁰ Respondents were asked to identify their ethnic background and country of birth. In cases where some debate exists as to their ethnicity both variables were used to classify individuals. As an example, Guyana is a predominately English speaking South American country, and if a person born there claimed East Indian heritage, they were included in the Other Asian category along with other East Indians. Similar adjustments were made for blacks from Guyana - included in the Black ethnic group. East Indians from other areas in the

4. Cognitive Skills and Ethnicity

As a first step in our investigation of whether cognitive skills may help explain income patterns across ethnic groups, we explore the related differences in literacy and numeracy levels. The test score means shown in Table 2 indicate that on average, the least literate and numerate men appear to be those with Mid-East backgrounds and blacks, while those with multiple ethnic origins, Europeans (i.e., white) and Latin Americans score the highest; and Native Canadians, Chinese, and other Asians are in the middle rank. For women, the least literate and numerate are the Mid-East group, and Chinese; whites are at the top; and the other groups come between them. Table 2 also indicates that a significant majority of (self-identified) visible minorities in Canada are foreign-born and have, in general, high levels of education with a significant number of certain groups having university degree. Excluding aboriginals and the multiple ethnic group, the remaining five minorities all have more years of education than white males, while two (Latin Americans and Asians) have more education than white females.

Table 2 has shown that there are substantial differences in average literacy and numeracy scores across ethnic groups. We next estimated the determinants of these outcomes using both ordinary least squares (OLS) and two-stage least squares (2SLS). The latter is motivated by the possibility that cognitive skills learned elsewhere may influence an individual's education level.¹¹ It might be the case that literacy or numeracy may be obtained outside the educational system and unaccounted for by our parental or cultural background variables which, in turn, influence an individual's level of education, which will further influence their test scores. The estimates are generally similar, especially with respect to the ethnicity variable. The results are reported in Table 3.

For both men and women, own education (EDUC) and having a degree (DG), generally have strong positive effects on both literacy and numeracy, while not speaking English as a first language (OTHLANG, FRE), learning English or French later rather than earlier (LEARN 5+) and having experienced learning difficulties as a child (LDIFF), have negative influences. Immigrants (IMM) have lower scores than the native-born, but their skills improve with their time in Canada (YRIC).¹² Similar to other studies, we find that literacy and numeracy improves as one moves east to west in Canada, with Atlantic Canada scoring the lowest and residents of Western Canada (PRA, BC) having the highest test scores. Mothers' and fathers' education have strong influences on their children's outcomes. There is a non-linear relationship between age and literacy/numeracy, the coefficient for AGE being positive and the coefficient for AGE2 negative.

Caribbean were also included in the other Asian group. Likewise, the Chinese category only includes people who claim this heritage no matter where they are born (PRC, Canada, Taiwan, Hong Kong, etc.). Unless otherwise indicated, Jews were included in the "EUROPE (white)" category.

¹¹ The instruments used in obtaining the estimates are: age, age squared, LDIFF, LEARN5+, region, city, father's and mother's education, parental education times own age, own age times own education, marital status, the presence of children, having a disability, IMM, YRIC, YRIC2, parents' immigration status, ethnic background, type of schooling, and ethnicity times immigration.

¹² We also included years in Canada squared in the OLS and final stage of the 2SLS estimates. In most cases the coefficients for the variable, along with the coefficient for years in Canada, were statistically insignificant. As a consequence, the term was dropped.

The variables of greatest interest here, however, are those relating to individuals' ethnic backgrounds. The OLS and 2SLS results are generally quite consistent and indicate that after controlling for immigration, age, years in Canada, and the other variables there are still very significant differences in literacy and numeracy skills.

