DOES LABOUR MARKET DISCRIMINATION EXPLAIN EARNINGS DIFFERENTIAL BETWEEN IMMIGRANTS AND NATIVE-BORN WORKERS?

THE RETURN TO COGNITIVE SKILLS IN THE CANADIAN LABOUR MARKET

by

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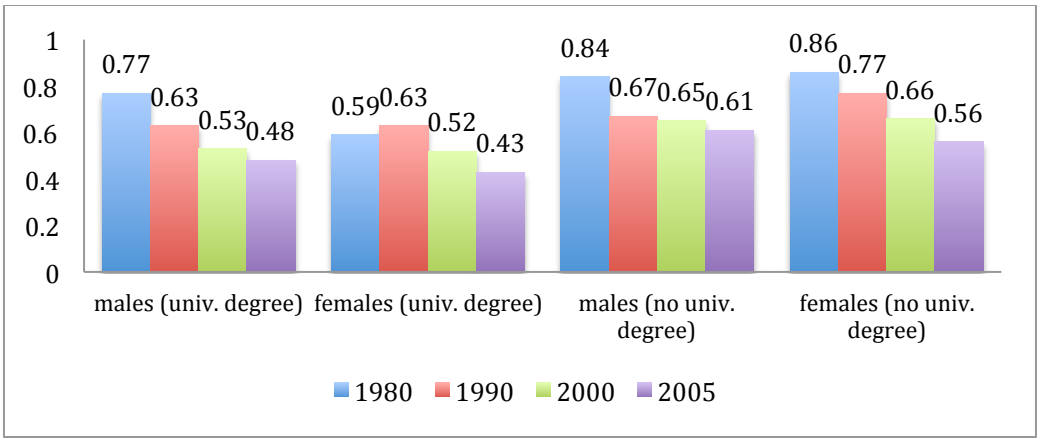
Section 1

General Introduction

The Canadian *Abella Royal Commission Report* of 1984 recommended that governments at both the federal and provincial levels should introduce employment equity legislation to address inequities in the employment opportunities available to racial minorities, and by extension to immigrants (Abella, 1984).[1] Yet, 25 years later, there is growing evidence that an earning differential persists (and widening significantly) between immigrants and Canadian-born workers as shown below:

Figure 1: Earnings Differential between Immigrants & Canadian-Born Workers



Notes: In 1980, male immigrant workers earned 84 cents for each dollar received by a male Canadian-born worker (with no university degree). By 2005, this ratio dropped to 61 cents.
Source: Statistics Canada, Oct. 2009.

Studies have shown that "…immigrants earn less than native-born workers with the same amount of education and work experience." (Ferrer, Green and Riddell, 2006). Some of these studies focused on the disparities in labour market outcomes between the two groups to suggest that discrimination is a real phenomenon in the Canadian labour market (see Goldberg, Mourinho and

[1] In 1971, 61.6 percent of Canadian immigrants were from Europe and only 12.1 percent were from Asia. In 2006, immigrants born in Europe dropped to 36.8 percent and those born in Asia including the Middle East increased to 58.3 percent (Statistics Canada Nov. 2009).

Kulke, 1996). However, the presence or absence of earning differentials is not in itself always evidence of discrimination against a particular group in the labour market. Some studies have found that immigrants often receive different returns to skills attained through education and work experience acquired abroad than seemingly similarly skilled Canadian-born workers (see Bloom, Grenier and Gunderson, 1995). Such findings suggest that the perception of discrimination in the Canadian labour market and its effects on earnings differential between immigrants and native-born workers may be overstated if there are differences in the quality of the human capital.

In this paper, I examine and build on the works of Muhammad (2009), Hunt (2008), Firpo, Fortin, Lemieux (2009), Ferrer, Green and Riddell (2006) and Barrett (2009) to determine whether the earnings differential between Canadian-born and immigrant workers is attributable in part to deficiencies in the cognitive skills of immigrants and not solely to labour market discrimination. Muhammad (2009) attempts to measure labour market discrimination in the U.K. market using the Blinder-Oaxaca decomposition but ignores the possible impact of cognitive skills on differences in returns to observable characteristics including the determinants that form human capital. Bonikowska, Green and Riddell (2008) use the 2003 International Adult Literacy and Skills Survey (IALSS) dataset, which provides a direct measurement of cognitive skills, to examine the role of such skills in the earnings pattern of immigrants and Canadian-born workers. However, they do not decompose the earnings differential into separate components to specifically analyse the sources of the differential into what is explained by differences in cognitive skills and what is unexplained by such. Hunt (2008) utilizes a quantile regression approach to examine how the immigrant-native earnings differentials across the conditional earnings distribution in the U.K. labour market behave over time. Similarly, Barrett (2009) examines the Australian labour market returns to education, cognitive and non-cognitive skills

across quantiles of the conditional hourly earnings distribution through a conditional quantile regression technique. Yet, neither study use an unconditional quantile regression technique, as one developed by Firpo, Fortin, Lemieux (2009), that will allow one to study the impact of an explanatory variable on the marginal distribution of interest, and thus allows for the decomposition of the differentials into explained and unexplained components.

There has been too little emphasis put on the effect of cognitive skills on labour market outcomes of immigrants in terms of earnings and discrimination in Canadian research. There is scarce work focusing on Canadian markets and none that examines the earnings differential between immigrant and Canadian-born workers across the earnings distribution while taking into account the importance of workers' cognitive skills. This paper will add to the decomposition literature by analyzing the explained and unexplained components of the earnings differential between Canadian-born and immigrant workers through the Blinder-Oaxaca decomposition technique to determine to what extent the differential reflects labour market discrimination after controlling for measures of cognitive skills. While some previous studies have taken the entire earnings differential to simply reflect the presence of labour market discrimination, the aim of this paper is to analyse the differential in terms of cognitive skill differences in order to isolate the component of the differential that is explainable without reference to labour market discrimination. The remaining unexplained portion of the differential represents the upper bound of labour market discrimination since it persists even after controlling for cognitive skill differences. I will discuss this in further detail below. Furthermore, I will use the unconditional quantile regression technique to decompose the earnings differential at different quantiles in the Blinder-Oaxaca framework and examine the importance of cognitive skills for earnings determination at the different quantiles of the earnings distribution. Though examining the

earnings differential of the average worker is important, it cannot address the fact that workers have different endowments and returns to human capital characteristics across the earnings distribution, and I will treat each group of workers must be treated separately.

The results from the Blinder-Oaxaca decomposition strongly suggest that differences in level and in returns to cognitive skills are important for explaining the differences in earnings between immigrant and Canadian-born workers. This indicates the potential presence of labour market discrimination cannot explain the earnings differential. Examining the differential through an unconditional quantile regression method shows that immigrant workers at the lower end of the distribution receive less than what they should receive at their current levels of experience, education and amongst other characteristics. When the cognitive skills variable[2] is included in the analysis, discrimination becomes less relevant as an explanation for the earnings differential across the distribution, with the exception of the 90th quantile. This suggests that for the majority of immigrant workers in Canada the earnings differential can be attributed to deficiencies in cognitive skills and not solely to discrimination.

In the following section, there is a brief literature review where I outline the Blinder-Oaxaca earnings decomposition technique and an unconditional quantile regression method that provides the framework for structuring the data analysis and interpretation of the results. The 2003 IALSS data is be discussed in detail in Section 3. In Section 4, I present the empirical findings from the Blinder-Oaxaca regressions and unconditional quantile regressions, as well as the analyses of the earnings differentials between immigrants and Canadian-born workers for both techniques. The final section contains a summary of the paper as well as a discussion about its implications for both immigration literature and policy

[2] The cognitive skills variable is the proxy for the personal characteristics that can be acquired by the worker, enhance the individual's earnings and aid in productivity in specific tasks.

Section 2

Literature Review

Chiswick (1978) and Borjas' (1985) U.S. findings have led to numerous studies regarding the economic performance of immigrant workers in the Canadian labour market. Following their initial findings of earnings disparities of immigrants relative to native-born workers, both upon entry to a host country and later following their economic assimilation, studies have found that such disparities are generated by either differences in the returns of human capital or various forms of labour market discrimination. Most of the available literature focuses on measures of human capital typically observable in available data including education and experience. The possible impact of differences in cognitive skills on the returns to the observable characteristics is ignored. However, recent research has demonstrated the general importance of obtaining cognitive measures when analysing labour market earnings differential between various groups of workers. Using microdata from the 1994-1998 International Adult Literacy Survey, Blau and Kahn (2005) investigated the role of cognitive skills in explaining earnings differentials between various groups of workers within the U.S. The authors find that the wide gap in literacy test scores, an aspect of cognitive skills, largely accounts for the earnings differential in the country. This is particularly true at the higher end of the earnings distribution in which cognitive performance provides another explanation of the earnings differentials.

For the Canadian labour market, Bonikowska, Green and Riddell (2008), an updated version of Ferrer, Green and Riddell (2006)[3], found that the deficiencies in cognitive skills[4] of immigrants

[3] Bonikowska, Green and Riddell (2008) is similar to Ferrer, Green and Riddell (2006) in every aspect with the exception the data used by Bonikowska, Green and Riddell (2008) allows them to examine all of Canada instead of just Ontario. As well, their data provides a much larger sample size.

significantly affected the labour market outcomes differential between immigrant and Canadian-born workers. Using the 2003 IALSS dataset, they found that although there was a marked difference in the level of literacy skill, both groups receive similar returns to their cognitive skills. Of particular relevance, they observe that there is an impact from controlling for cognitive skills on the workers' earnings. However, the authors do not determine what part of the earnings differential is due to differences in observable characteristics and what proportion potentially reflects labour market discrimination after controlling for measures of cognitive skills.

One method to examine the sources of the earnings differential is with the Blinder-Oaxaca decomposition. Aldashev, Gernandt and Thomsen (2008) used the German Socio-Economic Panel dataset to study the differential between immigrants and native-born workers by applying the Blinder-Oaxaca decomposition technique. The authors specifically examined the earnings differentials between native-born and immigrant workers and find that the earnings differential for immigrants was significantly lower if they attained some of their education in Germany. This implies that human capital such as observationally equivalent educational degrees attained in different countries is not entirely transferable, thus providing a further reason for differences in the valuation of endowments. Importantly, they concluded that discrimination alone could not entirely explain the earnings differential between immigrants and German-born workers.

Like Bonikowska, Green and Riddell (2008), Barrett (2009) examined the labour market returns for education, cognitive and non-cognitive skills using the Australian component of the 2003 IALSS. This dataset provided measures of cognitive skills including literacy, numeracy and problem-solving skills. He found that cognitive skills were largely responsible for the negative

[4] Bonikowska, Green and Riddell (2008) grouped together attributes ("personal characteristics that can be acquired by the worker and enhance individual earnings") and skills ("personal characteristics that aid in productivity in specific tasks and which can be acquired by the worker") and are referred to general skills throughout their research. Skills are different from abilities, which are "innate, productive characteristics".

earnings differential between immigrants with non-English speaking backgrounds and native-born workers. Further, using a conditional quantile regression technique, Barrett found that both immigrant and native-born workers received the same return to cognitive skills across the quantiles of the conditional hourly earnings distribution. However, the author does not discuss the impact of cognitive skills on the earnings differential between immigrant and Australian-born workers across the distribution using an unconditional quantile regression technique. Powell (2011) proposes that an unconditional quantile regression technique produces a more generalized and unbiased estimates than those estimates produced by a conditional quantile regression technique.

The analysis in this paper builds on the research of Bonikowska, Green and Riddell (2008) by determining whether workers' cognitive skills can in part explain the earnings differential between immigrants and Canadian-born workers, and uses the Blinder-Oaxaca decomposition technique to examine the existence of labour market discrimination against immigrants. This paper will also complement and build on Barrett (2009) by providing unique Canadian empirical results on earnings differential decomposition with regards to earnings distributions via an unconditional quantile regression technique in order to examine whether measures of cognitive skills impact the perceived existence of labour market discrimination against immigrants at certain quantiles of the earnings distribution.

For economists, the mere presence of unexplained differences in earnings or employment is often considered evidence of discrimination (Ashenfelter and Oaxaca, 1987). However, this position has been challenged because neither productivity nor discrimination itself are directly observable. This is due to the fact that past data do not control for determinants of earnings such as motivation, innate ability, and cognitive ability. However, the 2003 IALSS provides an

extensive dataset that controls for the previously unquantifiable productivity-enhancing effects of cognitive skills. By controlling for worker's cognitive skills, this paper builds on previous studies in order to better explain the underlying factors of the earnings differential between immigrants and Canadian-born workers.

Section 3

Methodology

3.1 Blinder-Oaxaca Decomposition

To assess the impact of cognitive skills on the earnings differential between immigrant and Canadian-born workers and examine the presence of labour market discrimination against immigrants, I use the Blinder-Oaxaca earnings decomposition approach in this paper rather than the hedonic Ordinary Least Squares (OLS) technique used by Bonikowska, Green and Riddell (2008). The Blinder-Oaxaca technique is able to decompose the earnings differential into explained and unexplained components to specifically analyse the sources of the differential after controlling for measures of cognitive skills.

The Blinder-Oaxaca decomposition technique is based on separate OLS equations for each group, which determine the relationship between group specific characteristics and their earnings. As discussed, this method allows the decomposition of the mean earnings differential in the model in a counterfactual manner to determine the size of two separate components. The twofold Blinder-Oaxaca decomposition technique used in this paper starts off with an earnings equation that follows a human capital earnings function established by Mincer (1974) in which the specification is similar to immigrant-Canadian-born earnings equations estimated with cross-sectional data that have been reported in previous studies[5] (see Aydemir and Skuterud, 2005):

[5] However, I do not include variables in which for the Canadian-born workers the variable would equal to zero, as it would result in unequal sets of covariates for the two groups. For example, a "years since migration" variable does not enter the earnings regression so that the regression for each group contains the same set of variables. Although the total earnings differential is unaffected, excluding relevant determinants of the earnings differential can lead to an omitted variable bias. This can affect the coefficients in the earnings regression, and thereby resulting in biased decomposition results and misleading conclusions regarding discrimination. Future studies will address this problem using an extension to the B-O decomposition technique established by Aldashev, Gernandt and Thomsen (2008).

$$lnY_{ij} = \beta_0 + \beta_j x_{ij} + u_{ij}$$

$i = 1,2,3,\ldots, n$ $\quad$ j = I (immigrant workers), CB (Canadian-born workers) (1)

where lnY_{ij} is the natural logarithm of the weekly earnings of individual i and of group j. Here β_j is the vector of the corresponding coefficients for group j, x_{ij} is a vector of individual characteristics, and u_{ij} is the error term of the model. The model is comprised of many variables that capture human capital. These variables include: dummy variables for the highest level of education, a variable for potential work experience and potential work experience-squared, a dummy variable for whether the worker's mother tongue is neither English nor French, dummy variables for occupations and region of residence, a dummy variable for the completion of the main cognitive skills test, and a variable representing the average score of observed cognitive skills of the type measured in literacy (prose and document), numeracy and problem-solving.

The standard Blinder-Oaxaca decomposition then breaks down the difference between immigrant and Canadian-born workers' earnings:

$$\bar{Y}_{CB} - \bar{Y}_I = (\bar{X}_{CB}' - \bar{X}_I')\hat{\beta}_{CB} + \bar{X}_I'(\hat{\beta}_{CB} - \hat{\beta}_I) \quad (2)$$

where $\bar{Y}_{CB} - \bar{Y}_I$ is the predicted mean immigrant-Canadian-born earnings differential in logs, $(\bar{X}_{CB}' - \bar{X}_I')\hat{\beta}_{CB}$ is the 'explained' gap, $\bar{X}_I'(\hat{\beta}_{CB} - \hat{\beta}_I)$ can be taken to be an estimate of the 'unexplained' gap. According to Montoya (2006), the overall earnings differential between immigrant and Canadian-born workers can be decomposed into two components. The portion attributable to differences in the mean endowment of human capital ($\bar{X}_{CB}' - \bar{X}_I'$), evaluated with the Canadian-born pay structure β_{CB} is the explained component, and the portion that is attributable to differences in the returns ($\hat{\beta}_{CB} - \hat{\beta}_I$) that immigrant and Canadian-born workers receive for the same endowment of earnings generating characteristics X is the unexplained

component. The unexplained portion can be taken as reflecting the upper bound level of potential presence of labour market discrimination as opposed to that both groups should receive same return to their productive characteristics in the absence of discrimination (in this case $\beta_{CB} = \beta_I$).

The unexplained component of the differential puts an upper bound estimate on the amount of discrimination in the labour market instead of interpreting the entire portion as discrimination. This component cannot be interpreted as a pure measure of discrimination unless the earnings equation include all relevant attributes measuring skills and individual productivity, which is not the case for this paper (see Altonji and Blank, 1999 for further explanation of labour market discrimination measurement issues). Some examples of such unobserved sources might include: drive, motivation, tastes and personality. Hence, it is more prudent for my paper to interpret the unexplained component as a residual that reflects the upper bound estimate of labour market discrimination instead of as a pure discrimination measure.

The earnings regression (1) and the Blinder-Oaxaca decomposition regression (2) above are estimated with and without the cognitive skills variable to determine whether individual cognitive skills affect the earnings of workers, and to accurately approximate the upper bound estimate of labour market discrimination based on immigrant status in Canada.

3.2 Unconditional Quantile Regression

By following the unconditional quantile regression method proposed by Firpo, Fortin and Lemieux (2009)[6] and applying it in a Blinder-Oaxaca earnings decomposition framework, this study looks at the effects of immigrant status and other explained variables on different quantiles of the earnings distribution instead of only at the average of covariates, which occurs if a conditional quantile regression was used instead. The conditional quantile regression analyses the

[6] See also Chi and Li (2007) and Firpo, Fortin and Lemieux (2006).

effect of the explained variable on the conditional distribution of the outcome variable but cannot analyse the difference in the quantiles for different values of the explained variable, unconditional on covariates. On the other hand, an unconditional quantile regression method allows one to study the impact of an explanatory variable on the marginal distribution of interest in presence of covariates without altering the interpretation of the estimates. According to Powell (2011), an unconditional quantile regression method will produce a more generalized and unbiased estimates than those estimates produced by a conditional quantile regression method.