Given that ethnicity is a dichotomous variable, all the following literacy and numeracy rankings are relative to whites (the reference group). Based on the coefficient estimates, the most literate men are those with multiple ethnic backgrounds, followed by whites and Chinese, then Asians and Latin Americans, while the least literate are aboriginals, men with Mid-East backgrounds, and blacks. More or less the same pattern exists for women, except Chinese, and to some degree Latin American women, are noticeably less literate compared to the reference group than men of the same ethnic background, while Asian women do a little better.¹³

Turning to numeracy we see that the most numerate men (on average) are Latin Americans and Chinese, although the respective t-statistics are not significant. They are followed by whites and men with multiple ethnic backgrounds. Interestingly natives come next—that is, no lower than this middle ranking. Asian men have distinctly below average numeracy scores, while blacks and Mid-Easterners are the least numerate of all.

For women, some of the patterns are quite different. Chinese women have very low numeracy scores, the top groups are those with multiple ethnic backgrounds and the reference European group, and the others are again either medium-low (natives, blacks, Asians) or low (Mid-Easterners, Latin Americans).

Let us summarize the results shown in Table 3. First, the standard human capital variables behave as one would expect. Second, after controlling for these factors, there are significant ethnic differences in cognitive skills, and while men and women of European heritage have fairly high test scores compared to the various minority groups, their rankings are not uniformly the highest. Third, there are significant differences between the literacy and numeracy outcomes with, for example, Chinese, Latin American, and native men doing relatively better on the numeracy tests, while men with multiple ethnic backgrounds do better on the literacy tests. Finally, the relative rankings are generally, but by no means exactly the same for men and women.

5. Incomes

Do minorities have lower incomes than whites and do differences in cognitive skill levels help explain any such differences? Table 4 represents our estimates of the log of income equations for men and women. Looking at the individual's wage rate or employment income (earnings) would have been preferred to the total income (all sources) measure used here, but these are not available on the LSUDA file. The equations shown in columns (1) and (4) for men and women, respectively, do not include literacy, numeracy or ethnicity as independent variables, and thus represents our baseline equations. Equations (2) and (5) add the key ethnicity indicators. Equations (3) and (6) then include the literacy and numeracy variables. All equations control for

¹³ One might be concerned that the test scores are culturally biased (European standards). Unfortunately, we cannot say this is true or not.

heteroskedasticity using White's technique found in LIMDEP (V. 7.0) and selection into work using Heckman's selectivity model.¹⁴

The human capital and labour market variables all behave as expected, their coefficients having the predicted signs and magnitudes. Interestingly, the overall fits for the female equations (F-statistic and R^2) are very similar to the male equations. As anticipated, job tenure and age have non-linear impacts on annual income for both men and women. Education (EDUC) and having a degree (DG) lead to higher incomes. When ethnicity and cognitive skills are not controlled for (equations (1) and (4)), the coefficient for OTHLANG is negative and significant while French (FRE) is insignificant but the inclusion of the other variables in the model yields statistically insignificant effects for the other language variable.

We follow both Neal and Johnson (1996) and Randenbush and Kosim (1998) in first estimating a model that includes minority status variables, equations (2) and (5), and then adding controls for cognitive skills (equations (3) and (6)). Holding immigration status and all other factors constant, equation (2) indicates that the incomes of aboriginals, Asians, blacks and Latin American men are 27 to 52 percent lower than whites'. Chinese and Mid-Eastern men also have lower incomes, but don't do as badly (smaller coefficients, less statistically significant). The coefficient for the men of multiple ethnic origins is positive and significant.

When the literacy and numeracy measures are added to the male models (Equation (3)), the former is statistically significant but the latter is not.¹⁵ Furthermore, after controlling for literacy and numeracy in this manner, the coefficients and accompanying *t*-statistics on the ethnic variables fall (generally becoming less negative) or remain unchanged (LATIN). The exceptions are the marginal increases in the coefficients for Chinese and aboriginal males.¹⁶

Including cognitive skills in the male human capital equations thus substantially diminishes the unexplained portion of the income gap between whites and Mid-Easterners, blacks and Asians. The reduction in the size of the ethnic coefficients in column (2) is 63.7 percent for Mid-Easterners, 31.2 percent for blacks and 32.8 percent for non-Chinese Asians. In short, a significant portion of some of the ethnic income differentials among men are explained by cognitive skills, even though considerable gaps remain. In comparison to the findings of Raudenbush and Kasim (1998) and Neal and Johnson (1996) for the U.S., our results are not as strong.¹⁷

¹⁴ The probability of working is hypothesized to be a function of literacy, numeracy, degree, education, disability, language, marriage, children, age, age squared, immigrant, years in Canada, years in Canada squared, city size, minority, region, learning difficulties in childhood, age when learned English or French, parental immigration status, type of schooling (academic or applied), parental education, and parents education times age (to capture vintage effects). Those individuals reported in the "Income Equation" (Table 1) all have positive weeks worked and incomes and are analyzed in the subsequent regression equations, the others are excluded.

¹⁵ When literacy and numeracy are included separately in the male and female equations they are each statistically significant. The multicollinearity between the two thus helps explain why one of the variables is insignificant in some of the income equations.

¹⁶ The incremental F-statistic for the inclusion of LIT and NUM in the male equation is 15.5. For the female estimates equation it is 7.1. Both estimates are easily significant at the five percent level.

¹⁷ Many human capital income functions contain right hand side variables that are not necessarily truly exogenous. In the models presented here, weeks worked is excluded so that we do not over control for any

In the female equations, the coefficients on the immigrant and minority variables are much smaller and more mixed in sign than in the male equations and few are statistically significant, implying that there is little significant variation in women's incomes along these dimensions. Although different estimates are not always directly comparable, our findings differ significantly from Christofides and Swidinsky's (1994), but are similar to Hum and Simpson's (1999) and Beach and Worswick's (1993) in this regard.¹⁸ When the literacy and numeracy variables are added (equation (6)), literacy is statistically significant but numeracy is not. The inclusion of these variables has, however, little effect on the minority variables, all of which remain insignificant, except for those representing individuals of Mid-Eastern and Asian origin, which become considerably stronger (more positive).

Do these results imply that most of the income differences between majority and minority men (in particular) cannot be explained by human capital theory? To pursue this issue further, we followed Hum and Simpson (1999) by estimating separate regressions for immigrants and native-born Canadians. The results appear in Table A-1 in the Appendix. In the case of foreign-born men, incomes are strongly related to ethnicity. Chinese, Mid-Easterners, blacks, Asians and Latin Americans all have significantly lower incomes than the reference group, while the multiple ethnic males have by far the highest incomes. These patterns do *not*, however, translate to the Canadian-born male population. There are *no* significant differences by ethnic group except in one case (Chinese male incomes are significantly higher than others). Our male estimates, both immigrant and native-born, are thus somewhat similar to Hum and Simpson's

effects related to LIT, NUM, immigrant status and ethnicity (see Charette and Meng, 1998, Table 4). In our models TENURE, TEN2, FTIME and SELF might also be considered outcomes and related to ethnicity and cognitive skills. To account for this possibility we re-estimated the equation presented in Table 4 excluding these variables. The estimates are reported below (t-statistics are in brackets):

	(2)	(3)	(5)	(6)
NATIVE	-0.4993 (5.30)	-0.5078 (4.43)	0.0628 (0.54)	0.0853 (0.72)
CHINESE	-0.2306 (2.63)	-0.2700 (2.54)	0.1839 (1.60)	0.2760 (2.26)
MIDEAST	-0.0682 (0.77)	0.0469 (0.42)	0.0479 (0.31)	0.0946 (0.59)
BLACK	-0.3305 (2.75)	-0.1871 (1.27)	0.2149 (1.75)	0.2516 (2.00)
ASIA	-0.3955 (4.79)	-0.2633 (2.59)	0.1675 (1.66)	0.2572 (2.41)
LATIN	-0.5494 (4.61)	-0.5504 (3.76)	0.0409 (0.27)	0.0612 (0.40)
MULTIPLE	0.5250 (5.61)	0.4914 (4.29)	0.0504 (0.46)	-0.0038 (0.03)
LIT		0.0022 (4.53)		0.0015 (2.87)
NUM		0.0003 (0.82)		0.0004 (0.80)

¹⁸ We find no evidence for a "double-negative" effect with respect to minority immigrant women's incomes—lower incomes than native born women, who are primarily white, in addition to the male-female income gap. See Beach and Worswick (1993) for a more detailed discussion of the double-negative effect and the family investment model.