The recentered influence function (RIF) method proposed by the Firpo, Fortin and Lemieux (2009) is used to create an unconditional quantile (UQ) regression that starts off with letting q_τ be a quantile. The robust IF of *v* is:

$$IF(y; q, F) \equiv lim_{t\to 0} \frac{q_\tau(F_{t,\Delta y}) - q_\tau(F)}{t} = \frac{\partial q_\tau(F_{t,\Delta y})}{\partial t}\bigg|_{t=0} \tag{3}$$

where $F_{t,\Delta y} = (1-t)F + t\Delta_y$ is a slight perturbation of F by point mass at y. The RIF is obtained by adding the original quantile back to its IF:

$$RIF(y; q_\tau, F) \equiv q_\tau(F) + IF(y; q_\tau, F)$$

and thus the RIF for a quantile q_τ is given by:

$$RIF\ (Y; q_\tau) = q_\tau + \frac{\tau - I(\leq q_\tau)}{f_Y(q_\tau)} \tag{4}$$

where f_Y is the marginal density function of Y, and I(.) is an indication function.

Let G_Y be the counterfactual distribution of *Y*, obtained by replacing $F_X(x)$ with another distribution $G_X(x)$ while keeping the conditional distribution $F_{Y|X}(.)$ unchanged,

$$G_Y(y) = \int F_{Y|X}(y|X = x)dG_X(x) \tag{5}$$

Following Theorem 1 in Firpo, Fortin and Lemieux (2009),

$$\pi_G(v) = \frac{\partial v(F_{Y,tG})}{\partial t}\Big|_{t=0} = lim_{t\to 0}\frac{v\left(F_{y,t,G}\right) - v(F)}{t} = \int RIF(y;v)d(G_y - F_y)(y)$$
$$= \int E[RIF(Y;v)|X = x]d(G_X - F_X)(x) \tag{6}$$

where this is central to the UQ regression method as (6) show that the marginal effects of the covariates on the unconditional quantiles can be obtained by averaging the RIF-regression $E[RIF(Y;v)|X = x]$ with respect to the change in the distribution of the covariates, $d(G_X - F_X)$. The unconditional partial effects of the covariates can be derived into:

i. (continuous covariates): $\alpha(v) = \int \frac{dE[RIF(Y;v)|X=x]}{dx} dF(x)$ (7)

ii. (dummy covariate): $\alpha_D(v) = E[RIF(Y;v{:}F)|X = 1] - E[RIF(Y;v{:}F)|X = 0]$ (8)

For estimation purpose, one must first estimate the RIF by replacing the unknown quantities by their estimators respectively:

$$\widehat{RIF}(Y;\widehat{q_t}) = \widehat{q_t} + \frac{\tau - I(Y \le \widehat{q_t})}{\widehat{f_Y}(\widehat{q_t})} \tag{9}$$

where $\widehat{q_t}$ is the τ-th sample quantile, and $\widehat{f_Y}$ is the kernel density estimator. The RIF regression is a function, represented by $E[RIF(Y;v{:}F)|X = x]$, that assumes a linear specification,

$$E[RIF(Y;q_t)|X] = X\beta \tag{10}.$$

The partial effects of the covariates in (7) and (8) are given by the RIF regression coefficients, β. Since the true $RIF(Y;q_t)$ is unobservable, one uses its sample analogy $\widehat{RIF}(Y;\widehat{q_t})$ in (10).

The Oaxaca-Blinder technique applies to the decomposition of the *mean* earnings differential between immigrant and Canadian-born workers, which follows immediately from the OLS estimates as discussed above, but it does not work for other distribution statistics including quantiles. To resolve this problem, a reweighting method developed by DiNardo, Fortin, and Lemiux (1996) must be applied which essentially generates a counterfactual earnings distribution. The first step decomposes the overall changes or differences between the two earnings distributions to those changes due to differences in characteristics and in the return to these characteristics.

Specifically, let $v(Y)$ be a quantile of the earnings distribution *Y*. To decompose the earnings differences between immigrant and Canadian-born workers at a quantile, $v(Y_{CB}) - v(Y_I)$, into the two components aforementioned, one must produce a counterfactual earnings Y_c, which represents the log earnings that immigrants could have earned had they received the same return to their labour market characteristics as Canadian-born workers. Having done that, the overall difference $v(Y_{CB}) - v(Y_I)$ can be decomposed into:

$$v(Y_{CB}) - v(Y_I) = [v(Y_{CB}) - v(Y_C)] + [v(Y_C) - v(Y_I)] \tag{11}$$

where $v(Y_{CB}) - v(Y_C)$ represents the explained component and $v(Y_C) - v(Y_I)$ represents the unexplained component. The counterfactual earnings Y_C can be obtained by reweighting. The reweighting factor is:

$$\psi_i = \left[\frac{1 - p(X_i)}{p(X_i)}\right]\left[\frac{p}{1-p}\right] \tag{12}$$

where $p(X)$ is "the probability of a worker being a [Canadian-born worker] given individual attributes X" and p denotes the proportion of Canadian-born workers in the population (Chi and Li, 2007). $p(X)$ may be regarded as the 'propensity score' and can be estimated by the usual

logit/probit model. Then the reweighted data ψY_{CB} can be defined as the realizations from the counterfactual earnings distribution Y_C.

Next, the explained and unexplained components are further decomposed to the contribution of each individual covariate, as it is usually done with the Oaxaca-Blinder decomposition. Using the RIF-projection method represented in (10), one must estimate the contribution of each explanatory variable to the unconditional quantiles of the Canadian-born and immigrant workers as well as the counterfactual earnings, which allows for the further decomposition of the contribution of each X to the two components. Taking the expectation on both sides of (10) yields:

$$q_\tau(Y_k) = E(X_k)\beta_k, k = CB, I, C \tag{13}$$

Then equation (13) is estimated by:

$$\hat{q}_\tau(Y_k) = \bar{X}_k\hat{\beta}_k, k = CB, I, C \tag{14}$$

from which it follows the decomposition of the immigrant-Canadian-born workers earnings differential at a quantile attributable to a specific X variable as the following:

$$\widehat{q_\tau}(Y_{CB}) - \widehat{q_\tau}(Y_I) = \bar{X}_{CB}\left(\hat{\beta}_{CB} - \hat{\beta}_C\right) + (\bar{X}_{CB}\hat{\beta}_C - \bar{X}_I\widehat{\beta_I}) \tag{15}$$

Once again, the entire procedure is estimated with and without the cognitive skills variable to determine whether individual cognitive skills affect the worker's earnings, and therefore affect the perception of Canadian labour market discrimination against immigrants.

3.3 Averaging Solution to the Identification Problem

Many papers have outlined a methodological issue associated with the application of the Blinder-Oaxaca earnings decomposition technique (see Oaxaca and Ransom, 1999; Gardeazabel and Ugidos, 2005). Specifically, an identification problem arises in which "the detailed decomposition of the coefficients effect is destined to suffer as the detailed coefficients effect attributed to dummy variables is not invariant to the choice of reference groups" (Yun, 2005). The solution to this issue can be resolved by using the 'averaging approach' developed by Yun (2005). As outlined by Jann (2008), this method in the context of the Blinder-Oaxaca decomposition starts by estimating the constant and dummy variables in the earnings equations with varying reference groups. Subsequently, one transforms the coefficients vectors to allow for deviations from the grand average to be expressed and then the (redundant) coefficient for the base category is added. By using the transformed estimates to calculate the Blinder-Oaxaca equation, this method will produce results that are independent of the choice of the omitted category.

Section 4

Data

The empirical analysis of this paper uses the 2003 Canadian component of the IALSS. The IALSS contains both standard demographic and labour market information for immigrants and native-born Canadians. Most importantly, the IALSS dataset provides measures of four skill domains in which the test scores are used as direct measurements of cognitive skills for this paper[7]: prose literacy, document literacy, numeracy and problem solving. As outlined by Barrett (2009), respondents were required to complete the 'Main Task Booklet' (MTB) of the IALSS in which it provided an instrument for assessing proficiency in the above four skill domains.[8] Proficiency scores in each skill domains are measured along a continuous scale ranging from 0 to 500. These four scores are averaged to summarize their cognitive skills and the average cognitive skills score is used throughout the analysis in this paper. Notably, the 2003 IALSS not only attempts to measure abilities to read and perform math, it also tries to assess individuals' capabilities in applying skills to situations that may arise in their daily lives. Instead of measuring innate ability, the IALSS data allows the use of "the test results as revealing job relevant skills at the time of the interview rather than inherent abilities." (Bonikowska, Green and Riddell 2008). According to Bonikowska, Green and Riddell (2008), these skills are cognitive in nature.

[7] As summarised in Barrett (2009): Prose literacy is the knowledge and skill needed to understand and use various kinds of information from texts including editorials, news stories and instructions manuals. Document literacy is the knowledge and skill required to locate and to use information contained in various formats including job applications, transportation schedules, maps, tables and charts. Numeracy entail the skill required to effectively manage and respond to the mathematical demands of diverse situations. Problem Solving is the goal-directed thinking that is required in situations for which no routine solution procedure is applicable.

[8] For detailed methodology of the exercises used for assessing the main skill domains of the 2003 IALSS, see Statistics Canada (2003) and Barrett (2009).

Following Bonikowska, Green and Riddell (2008), the sample used for this paper is restricted to earners, thereby excluding students, the unemployed or those not in the labour force, the self-employed, and workers with weekly earnings of less than or equal to $50 and over $20,000.[9] Additionally, observations with missing information on education or earnings are excluded. Only earners aged 24 to 59 are included in the sample to ensure that the focus of the analysis is on the determinants of weekly earnings in post-scholastic, pre-retirement employment. The analysis is further limited to full-year and full-time employed[10] workers with the focus centred on estimating the prices of skills and on minimizing the variation in the measure of earnings induced by labour supply variation. Furthermore, the sample is restricted to males since this allows the analysis to be free of effects of possible differential and measurement problems of constructing an accurate measure of labour force experience for females due to female participation problems in the labour market.[11] Lastly, population weights are used in the analysis. The resulting sample for the analysis consists of 2289 observations (1802 Canadian-born and 487 immigrant workers).

[9] Bonikowska, Green and Riddell (2008) also excluded aboriginals in their study. Using their study as one of the foundation to this paper, I also exclude aboriginals.

[10] Full-year workers are employees who usually work five days a week, four weeks per month and twelve months per year. Full-time workers are employees who work 35 or more hours per week.

[11] For future studies, female earnings differential will be examined. However, there exists sample selection bias that can under- or over-estimate "true" discrimination (see Heckman 1979). This result occurs because individuals who are labour force participants are generally not a random sample of the working age population, especially females. Unobserved factors that determine whether or not an individual is employed may be correlated with the unobserved factors that determine earnings. Failure to take into account of self-selection can results in bias when estimating earnings equations for the sample of employed workers. An extension to the typical Blinder-Oaxaca decomposition technique suggested by Neuman and Oaxaca (1998) can correct this methodological issue.

Section 5

Empirical Findings

5.1 Blinder-Oaxaca Decomposition

5.1.1 Results without Cognitive Skills Variable

The results of the earnings decomposition between immigrant and Canadian-born workers are analysed with controls for the grouped levels of education, a variable representing potential experience and its square, the grouped regions and a variable representing the mother tongue of the worker.[12] The corresponding OLS coefficient estimates of the underlying earnings equations are in line with commonly observed patterns found in the immigration literature, and are not discussed in this paper (see Tables 5 and 7 for full results in the Appendix). Overall, the predicted mean log-earnings differential between male immigrants and Canadian-born workers is 21.28 log points (see Table 1 below).

[12] There are three specifications of the Blinder-Oaxaca decomposition in this paper to sufficiently analyse the earnings differential between immigrants and Canadian-born workers: Table A2 does not include the grouped variables of the various levels of education and different regions in Canada; Table 1 contains the grouped variables for education and region; another specification that included occupations but is not included in this paper. All three specifications have the same results and interpretation. The specification used in this section presents simpler interpretations for audience to follow. Detailed analysis of the results is available upon request from author.

Table 1: Blinder-Oaxaca Results

Twofold Decomposition Results		
Difference	**0.2128*** **	
(Robust Standard Errors)	(0.0447)	
Decomposition Into	**Explained**	**Unexplained**
Total	**-0.0209**	**0.2337*** **
	(0.0809)	(0.0949)
Experience	0.0057	-0.1974***
	(0.0050)	(0.0763)
Education	-0.0009	-0.1173**
	(0.0039)	(0.0601)
Region	-0.0235***	0.2078
	(0.0046)	(0.1768)
Foreign Language	-0.0022	0.2311**
	(0.0807)	(0.1061)
Constant		0.1096
		(0.1903)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Similarly, the decomposition results with the variables grouped by category show that if immigrant workers have the same characteristics as their Canadian-born counterparts, the earnings differential would decrease by approximately 0.02 log points. These results indicate that immigrants have greater endowments, such as years of potential work experience and years of education, relative to Canadian-born workers. This is discussed in further detail below. When applying the coefficients of Canadian-born workers to the characteristics of immigrant workers, it accounts for nearly the entire differential between the two groups, which is approximately 0.23 log points. Differences in unobserved characteristics between immigrant and Canadian-born workers may account for this unexplained portion of the earnings differential. Particularly, the

unexplained component can be thought of as an upper bound on the presence of labour market discrimination in Canada.

Past literature have shown that immigrants typically have greater endowment of education and therefore earn greater; but due to unexplained factors in the labour market including labour market discrimination, this is not valid (see Chiswick and Miller, 2002 and Fang and Wald, 2008). This can be partly explained by considering that observationally similar education degrees attained in different countries are not valued equally as Canadian education. This indicates either that immigrant workers are less able than their Canadian-born counterparts to transfer their human capital into good jobs, or that the value of human capital differs with regard to where degrees are attained. As shown in Table 1, despite the negative estimate for education of the explained component of the differential, it appears that there is not much difference between immigrant and Canadian-born workers in terms of endowment of education.[13] Intriguingly, immigrants receive higher returns to education.

Furthermore, a worker's experience contributes to -0.20 log points of the unexplained component of the decomposition; it is statistically significant at the one percent level. The findings of this paper show that differences in the returns to work experience have a positive impact on the earnings differential between immigrants and Canadian-born workers. The typical education explanation documented in most literature also does not apply to the experience a worker attains in either Canada or abroad. This is contrary to most literature in which foreign labour market experience has a negative impact on earnings due to the limited international transferability of skills acquired on the job (see Chiswick and Miller, 2009 and Friedberg, 2000).[14]

[13] As shown in Table 1, there is an earnings differential of -0.001 for education of the explained component. The earnings differential of -0.05 log points for university education of the explained component, presented in Table A2 in the appendix, shows greater evidence that immigrants have higher education endowment.

[14] Different specifications of the model with the IALSS dataset give both a positive and a negative contribution by experience to the overall explained component. In fact, Bonikowska, Green and Riddell (2008) used the same IALSS dataset and found that

Another important characteristic that helps explain the earnings differential is the region in Canada where immigrant workers are located. Immigrants tend to live in regions with higher earnings, and so the regional difference explains -0.02 log points of the differential. Further, the requirement of fluency in either English or French may explain the lower earnings of immigrant workers. A majority of current immigrants are from non-English or non-French speaking countries, and thus there exists a language barrier in the workplace, which contributes to the earnings differential between the immigrants and their Canadian-born counterparts. This is further confirmed with the introduction of the foreign language variable, which contributes about 0.23 log points to the unexplained component; it is statistically significant at the five percent level. If the immigrant worker's mother tongue were either one of Canada's official languages, he would receive higher earnings.

From the results presented, it is clear that male immigrant workers, on average, have more favourable human capital endowments than their Canadian-born counterparts, but receive lower rewards, and hence lower earnings given their current levels of experience, education, and other such characteristics. This suggests that there may be discrimination in the Canadian labour market against immigrant workers. The 2003 IALSS dataset provides a direct measurement of productivity, in particular cognitive skills, that can offer an additional explanation for the earnings differential between immigrant and Canadian-born workers. This will eliminate some of the unobservable portion of the unexplained component of the differential, and ultimately lower the upper bound level of the perception of labour market discrimination against immigrants.

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immigrant workers receive lower returns to foreign experience, a variable the authors created. Future studies will involve variables representing Canadian attained experience and foreign attained experience to attempt to address this atypical experience result.

5.1.2 Results with Cognitive Skills Variable[15]

After controlling for cognitive skills, the decomposition results show that the unexplained portion of the mean log-earnings differential significantly decreased from 0.23 to 0.03 log points (see Table 2 below). As well, the explained portion significantly increased from -0.02 to 0.18 log points.[16] Importantly, the variable representing cognitive skills, 'average score', contributes 0.17 log points to the explained component of the differential between immigrant and Canadian-born workers; it is statistically significant at the one percent level. This implies that immigrant workers have lower endowments, specifically cognitive skills.[17] Hence, introducing cognitive skills into the earnings equation demonstrates that there exist other reasons, such as unquantifiable productivity, that can explain the earnings differential between the immigrant and Canadian-born workers.

[15] Similarly to the tables without the cognitive skills variable, there are three specifications of the Blinder-Oaxaca decomposition in this paper to sufficiently analyse the earnings differential between immigrants and Canadian-born workers: Table A5 does not include the grouped variables of the various levels of education and different regions in Canada; Table 2 contains the grouped variables for education and region; another specification that included occupations but is not included in this paper. All three specifications have the same results and interpretation. The specification used in this section presents simpler interpretations for the audience to follow. Detailed analysis of the results is available upon request from author.