(1999, Table 4); the only significant differences are that they find native-born blacks to be at a statistically significant earnings disadvantage whereas we do not, and we find native-born Chinese to have higher incomes than whites.

For women, the earnings patterns are again noticeably different. Although caution should again be exercised in interpreting some of the estimates due to very small sample sizes, the separate models by immigration status reveal no significant income differences among the Canadian born, whereas for the larger visible minority groups for whom the estimates are more credible, notably Chinese and Asians, the incomes of minority immigrants are *higher* than those of white immigrants.¹⁹

6. Conclusion

Our results demonstrate, first of all, that ethnic minority groups in Canada are extremely heterogeneous in terms of their income levels and measured literacy and numeracy skills. In particular, some minority groups have substantially lower levels of these cognitive abilities than whites and other more economically successful minorities, and in some cases these differences— independent of education, years in Canada, family background, and other income-determining factors—play a significant role in explaining the observed income patterns, accounting for up to 65 percent of the minority-white income gap in the case of men. We find, however, that the ethnic income gaps are much smaller for women and that the literacy and numeracy variables do not have much of a role to play in explaining those differences.

We find—stated with caution—no evidence of an income gap based on skin colour for Canadian born visible minorities and where adding two explanatory variables—literacy and numeracy—to the analysis in some cases substantially reduces the unexplained portion of the white-minority (immigrant) income gap. One might therefore, speculate that other improvements in our measures of human capital or the inclusion of other explanatory variables could result in a further reduction of the unexplained portion of the relevant income gap. Alternatively the ethnicity effects found here could be due to the under-evaluation of immigrants education, previous labour market experience, and other skills in the Canadian labour market (Li, 2001). This would constitute an information problem with a clear (potential) role for government, such as establishing agencies to better evaluate foreign credentials and make this information available to Canadian employers.

¹⁹ Finnie and Meng (2001c) also find that in addition to cognitive skills explaining overall income, the returns to these skills vary by minority group, with Chinese and aboriginal males having the highest returns.

Table 1

Sample Means and Variable Descriptions

Variable Name	Description	Men		Women	
		Total Sample	Income Equation	Total Sample	Income Equation
LNINC	Log of total income	-	10.12	-	9.53
LIT	Literacy test score	255.9	261.7	256.4	267.5
NUM	Numeracy test score	248.5	254.4	247.5	260.0
FTIME	Primarily work full-time	-	0.92	-	0.73
AGE	Age in years	39.1	36.7	39.4	35.1
EDUC	Years of education	11.7	12.4	11.6	12.7
DG	Obtained a degree	0.13	0.15	0.10	0.13
LEARN5+	Learned English/French after the age of 5	0.16	0.15	0.15	0.14
MOED	Years of mother's education	9.4	9.7	9.5	10.0
FAED	Years of father's education	9.4	9.7	9.4	9.9
Language:					
ENG	English first language	0.69	0.71	0.68	0.71
FRE	French first language	0.24	0.24	0.25	0.23
OTHLANG	Other language	0.07	0.05	0.07	0.06
LDIFF	Experienced learning difficulties as a child	0.11	-	0.10	-
MARR	Married (spouse present)	0.65	0.65	0.65	0.64
CHILD	Have at least one child	-	0.47	-	0.51
TENURE	Current job tenure (in months)	-	84.7	-	60.3
IMM	Immigrant	0.18	0.18	0.18	0.18
YRIC	Years in Canada (immigrants)	23.4	21.6	22.3	20.6
SELF	Self-employed	-	0.08	-	0.06
DISABLED	Currently have a disability	-	0.08	-	0.06
Region:					
ATL	Atlantic Canada	0.09	0.08	0.09	0.08
QUE	Quebec	0.27	0.26	0.27	0.25
ONT	Ontario	0.35	0.37	0.35	0.39
PRA	Prairies	0.17	0.17	0.17	0.17
BC	British Columbia	0.12	0.12	0.12	0.11
City Size:					
BCITY	Pop \$ 100,000	0.61	0.61	0.61	0.63
SCITY	30,000 < POP. < 99,999	0.10	0.10	0.10	0.09
RURAL	Pop. # 30,000	0.29	0.29	0.29	0.28
Ethnic or Racial Origin (%):					
NATIVE	Aboriginal Canadian (Metis, Inuit, North American Indian)	2.27	2.22	3.10	2.86
CHINESE	Chinese	1.86	1.86	2.20	2.29
MIDEAST	Middle-East (Turkish, Lebanese, Arab)	1.66	1.71	0.95	0.87
BLACK	Black	0.73	0.81	1.33	1.44
ASIA	Non-Chinese Asian	1.90	2.23	2.34	2.89
LATIN	Latin Americans	1.08	1.14	1.01	0.94
MULTIPLE	Multiple Ethnic Origin	2.77	2.85	3.42	3.43
WHITE	European (including American) ethnic origin	87.73	87.18	85.65	85.28
n	Sample size (n)	3973	3152	5028	3035