[16] The corresponding coefficient estimates of the underlying earnings equations with the cognitive skills variable are also not discussed in this paper but are presented in Table A6.

[17] Cognitive skills contribute 0.30 log points to the unexplained component of the differential. This implies that immigrant workers receive lower returns than their Canadian-born counterparts. However, this result is economically insignificant.

Table 2: Blinder-Oaxaca Results

Twofold Decomposition Results		
Difference	**0.2128*** **	
(Robust Standard Errors)	(0.0455)	
Decomposition Into	**Explained**	**Unexplained**
Total	**0.1830*** **	**0.0299**
	(0.0589)	(0.0683)
Experience	0.0095	-0.1490**
	(0.0070)	(0.0716)
Education	-0.0007	-0.0765
	(0.0031)	(0.0549)
Region	-0.0156***	0.1420
	(0.0043)	(0.1730
Foreign Language	0.0196	0.1005
	(0.0519)	(0.0814)
Main Tasks Completion	-0.0044	0.0354
	(0.0063)	(0.0703
Average Score	0.1745***	0.2960
	(0.0259)	(0.2475)
Constant		-0.3184
		(0.3184)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

It is interesting to note that the inclusion of the cognitive skills variable in the decomposition increased the unexplained components of experience and education to the differential. This implies that there is an increase to immigrant workers' returns to both experience and education.

After controlling for workers' cognitive skills, it is obvious that variables typical to an earnings equation, such as experience and education, do not entirely explain the earnings differential between immigrant workers and their Canadian-born counterparts. This verifies the

existence of other unquantifiable characteristics that can decrease the estimates of the unexplained component. In short, cognitive skills are an important determinant of the differential and must be taken into account when investigating labour market discrimination against immigrant workers in Canada.

5.2 Unconditional Quantile Regression[18]

5.2.1 Results without Cognitive Skills Variable

In this section, I will analyse the earnings differentials across the earnings distribution in the Canadian labour market for the purpose of analyzing the unexplained components, and assuming that it can be thought of as the upper bounds on the presence of labour market discrimination in Canada. The unconditional quantile regressions are estimated at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} quantiles with the cognitive skills measure excluded. Quantile regressions allows for potential variations in the return to cognitive skills, and other determinants of earnings, across the weekly log earnings distribution. The estimates are presented in Table 3 below.

[18] For the purpose of this paper, the corresponding OLS coefficient estimates of the underlying earnings equations used in the decompositions are not presented nor discussed in this paper. The corresponding OLS results will be provided upon request.

Table 3: Quantile Regression Estimates

(with the variables grouped by category and without the cognitive skills variable)

Quantile Regression Estimates										
Quantile	0.10		0.25		0.50		0.75		0.90	
Difference	**0.1587*** **		**0.2693*** **		**0.1951*** **		**0.0567**		**0.0415**	
(Robust S.E.)	(0.0637)		(0.0436)		(0.0469)		(0.0469)		(0.0491)	
Decomposition Into	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Total Contribution	**0.1018**	**0.0569**	**0.0504**	**0.2189*** **	**0.0148**	**0.1802** **	**-0.0562**	**0.1129**	**-0.1795*** **	**0.2209*** **
	(0.1094)	(0.1251)	(0.0683)	(0.0815)	(0.0629)	(0.0790)	(0.0712)	(0.0871)	(0.0749)	(0.0931)
Experience	0.0129**	0.0549	0.0105**	0.0254	0.0104**	0.0046	0.0069**	-0.0800	-0.0168**	0.1612*
	(0.0066)	(0.1384)	(0.0046)	(0.0789)	(0.0046)	(0.0732)	(0.0032)	(0.0733)	(0.0086)	(0.0904)
Education	-0.0039	0.0615	-0.0025	-0.0457	-0.0028	-0.1143	-0.0030	-0.1602***	0.0081	0.1098*
	(0.0039)	(0.1009)	(0.0022)	(0.0693)	(0.0022)	(0.0747)	(0.0023)	(0.0664)	(0.0060)	(0.0605)
Region	-0.0169**	-0.1838	-0.0248***	0.2154	-0.0176***	0.1920	-0.0122***	-0.0284	0.0069	-0.0056
	(0.0067)	(0.2932)	(0.0038)	(0.1625)	(0.0029)	(0.2068)	(0.0024)	(0.1791)	(0.0202)	(0.2183)
Foreign Language	0.1098	0.0542	0.0671	0.1737**	0.0249	0.1141	-0.0479	0.1648*	-0.1777**	-0.0206*
	(0.1100)	(0.1365)	(0.0684)	(0.0915)	(0.0630)	(0.0981)	(0.0714)	(0.1024)	(0.0788)	(0.0118)
Constant		0.0701		-0.1500		-0.0162		0.2166		-0.0238
		(0.3598)		(0.2016)		(0.2313)		(0.2014)		(0.2601)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

The differentials increase along the earnings distribution, from 0.16 log points at the 10th quantile to 0.293 log points at the 25th quantile. The estimate dramatically falls to 0.20 log points at the 50th quantile and continues to fall to 0.04 log points at the very top quantile.[19] This implies that the earnings differentials heavily favour Canadian-born workers below the 50th quantile, but the differential against immigrant workers nearly diminishes at the top. The estimates of the explained components of the differential are at their greatest at the bottom of the earnings distribution, but they decrease across the distribution into the negative, from 0.10 log points at the 10th quantile to -0.18 log points at the 90th quantile. The falling negative explained estimates indicates that immigrant workers have lower endowments than their Canadian-born counterparts at the lower end of the earnings distribution but the opposite is true for those immigrant workers located at the 75th and 90th quantiles.

It is necessary to examine some of the covariates that contribute to the explained and unexplained components across the distribution to investigate the differential against immigrant workers. Such an examination shows first that the estimates of the explained components on experience are positive but decreasing until the 90th quantile when the estimate becomes negative. This implies that immigrant workers have lower potential work experience than Canadian-born workers except for those located at the very top where the opposite is true. Looking at the estimates of the unexplained components, immigrant workers receive lower returns to their experience compared to their Canadian-born counterparts, and again except at the 90th quantile. The estimates of the explained components on education show that immigrants have greater endowments than their Canadian-born counterparts have[20], but become less true at

[19] The estimates for the lower quantiles, 10th to 50th, are statistically significant at the one percent level. This is not true for the 75th or 90th quantile.
[20] Except for the 10th quantile.

higher quantiles; however, these estimates are statistically insignificant. The estimates and analysis of the unexplained components on education is similar to potential work experience.

In general, at the lower end of the distribution[21], the earnings differentials are almost entirely due to the unexplained components. This is true since differences in observable characteristics explain little of the differential; instead, immigrant workers receive lower returns to their observable human capital that accounts for nearly the entire differential. On the other hand, the smaller earnings differentials at the 75th and 90th quantiles is due to the lower returns that immigrant workers receive for their observable characteristics that is offset by the higher levels of human capital that these workers have.

The results presented above imply that immigrant workers at the lower end of the earnings distribution are receiving less than what they should receive at their current levels of experience and education, amongst other characteristics. Some would claim that this is strong evidence for discrimination against immigrant workers in the Canadian labour market at the lower end of the earnings distribution. However, the ability to measure cognitive skills with the 2003 IALSS data may provide a more accurate explanation for the unexplained component of the differential other than the pure presence of labour market discrimination.

5.2.2 Results with Cognitive Skills Variable

After controlling for cognitive skills, looking at the results in Table 4 below, the estimates of the explained components are greater and the estimates for the unexplained components of the earnings differentials is lower compared to those estimates above in Table 3 without the cognitive skills variable.[22] In general, the explained components of the earnings differential tend

[21] Except for the 10th quantile.
[22] Except for the 90th quantile.

to decrease across the distribution.[23] For the unexplained component, the very bottom and top quantiles of the earnings distribution is lower than the middle quantiles.

Intriguingly, after controlling for cognitive skills, it can be seen that the ability of most covariates to account for the explained component of the decomposition increases across the earnings distribution, except at the 90th quantile. This result suggests that there is a relationship between the characteristics that contribute to the human capital of workers and their cognitive skills. However, since the level of the skills required at the top end of the distribution is much more demanding than the skills measured by the cognitive skill variable, the IALSS test might not provide a good indicator of the skills of workers in the upper tail.

[23] Except for the 75th quantile.

Table 4: Quantile Regression Estimates
(with the cognitive skills and the variables grouped by category)

Quantile Regression Estimates										
Quantile	0.10		0.25		0.50		0.75		0.90	
Difference	**0.1587*** **		**0.2693*** **		**0.1951*** **		**0.0567**		**0.0415**	
(Robust S.E.)	(0.0624)		(0.0423)		(0.0453)		(0.0445)		(0.0491)	
Decomposition Into	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Total Contribution	**0.3103*** **	**-0.1516**	**0.1882*** **	**0.0810**	**0.1502*** **	**0.0449**	**0.0332**	**0.0235**	**-0.1971*** **	**0.2385*** **
	(0.1079)	(0.1243)	(0.0557)	(0.0685)	(0.0486)	(0.0639)	(0.0598)	(0.0740)	(0.0744)	(0.0921)
Experience	0.0189**	0.0995	0.0145***	0.0295	0.0144***	-0.0265	0.0096**	-0.1398***	-0.0217**	0.1966**
	(0.0085)	(0.1177)	(0.0060)	(0.0681)	(0.0059)	(0.0628)	(0.0041)	(0.0590)	(0.0099)	(0.0853)
Education	-0.0028	0.0726	-0.0018	-0.0102	-0.0021	-0.0407	-0.0025	-0.0652	0.0053	0.0440
	(0.0034)	(0.1001)	(0.0018)	(0.0683)	(0.0018)	(0.0690)	(0.0020)	(0.0645)	(0.0043)	(0.0620)
Region	-0.0079	-0.2711	-0.0188***	0.1491	-0.0118***	0.1200	-0.0083***	-0.0927	0.0085	0.0551
	(0.0068)	(0.2975)	(0.0037)	(0.1678)	(0.0026)	(0.2265)	(0.0023)	(0.1795)	(0.0204)	(0.2201)
Foreign Language	0.1138	-0.0311	0.0699	0.0810	0.0270	-0.0299	-0.0474	0.0132	-0.0740	-0.0128
	(0.1003)	(0.1230)	(0.0532)	(0.0800)	(0.0477)	(0.0849)	(0.0612)	(0.0968)	(0.0788)	(0.0109)
Complete	0.0018	0.2191*	0.0014	0.1135	-0.0005	0.0764	-0.0031	-0.0663***	-0.0032	0.0580
	(0.0055)	(0.1166)	(0.0033)	(0.0877)	(0.0026)	(0.0871)	(0.0028)	(0.0810)	(0.0057)	(0.0951)
Average Score	0.1865***	0.9069**	0.1231***	0.2668	0.1232***	-0.2202	0.0849***	-0.6325***	-0.1118***	0.2632
	(0.0324)	(0.4477)	(0.0152)	(0.2425)	(0.0133)	(0.2252)	(0.0120)	(0.2134)	(0.0244)	(0.2864)
Constant		-1.1474**		-0.5489*		0.1658		1.0067		-0.3656
		(0.5307)		(0.3169)		(0.3373)		(0.3012)		(0.3941)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

The variable representing cognitive skills contribute the greatest to both the explained and unexplained components of the earnings differential at all quantiles of the distribution; these are statistically significant at the one percent level. As mentioned above, this result indicates that differences in cognitive skills substantially affects the earnings of workers and must be taken into consideration when investigating the differential between immigrant and Canadian-born workers. Notably, it can be seen that the estimates on the explained component of the cognitive skills variable decreases across the distribution. Conversely, the estimates on the unexplained component decrease across the distribution, except at the 90th quantile.[24] These results imply that immigrant workers have lower endowments with respect to cognitive skills than their Canadian-born counterparts. This becomes less true at higher quantiles. Immigrants located at the lower end of the distribution, at the 10th and 25th quantiles, these workers experience lower returns to their cognitive skills relative to their Canadian-born counterparts. In general, the inclusion of the cognitive skills of workers explains much of the earnings differentials as opposed to the unexplained components solely contributing to the differentials across the earnings distribution.

Since past studies could not control for the cognitive skills of workers, the unexplained component of their earnings differentials between immigrants and Canadian-born workers were relatively large. However, the 2003 IALSS dataset provides an objective and direct measurement of cognitive skills, allowing one to control for such previously unquantifiable characteristics. Indeed, after controlling for cognitive skills, the results show that there exist unquantifiable characteristics that can explain the earnings differentials between the two groups across the distribution, without necessarily positing the existence of pure labour market discrimination against immigrant workers in Canada. Interestingly, after the inclusion of the cognitive skills, the estimates suggest that characteristics that are factors of human capital, such as education and

[24] As mentioned earlier, the IALSS test may be a poor indicator of a worker's cognitive skills in the upper tail.

experience, can further explain the earnings differential between immigrant and Canadian-born workers across the distribution. The earnings differential for the majority of immigrant workers in the Canadian labour market can be attributed to one's cognitive skills and not to a pure labour market discrimination explanation.

Section 6

Conclusion

In this paper, I analysed the impact of cognitive skills on the earnings differential between immigrant and Canadian-born workers, and the differential across the earnings distribution, while taking into account the differing effects of covariates across the distribution, to examine the perceived presence of labour market discrimination against immigrants in Canada. Most previous studies on this topic focused mainly on observable components of human capital that affect earnings, such as education and experience. However, these studies lacked direct information on individuals' cognitive skill. As well, previous research that did use cognitive skill test scores as a determinant of earnings did not employ the Blinder-Oaxaca decomposition to specifically analyse how much of the earnings differential between immigrant and Canadian-born workers is attributable to labour market discrimination nor did they analyse this across the earnings distribution.

The Blinder-Oaxaca decomposition technique allows for a much more precise analysis of the upper bound presence of labour market discrimination in Canada by taking into account the potential labour market entry disadvantages faced by immigrants caused by the impact of differences in cognitive skills in returns to observable characteristics. This is in contrast to other approaches that have attempted to analyse discrimination in the labour market, such as the OLS approach used by Bonikowska, Green and Riddell (2008), which cannot decompose the earnings differential into explained and unexplained portions to specifically investigate the upper bound level of labour market discrimination in Canada.

The results presented shows that immigrant workers receive lower returns compared to their Canadian-born counterparts despite having higher human capital and other observationally equivalent attributes. This supports the finding of upper bound labour market discrimination against immigrant workers. After the inclusion of the cognitive skills variable, the unexplained portion of the earnings differential decreases by about 50 percent. While this ultimately lowers the upper bound on the presence of labour market discrimination against immigrants in Canada, it does not account for the earnings differential entirely.

Though examining the average earnings differential is important, it cannot address the fact that workers have differing endowments and returns to human capital characteristics across the earnings distribution, and therefore each group of workers must be treated separately. Implementing unconditional quantile regressions in a Blinder-Oaxaca decomposition framework, I estimated the earnings differentials between immigrants and Canadian-born workers across the distribution. I used an unconditional quantile regression technique since this method produces a more generalized and unbiased estimates than those produced by a conditional quantile regression method.

With the inclusion of the cognitive skills variable, the upper bound of the potential presence of labour market discrimination falls across the distribution except at the 90^{th} quantile. However, the IALSS test likely does not provide a good indication of the level of cognitive skills required by workers at the very top of the earnings distribution. The skills level required at the top 10 percent far exceeds the basic tasks in the test and, therefore the differential at the 90^{th} quantile may turn out to be the result of cognitive skill differences between workers in the upper tail. Thus, it would be premature to conclude that cognitive skill differences cannot account for part of the earnings differential at the top of the distribution solely based on the findings

presented in this paper. However, it should be noted that even if the earnings differential present at the 90th quantile can be explained in part by differences in cognitive skills, as this paper has shown for all other parts of the distribution, there will most likely remain an unexplained portion that suggests that there may be labour market discrimination in Canada.

This paper does not attempt to interpret the entire unexplained component of the earnings differential as a reflection of pure labour market discrimination since the earnings equation used in this paper does not include all relevant attributes measuring skills and individual productivity. Instead, the unexplained component is interpreted as a residual that reflects the upper bound estimate of labour market discrimination. Importantly, the results of this paper offer an additional explanation for the differential by adding a measure of cognitive skills to eliminate some of the unobservable portion of the unexplained component. Ultimately, an explanation for the differential based solely on pure labour market discrimination is dismissed. In so doing, the findings in this paper can offer better and more nuanced immigration policy advice to improve the labour market outcomes of both current and future immigrant arrivals in Canada, and ultimately, may lead to practical implication for the earnings differential closing endeavour.

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Appendix

Tables

Table A1: OLS Results
(corresponds with Table A2)
(without the grouped variables & without cognitive skills variable)

Returns to Weekly Earnings		
	Canadian-Borns	Immigrants
Experience	0.0056***	0.0145***
(Robust Standard Errors)	(0.0013)	(0.0025)
Education (Ref. Less than High School)		
High School	0.2706***	0.0881
	(0.0544)	(0.1219)
Non-Univ. Post-Secondary	0.3417***	0.3285***
	(0.0568)	(0.1133)
Univ.	0.6536***	0.4464***
	(0.0577)	(0.1283)
Region (Ref. Ontario)		
Atlantic	-0.2645***	-0.0670
	(0.0544)	(0.1679)
Quebec	-0.1481***	-0.1814*
	(0.0472)	(0.1100)
North	0.0198	0.2046
	(0.0547)	(0.1624)
West	-0.0362	-0.0396
	(0.0505)	(0.0726)
Mother Tongue (Ref. English/French)		
Foreign Language	-0.0166	-0.2961***
	(0.0943)	(0.0811)
Constant	6.4342***	6.2671***
	(0.0686)	(0.1571)
R-Squared	0.2028	0.1681
Obs.	1802	487

Notes: *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A2: Blinder-Oaxaca Results
(without the variables grouped by category & cognitive skill variable)