Table 2

Ethnic Background and Human Capital

Men						
Group	No. of Observations	Mean Literacy Score	Mean Numeracy Score	Average Years of Educ.	Percent of Immigrants	Percent with Degree
NATIVE	91	240.1*	229.0*	10.8		7.7
CHINESE	74	237.7*	226.7*	11.9	88.0	37.8
MIDEAST	66	218.8*	181.3*	12.7	87.5	9.1
BLACK	30	236.9*	196.9*	11.8	85.4	10.0
ASIA	76	247.5	224.6*	13.3	94.3	31.6
LATIN	43	259.3	257.9	14.0	37.2	27.9
MULTIPLE	110	251.4	232.5*	11.3	21.8	10.9
WHITE	3483	257.3	250.8	11.7	13.6	13.4
Women						
Group	No. of Observations	Mean Literacy Score	Mean Numeracy Score	Average Years of Educ.	Percent of Immigrants	Percent with Degree
NATIVE	154	246.6*	235.4*	10.7		3.2
CHINESE	110	211.0*	180.2*	11.2	92.4	7.3
MIDEAST	48	199.5*	181.5*	10.5	88.9	8.3
BLACK	67	234.3*	231.6*	10.9	92.4	4.5
ASIA	118	249.4	217.5*	12.2	91.6	29.7
LATIN	51	226.2*	205.5*	13.8	66.7	9.8
MULTIPLE	172	256.3	238.5*	12.1	30.1	13.4
WHITE	4308	259.4	251.4	11.7	13.0	10.4

* Significantly different from the white mean at the 5 percent level.

Note: Because of potential sampling error due to the small samples, the profile of immigrants and ethnic groups was specifically designed and weighted to reflect their share of the population by Statistics Canada.

Table 3

The Determinants of Literacy and Numeracy
(*t*-statistics in brackets)

Independent Variables	Literacy				Numeracy			
	Men OLS	Men 2SLS	Women OLS	Women 2SLS	Men OLS	Men 2SLS	Women OLS	Women 2SLS
AGE	0.8015 (2.95)	0.0058 (0.02)	0.6062 (1.54)	1.2926 (2.56)	1.8718 (4.95)	2.4343 (4.54)	2.0331 (6.73)	2.5342 (6.60)
AGE2	-0.0168 (5.32)	-0.0093 (2.12)	-0.0174 (3.79)	-0.0252 (4.38)	-0.0248 (5.65)	-0.0314 (5.33)	-0.0289 (8.22)	-0.0345 (7.90)
LDIFF	-9.8915 (5.39)	-11.661 (5.90)	-10.259 (3.60)	-8.9946 (3.08)	-9.7663 (3.82)	-9.6473 (3.65)	-11.833 (5.42)	-10.843 (4.88)
EDUC	3.2880 (22.34)	2.4468 (9.72)	3.0080 (13.53)	2.3696 (6.94)	4.3061 (21.02)	3.9054 (11.60)	4.2007 (24.64)	3.9203 (15.10)
DG	13.631 (7.06)	52.578 (6.81)	10.126 (3.15)	58.881 (4.03)	3.5733 (1.33)	24.636 (2.39)	-2.6742 (1.08)	26.903 (2.42)
LEARN5+	-7.9231 (3.91)	-8.8935 (4.09)	-4.9518 (1.55)	-2.4701 (0.74)	-4.4073 (1.56)	-3.0764 (1.06)	-5.8872 (2.40)	-4.0701 (1.60)
MOED	0.9119 (4.78)	0.6436 (3.06)	0.7788 (2.46)	0.6906 (2.23)	0.5209 (1.96)	0.5350 (1.91)	1.2798 (5.76)	1.2239 (5.21)
FAED	0.9269 (5.12)	0.4632 (2.20)	0.6598 (2.45)	0.2450 (0.78)	0.9642 (3.83)	0.8313 (2.95)	0.6166 (2.98)	0.3526 (1.49)
OTHLANG	-31.217 (10.29)	-29.917 (8.52)	-38.103 (8.25)	-45.082 (8.72)	-56.491 (13.38)	-62.227 (13.25)	-44.490 (12.57)	-49.257 (12.54)
FRE	-11.217 (4.45)	-10.773 (4.11)	-5.9967 (1.63)	-6.2551 (1.66)	-10.269 (2.94)	-10.228 (2.92)	-8.9857 (3.18)	-9.0356 (3.15)
MARR	7.9398 (5.93)	7.8694 (5.52)	4.6257 (2.40)	6.2331 (3.02)	8.4626 (4.54)	7.1720 (3.76)	7.2402 (4.91)	8.1662 (5.21)
IMM	-11.481 (3.46)	-13.265 (3.80)	-12.243 (2.37)	-11.884 (2.24)	-14.022 (3.04)	-14.427 (3.09)	-8.4982 (2.14)	-8.1485 (2.02)
YRIC	0.2397 (2.42)	0.2086 (2.02)	0.2353 (1.56)	0.2226 (1.45)	0.2319 (1.69)	0.2062 (1.49)	0.2256 (1.96)	0.2162 (1.85)
ATL	-15.627 (7.04)	-16.194 (6.91)	-6.7673 (2.04)	-5.0692 (1.48)	-17.137 (5.54)	-16.241 (5.18)	-18.086 (7.12)	-16.927 (6.52)
QUE	0.4089 (0.17)	-0.4421 (0.17)	-2.1949 (0.58)	-0.0459 (0.01)	0.5665 (0.16)	1.0757 (0.31)	2.7435 (0.98)	4.1935 (1.47)
PRA	6.5278 (3.84)	6.4543 (3.61)	3.9991 (1.56)	6.2389 (2.33)	9.7697 (4.13)	10.407 (4.36)	2.0493 (1.04)	3.4782 (1.71)
BC	6.3827 (3.30)	7.6492 (3.75)	6.5280 (2.24)	9.0916 (2.98)	7.8246 (2.91)	8.7453 (3.20)	6.1374 (2.74)	7.7028 (3.32)
BCITY	4.6080 (3.37)	2.8584 (1.93)	0.5142 (0.09)	1.1300 (0.54)	3.1551 (1.66)	2.9663 (1.49)	0.4328 (0.28)	0.8227 (0.51)
SCITY	7.0291 (3.28)	7.8240 (3.48)	-0.2994 (0.09)	2.3717 (0.72)	8.0106 (2.70)	9.3089 (3.10)	-2.2014 (0.90)	-0.5361 (0.21)
NATIVE	-22.528 (4.36)	-25.418 (4.66)	-19.859 (2.84)	-13.587 (1.87)	-11.843 (1.65)	-11.477 (1.57)	-13.235 (2.47)	-9.0596 (1.64)
CHINESE	-5.7576 (1.19)	-13.115 (2.48)	-15.001 (2.17)	-12.491 (1.76)	8.9012 (1.20)	5.8751 (0.83)	-37.788 (7.13)	-36.212 (6.71)
MIDEAST	-21.197 (4.22)	-16.952 (3.18)	-29.307 (3.12)	-26.974 (2.80)	-36.946 (5.28)	-32.633 (9.57)	-36.549 (5.07)	-34.974 (4.78)
BLACK	-19.913 (2.84)	-17.788 (2.42)	-18.460 (2.27)	-14.963 (1.79)	-45.310 (4.64)	-43.565 (4.48)	-14.521 (2.33)	-12.361 (1.93)
ASIA	-8.0252 (1.76)	-12.291 (2.52)	2.5982 (0.39)	-3.4361 (0.49)	-14.416 (2.27)	-15.462 (2.38)	-18.134 (3.58)	1.923 (4.52)
LATIN	-13.529 (1.99)	-17.419 (2.43)	-25.888 (2.71)	-19.916 (2.02)	11.469 (1.21)	10.640 (1.11)	-37.525 (5.12)	-33.923 (4.52)
MULTIPLE	13.834 (2.59)	16.250 (2.89)	10.740 (1.57)	5.2707 (0.74)	-4.6904 (0.63)	-4.3410 (0.58)	2.0453 (0.39)	-1.4740 (0.27)
Constant	195.63 (33.07)	227.45 (21.38)	218.19 (25.31)	209.20 (17.19)	154.32 (18.74)	147.12 (10.34)	157.46 (23.78)	148.56 (16.05)
R-Squared	0.44	0.38	0.22	0.18	0.33	0.32	0.37	0.35
F	119.9	94.3	55.5	43.6	76.6	72.3	113.3	103.6
N	3,973	3,973	5,028	5,028	3,973	3,973	5,028	5,028