Twofold Decomposition Results		
Difference	**0.2128*** **	
(Robust Standard Errors)	(0.0456)	
Decomposition Into	**Explained**	**Unexplained**
Total	**-0.0920**	**0.3048*** **
	(0.0671)	(0.0813)
Experience	0.0082	-0.2077***
	(0.0061)	(0.0668)
Education		
Less than High School	-0.0199***	-0.0091
	(0.0081)	(0.0085)
High School	-0.0005	0.0249
	(0.0022)	(0.0202)
Non-Univ. Post-Secondary	0.0015	-0.0219
	(0.0023)	(0.0150)
University	-0.0448***	0.0378
	(0.0128)	(0.0259)
Region		
Atlantic	-0.0168***	-0.0012
	(0.0034)	(0.0013)
Quebec	-0.0097**	0.0128
	(0.0044)	(0.0114)
Ontario	-0.0217**	0.0402
	(0.0094)	(0.0446)
West	0.0000	0.0206
	(0.0018)	(0.0201)
North	0.0003***	-0.0001
	(0.0001)	(0.0001)
Mother Tongue		
Foreign Language	0.0057	0.1049**
	(0.0326)	(0.0470)
English/French	0.0057	-0.0348**
	(0.0326)	(0.0163)
Constant		0.3383***
		(0.0979)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. *English/French* is a dummy variable and is equal to one if the worker's mother tongue is either of Canada's official language and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A3: OLS Results
(corresponds with Table 1)
(with the grouped variables & without cognitive skills variable)

Returns to Weekly Earnings		
	Canadian-Borns	Immigrants
Experience	0.0039**	0.0124***
(Robust Standard Errors)	(0.0018)	(0.0027)
Education	0.0862**	0.2550***
	(0.0394)	(0.0764)
Region	0.2501***	0.0404
	(0.0437)	(0.1730)
Mother Tongue (Ref. English/French)		
Foreign Language	0.0032	-0.3046***
	(0.1167)	(0.0783)
Constant	6.4489***	6.3393***
	(0.0643)	(0.1791)
R-Squared	0.0388	0.1251
Obs.	1802	487

Notes: *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A4: OLS Results
(corresponds with Table A5)
(with cognitive skills variable & without the grouped variables)

Returns to Weekly Earnings		
	Canadian-Borns	Immigrants
Experience	0.0067***	0.0134***
(Robust Standard Errors)	(0.0013)	(0.0027)
Education (Ref. Less than High School)		
High School	0.1684***	-0.0353
	(0.0570)	(0.1218)
Non-Univ. Post-Secondary	0.2211***	0.1529
	(0.0580)	(0.1240)
Univ.	0.4639***	0.1846
	(0.0677)	(0.1332)
Region (Ref. Ontario)		
Atlantic	-0.2234***	-0.0682
	(0.0551)	(0.1732)
Quebec	-0.1117***	-0.2070**
	(0.0466)	(0.1080)
North	0.0798	0.1821
	(0.0547)	(0.1691)
West	-0.0609	-0.0597
	(0.0512)	(0.0709)
Mother Tongue (Ref. English/French)		
Foreign Language	-0.0315	-0.1774**
	(0.0755)	(0.0802)
Main Tasks Status (Ref. Incomplete)		
Complete	-0.0411	-0.0884
	(0.0534)	(0.0738)
Average Score	0.0185***	0.0213***
	(0.0036)	(0.0056)
Constant	5.6780***	5.5778***
	(0.1610)	(0.2364)
R-Squared	0.2389	0.2322
Obs.	1802	487

Notes: *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A5: Blinder-Oaxaca Results
(with cognitive skill variable & without the grouped variables)

Twofold Decomposition Results		
Difference	**0.2128*** **	
(Robust Standard Errors)	(0.0459)	
Decomposition Into	**Explained**	**Unexplained**
Total	**0.0484**	**0.1645****
	(0.0625)	(0.0736)
Experience	0.0097	-0.1572**
	(0.0071)	(0.0701)
Education		
Less than High School	-0.0134**	-0.0125
	(0.0058)	(0.0092)
High School	-0.0005	0.0201
	(0.0022)	(0.0186)
Non-Univ. Post-Secondary	0.0005	-0.0174
	(0.0021)	(0.0156)
University	-0.0333***	0.0502*
	(0.0102)	(0.0261)
Region		
Atlantic	-0.0151***	-0.0011
	(0.0033)	(0.0014)
Quebec	-0.0076*	0.0160
	(0.0040)	(0.0114)
Ontario	-0.0160*	0.0190
	(0.0092)	(0.0451)
West	0.0000	0.0089
	(0.0010)	(0.0201)
North	0.0004***	-0.0001
	(0.0001)	(0.0001)
Mother Tongue		
Foreign Language	0.0109	0.0548
	(0.0261)	(0.0415)
English/French	0.0109	-0.0182
	(0.0261)	(0.0141)
Main Tasks Status		
Main Tasks Complete	-0.0023	0.0183
	(0.0032)	(0.0352)
Main Tasks Incomplete	-0.0023	-0.0054
	(0.0032)	(0.0105)
Average Score	0.1065***	-0.1130
	(0.0236)	(0.2736)
Constant		0.3019
		(0.2838)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A6: OLS Results
(corresponds with Table 2)
(with cognitive skills variable & the grouped variables)

Returns to Weekly Earnings		
	Canadian-Borns	Immigrants
Experience	0.0065***	0.0129***
(Robust Standard Errors)	(0.0015)	(0.0026)
Education	0.0648*	0.1748***
	(0.0390)	(0.0684)
Region	0.1654***	0.0221
	(0.0429)	(0.1696)
Mother Tongue (Ref. English/French)		
Foreign Language	-0.0284	-0.1622**
	(0.0750)	(0.0779)
Main Tasks Status (Ref. Incomplete)		
Complete	-0.0392	-0.0850
	(0.0529)	(0.0739)
Average Score	0.0304***	0.0232***
	(0.0031)	(0.0052)
Constant	5.0842***	5.4026***
	(0.1433)	(0.2843)
R-Squared	0.1758	0.2154
Obs.	1802	487

Notes: *Experience* is the combination of experience and experience-squared. *Education* is based on the highest level of education attained. *Region* includes: Atlantic, Quebec, Ontario, West and North. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.

Table A7: Quantile Regression Estimates
(without the grouped variables & cognitive skills variable)

Quantile Regression Estimates										
Quantile	0.10		0.25		0.50		0.75		0.90	
Difference	**0.1587*** **		**0.2693*** **		**0.1951*** **		**0.0567**		**0.0415**	
(Robust S.E.)	(0.0631)		(0.0419)		(0.0463)		(0.0469)		(0.0495)	
Decomposition Into	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Total Contribution	**0.0187**	**0.1400**	**-0.0239**	**0.2931*** **	**-0.0608**	**0.2559*** **	**-0.1185***	**0.1751** **	**-0.0915**	**0.1329**
	(0.1081)	(0.1243)	(0.0606)	(0.0735)	(0.0569)	(0.0741)	(0.0705)	(0.0874)	(0.0763)	(0.0880)
Experience	0.0165**	0.1161	0.0138***	**0.0328**	0.0134***	-0.0061	0.0089**	-0.1347**	-0.0247**	0.2476***
	(0.0077)	(0.1201)	(0.0058)	(0.0691)	(0.0056)	(0.0655)	(0.0038)	(0.0708)	(0.0111)	(0.0915)
Education										
Less than H.S.	-0.0208***	-0.0269	-0.0187***	-0.0028	-0.0161***	0.0044	-0.0090***	0.0151*	0.0213***	-0.0250
	(0.0065)	(0.0176)	(0.0044)	(0.0114)	(0.0038)	(0.0102)	(0.0027)	(0.0092)	(0.0073)	(0.0161)
High School	-0.0020	-0.0102	-0.0011	0.0043	-0.0015	0.0191	-0.0020	0.0218	0.0031	-0.0045
	(0.0026)	(0.0303)	(0.0013)	(0.0200)	(0.0013)	(0.0218)	(0.0015)	(0.0190)	(0.0027)	(0.0186)
Non-Univ. P.S.	0.0164***	0.0095	0.0107***	-0.0205	0.0049*	-0.0424***	-0.0019	-0.0389***	-0.0108	0.0249
	(0.0063)	(0.0208)	(0.0036)	(0.0132)	(0.0029)	(0.0153)	(0.0025)	(0.0166)	(0.0092)	(0.0295)
University	-0.0466***	0.1107***	-0.0440***	0.0480*	-0.0504***	0.0405	-0.0454***	-0.0165	0.0664***	0.0212
	(0.0119)	(0.0411)	(0.0072)	(0.0288)	(0.0072)	(0.0305)	(0.0074)	(0.0317)	(0.0145)	(0.0203)
Region										
Atlantic	-0.0141***	0.0012	-0.0190***	-0.0016	-0.0140***	-0.0013	-0.0109***	0.0003	0.0092	-0.0006
	(0.0051)	(0.0023)	(0.0029)	(0.0014)	(0.0021)	(0.0016)	(0.0018)	(0.0014)	(0.0164)	(0.0184)
Quebec	-0.0292***	-0.0176	-0.0103**	0.0162	-0.0160***	0.0125	-0.0183***	0.0039	0.0057	0.0145
	(0.0116)	(0.0169)	(0.0050)	(0.0108)	(0.0039)	(0.0108)	(0.0037)	(0.0098)	(0.0159)	(0.0305)
Ontario	-0.0228	-0.0754	-0.0299**	-0.0177	-0.0209**	0.0260	-0.0113	-0.0282	-0.0084	0.0050
	(0.0180)	(0.0654)	(0.0097)	(0.0389)	(0.0089)	(0.0485)	(0.0085)	(0.0481)	(0.0239)	(0.0336)
West	0.0010	0.0392	0.0006	0.0381	0.0006	0.0220	0.0006	0.0289	0.0008	-0.0210
	(0.0017)	(0.0300)	(0.0010)	(0.0186)	(0.0009)	(0.0197)	(0.0009)	(0.0194)	(0.0022)	(0.0265)
North	0.0004	0.0000	0.0003	-0.0001**	0.0003	-0.0001	0.0003	-0.0001	-0.0005	0.0001
	(0.0003)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0002)	(0.0003)	(0.0006)	(0.0007)