Table 4*

The Determinants of Income
(*t*-statistics in brackets)

Independent Variables	Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)
AGE	0.1110 (14.15)	0.1116 (13.46)	0.1286 (13.54)	0.0853 (9.29)	0.0849 (8.91)	0.0978 (9.13)
AGE2	-0.0012 (11.25)	-0.0013 (10.51)	-0.0015 (11.07)	-0.0010 (7.40)	-0.0010 (7.00)	-0.0012 (7.35)
TENURE	0.0060 (13.34)	0.0058 (13.04)	0.0055 (11.76)	0.0093 (16.27)	0.0094 (16.38)	0.0092 (16.11)
TEN2	-0.0020 (11.00)	-0.0019 (10.76)	-0.0018 (9.71)	-0.0030 (11.83)	-0.0030 (11.93)	-0.0030 (11.65)
IMM	-0.2771 (4.21)	-0.1866 (2.52)	-0.2129 (2.51)	-0.1399 (1.86)	-0.1867 (2.16)	-0.1851 (2.12)
YRIC	0.0128 (3.12)	0.0099 (2.27)	0.0126 (2.52)	0.0085 (1.87)	0.0101 (2.10)	0.0101 (2.09)
YRIC2	-0.0001 (1.98)	-0.0001 (1.65)	-0.0001 (2.11)	-0.0001 (1.86)	-0.0001 (2.03)	-0.0001 (1.82)
EDUC	0.0181 (6.12)	0.0181 (6.08)	0.0163 (4.86)	0.0388 (9.57)	0.0388 (9.36)	0.0389 (9.15)
DG	0.1388 (4.35)	0.1459 (4.16)	0.1276 (3.47)	0.3254 (8.25)	0.3162 (7.98)	0.3250 (7.92)
OTHLANG	-0.1143 (2.12)	-0.0470 (0.85)	-0.0242 (0.38)	-0.1453 (2.20)	-0.1298 (1.88)	-0.0962 (1.37)
FRE	-0.0945 (1.17)	-0.0507 (0.85)	-0.0345 (0.38)	-0.0359 (0.71)	-0.0411 (0.81)	-0.0345 (0.67)
NATIVE		-0.3756 (4.22)	-0.3878 (3.81)		0.0293 (0.30)	0.0432 (0.44)
CHINESE		-0.1729 (2.09)	-0.2040 (2.14)		-0.0164 (0.17)	0.0628 (0.62)
MIDEAST		-0.1243 (1.47)	-0.0404 (0.41)		0.2060 (1.55)	0.2432 (1.81)
BLACK		-0.3216 (2.82)	-0.2214 (1.67)		-0.0026 (0.03)	0.0265 (0.25)
ASIA		-0.2708 (3.46)	-0.1820 (1.99)		0.1205 (1.41)	0.1917 (2.15)
LATIN		-0.5150 (4.57)	-0.5172 (3.98)		-0.0150 (0.12)	-0.0037 (0.03)
MULTIPLE		0.4330 (4.90)	0.4149 (4.06)		0.0829 (0.89)	0.0416 (0.44)
LIT			0.0014 (3.33)			0.0010 (2.23)
NUM			0.0003 (0.79)			0.0006 (1.19)
Λ	0.3527 (2.82)	0.3115 (2.26)	0.6930 (4.37)	-0.0349 (0.36)	-0.0531 (0.51)	0.1883 (1.37)
Constant	6.7503 (42.72)	6.7643 (40.34)	6.0376 (26.20)	6.6218 (35.16)	6.6277 (33.73)	5.9479 (20.43)
R-Squared	0.50	0.50	0.51	0.48	0.48	0.48
F	131.6	104.6	100.0	116.1	107.8	85.3
N	3152	3152	3152	3035	3035	3035

* Also controlled for but not shown here are: DISABLED, FTIME, SELF, Region, City Size, MARR, CHILD, and LEARN5+. A full set of the estimates are available from the authors upon request.

Appendix

Table A-1*

The Determinants of Income: Canadian and Foreign-Born
(t-statistics in brackets)

Independent Variables	Men				Women			
	Foreign-Born		Canadian-Born		Foreign-Born		Canadian-Born	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
NATIVE			-0.1657 (1.70)	-0.1602 (1.53)			0.0857 (0.71)	0.08845 (0.71)
CHINESE	-0.3887 (3.19)	-0.4119 (3.34)	0.4080 (2.17)	0.4532 (2.14)	0.1917 (1.50)	0.2427 (1.82)	-0.5040 (1.85)	-0.5750 (0.90)
MIDEAST	-0.3675 (3.08)	-0.3248 (2.63)	-0.0307 (0.17)	-0.0165 (0.09)	0.2503 (1.36)	0.2893 (1.56)	0.2499 (0.85)	0.2819 (0.90)
BLACK	-0.4335 (2.77)	-0.3962 (2.57)	0.0195 (0.09)	0.1013 (0.47)	0.0254 (0.20)	0.0098 (0.08)	-0.0603 (0.18)	-0.0925 (0.26)
ASIA	-0.3838 (3.83)	-0.3716 (3.69)	-0.0740 (0.29)	0.0055 (0.02)	0.2775 (2.50)	0.2600 (2.32)	-0.1341 (0.56)	0.0470 (0.18)
LATIN	-0.8604 (4.25)	-0.8508 (4.15)	-0.2060 (1.38)	-0.2007 (1.25)	0.0949 (0.47)	0.0693 (0.35)	-0.0278 (0.16)	0.0981 (0.51)
MULTIPLE	0.8452 (4.78)	0.8448 (4.67)	0.1367 (1.20)	0.0938 (0.76)	0.1659 (1.07)	0.1521 (0.97)	0.0026 (0.02)	-0.0224 (0.16)
LIT		0.0007 (0.64)		0.0011 (2.66)		-0.0020 (1.87)		0.0017 (3.21)
NUM		0.0002 (0.35)		0.0008 (2.14)		0.0018 (2.23)		0.0006 (0.98)
R-Squared	0.58	0.58	0.49	0.49	0.53	0.53	0.48	0.48
F	18.5	17.3	96.5	92.0	13.3	12.7	89.0	84.2
N	361	361	2,791	2,791	317	317	2,718	2,718

* Also controlled for but not shown here are the other explanatory variables listed in Table 4. A full set of the estimates are available upon request.

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