Mother Tongue (continue from above)										
Foreign Language	0.0600	0.0338	0.0369	0.0896**	0.0195	0.0455	-0.0147	0.0725	-0.0768**	-0.0088
	(0.0542)	(0.0663)	(0.0301)	(0.0405)	(0.0281)	(0.0470)	(0.0349)	(0.0504)	(0.0395)	(0.0057)
English/French	0.0600	-0.0113	0.0369	-0.0300**	0.0195	-0.0153	-0.0147	-0.0243	-0.0768**	0.1598*
	(0.0542)	(0.0223)	(0.0301)	(0.0137)	(0.0281)	(0.0158)	(0.0349)	(0.0170)	(0.0395)	(0.1020)
Constant		-0.0291		0.1368		0.1510		0.2755***		-0.2803**
		(0.1580)		(0.0997)		(0.1016)		(0.1055)		(0.1399)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. *English/French* is a dummy variable and is equal to one if the worker's mother tongue is either of Canada's official language and zero otherwise. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent level.

Table A8: Quantile Regression Estimates
(with cognitive skills variable & without the grouped variables)

Quantile Regression Estimates										
Quantile	0.10		0.25		0.50		0.75		0.90	
Difference (Robust S.E.)	**0.1587***** (0.0620)		**0.2693***** (0.0411)		**0.1951***** (0.0449)		**0.0567** (0.0446)		**0.0415** (0.0495)	
Decomposition Into	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained	Explained	Unexplained
Total Contribution	**0.2273****	**-0.0686**	**0.0880**	**0.1813*****	**0.0497**	**0.1454****	**-0.0539**	**0.1106**	**-0.1357***	**0.1772****
	(0.1131)	(0.1297)	(0.0573)	(0.0695)	(0.0505)	(0.0664)	(0.0632)	(0.0788)	(0.0765)	(0.0897)
Experience	0.0192**	0.1444	0.0153***	0.0431	0.0149***	-0.0036	0.0098***	-0.1417***	-0.0255**	0.2465***
	(0.0087)	(0.1137)	(0.0063)	(0.0668)	(0.0061)	(0.0666)	(0.0042)	(0.0600)	(0.0112)	(0.0878)
Education										
Less than H.S.	-0.0085	-0.0226	-0.0121***	-0.0058	-0.0095***	-0.0080	-0.0051**	-0.0029	0.0127**	-0.0124
	(0.0056)	(0.0155)	(0.0037)	(0.0114)	(0.0031)	(0.0111)	(0.0024)	(0.0092)	(0.0063)	(0.0158)
High School	-0.0018	-0.0115	-0.0010	0.0015	-0.0014	0.0126	-0.0019	0.0131	0.0026	0.0009
	(0.0025)	(0.0294)	(0.0012)	(0.0192)	(0.0013)	(0.0198)	(0.0015)	(0.0183)	(0.0025)	(0.0193)
Non-Univ. P.S.	0.0121**	0.0088	0.0084***	-0.0180	0.0027	-0.0347**	-0.0032	-0.0284*	-0.0071	0.0176
	(0.0060)	(0.0196)	(0.0034)	(0.0134)	(0.0028)	(0.0160)	(0.0026)	(0.0160)	(0.0093)	(0.0300)
University	-0.0162	0.0960**	-0.0277***	0.0599*	-0.0341***	0.0874***	-0.0356***	0.0514*	0.0438***	0.0039
	(0.0123)	(0.0440)	(0.0071)	(0.0319)	(0.0067)	(0.0348)	(0.0070)	(0.0317)	(0.0134)	(0.0199)
Region										
Atlantic	-0.0106**	0.0015	-0.0171***	-0.0015	-0.0121***	-0.0011	-0.0098***	0.0005	0.0098	-0.0024
	(0.0052)	(0.0024)	(0.0028)	(0.0014)	(0.0020)	(0.0017)	(0.0018)	(0.0014)	(0.0166)	(0.0186)
Quebec	-0.0247**	-0.0153	-0.0079*	0.0168*	-0.0134***	0.0121	-0.0165***	0.0025	0.0036	0.0156
	(0.0115)	(0.0169)	(0.0049)	(0.0103)	(0.0037)	(0.0104)	(0.0036)	(0.0097)	(0.0158)	(0.0304)
Ontario	-0.0125	-0.1091*	-0.0244***	-0.0408	-0.0155*	-0.0058	-0.0083	-0.0584	-0.0024	0.0169
	(0.0182)	(0.0659)	(0.0096)	(0.0392)	(0.0088)	(0.0471)	(0.0085)	(0.0481)	(0.0241)	(0.0338)
West	0.0002	0.0286	0.0002	0.0335*	0.0002	0.0189	0.0003	0.0279	0.0009	-0.0180
	(0.0011)	(0.0300)	(0.0006)	(0.0185)	(0.0005)	(0.0192)	(0.0006)	(0.0195)	(0.0022)	(0.0267)
North	0.0004	0.0000	0.0003	0.0000	0.0003	0.0000	0.0003	-0.0001	-0.0005	0.0000
	(0.0003)	(0.0002)	(0.0002)	(0.0001)	(0.0002)	(0.0002)	(0.0003)	(0.0003)	(0.0006)	(0.0007)

Mother Tongue (continue from above)										
Foreign Language	0.0580	-0.0079	0.0359	0.0535	0.0181	-0.0140	-0.0159	0.0115	-0.0437	-0.0064
	(0.0498)	(0.0615)	(0.0263)	(0.0379)	(0.0242)	(0.0428)	(0.0325)	(0.0490)	(0.0397)	(0.0054)
English/French	0.0580	0.0026	0.0359	-0.0179	0.0181	0.0047	-0.0159	-0.0039	-0.0437	0.1159
	(0.0498)	(0.0207)	(0.0263)	(0.0128)	(0.0242)	(0.0144)	(0.0325)	(0.0165)	(0.0397)	(0.0985)
Cognitive skills Test										
Complete	0.0009	0.1028*	0.0006	0.0562	-0.0002	0.0368	-0.0014	-0.0291	-0.0009	0.0163
	(0.0027)	(0.0574)	(0.0017)	(0.0420)	(0.0013)	(0.0433)	(0.0014)	(0.0403)	(0.0028)	(0.0473)
Incomplete	0.0009	-0.0247*	0.0006	-0.0135	-0.0002	-0.0089	-0.0014	0.0070	-0.0009	-0.0027
	(0.0027)	(0.0139)	(0.0017)	(0.0102)	(0.0013)	(0.0105)	(0.0014)	(0.0097)	(0.0028)	(0.0077)
Average Score	0.1518***	0.3948	0.0810***	-0.0929	0.0820***	-0.6084***	0.0508***	-0.9081***	-0.0844***	0.3783
	(0.0363)	(0.4819)	(0.0162)	(0.2550)	(0.0137)	(0.2504)	(0.0124)	(0.2434)	(0.0250)	(0.3103)
Constant		-0.6571		0.1071		0.6575***		1.1692***		-0.5928**
		(0.5119)		(0.2764)		(0.2628)		(0.2422)		(0.2846)

Notes: The Oaxaca-Blinder decomposition results uses the Canadian-born workers as the Reference Coefficients. *Experience* is the combination of experience and experience-squared. The different levels of education are based on the highest level of education attained. *Foreign language* is a dummy variable and is equal to one if the worker's first language is neither English nor French and zero otherwise. *English/French* is a dummy variable and is equal to one if the worker's mother tongue is either of Canada's official language and zero otherwise. The *average score* variable was constructed by taking the proficiency scores (ranging from 0 to 500) in the four main skill domains assessed in the 2003 IALSS and divided by four. A dummy variable to control for workers who were incapable of completing the "Main Skills Test" was included as there is a strong relationship between literacy and human capital variables. Robust standard errors for the variables are located in parentheses. Significance is indicated as follows: (***) denoting the 1 percent, (**) the 5 percent and (*) the 10 percent levels.