Skill Mismatch of Indigenous Peoples in Canada: Findings from PIAAC

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Abstract

Using the Programme for the International Assessment of Adult Competencies (Canadian sample) the paper examines the skill mismatch of Indigenous o -reserve peoples. Using several approaches to measuring skill mismatch we nd that overskilling does not seem to be an issue for Aboriginal peoples of Canada. However, we do nd signi cant di erences in the underskilling rates between Indigenous populations and non-Aboriginal Canadian born. Speci cally, First Nations females are more likely to be underskilled in numeracy, and First Nations males are more likely to be underskilled in literacy. Inuit peoples show the highest underskilling rates and are much more likely to be underskilled in literacy and numeracy in comparison to non-Aboriginal Canadian born. We also incorporate skill mismatch rates into the analysis of wages and conclude that it does not change previously documented di erentials.

Keywords: Indigenous; Aboriginal; Skill Mismatch; Programme for the International Assessment of Adult Competencies (PIAAC)
JEL Codes: J15; J24; J71

1 Introduction

Technological progress, rampantly changing labor market, and the innate rigidity of skills have created an environment in which people's skills do not always match

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those required by their jobs. The literature on skill mismatch has documented that overskilling and underskilling has become a prevalent phenomenon existing in many countries (McGowan and Andrews (2015)). Due to matching mechanisms in the core of the labor market, some imbalances between demand and supply of skills are inevitable, but widespread mismatching may have pernicious economic consequences. It may also have negative impacts on social welfare and workers' productivity (Allen et al. (2013)). Overskilling is usually linked to lower wages and ine cient allocation of resources (McGuinness et al. (2018)), while underskilling may contribute to involuntary job loss during economic downturns (Nyström et al. (2018)).

As with many economic forces, skill mismatch may have a more profound e ect on population groups that are already at a disadvantage in the labor market one such group is the Aboriginal peoples of Canada. In addition to the challenges that these peoples face on Canadian labor market, they have historically retained strong ties with their reservations, so even those of them living o -reserves may experience a spatial constraint compelling them to choose jobs that do not match their skills. The di erentials between the Aboriginal peoples of Canada and other Canadian born are not uniform and depend on many socio-demographic characteristics (see Pendakur and Pendakur (2011

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sample size for Inuit is too small to make sensible comparisons. As for the underskilling, we find that First Nations males are almost twice more likely to be underskilled in literacy in comparison to non-Aboriginal Canadian born, while First Nations females are twice more likely to be underskilled in numeracy, with the latter effect being stronger. We also find that Inuit males and females are much more likely to be underskilled in both literacy and numeracy. One of the main driving forces of underskilling is education, so our findings further solidify the importance of policies promoting the availability of education and heterogeneous training programs for the Indigenous peoples of Canada.

In addition to hazardous economic effects, both overskilling and underskilling may be a sign of workplace discrimination that requires different policy remedies. For example, overskilling may be tackled by policies aimed at removing barriers on the labor market and reforming institutions supporting inefficient structures of corporate governance. Underskilling, on the other hand, may be alleviated by provision of targeted training programs and further improvement of access to education. On the Canadian labor market workers with high educational attainment are more likely to be overskilled while recent immigrants, women and older workers are more likely to be underskilled (Mahboubi (2019)). The primary focus of this paper is on the Aboriginal peoples of Canada, but the results reveal that established immigrants are also prone to underskilling. The latter observation may be due to the conflicting effects of aging and time spent in Canada.

Finally, we incorporate mismatch rates into the analysis of wages and find that among all Indigenous peoples of Canada, First Nations males earn significantly less than their non-Aboriginal Canadian-born counterparts. The last observation is consistent with the previous findings (George and Kuhn (1994), Kuhn and Sweetman (2002)).

2 Literature Review

An extensive literature has documented that Indigenous peoples face challenges in the Canadian labor market. For example, George and Kuhn (1994), Kuhn and Sweetman

(2002), Pendakur and Pendakur (2011), Frenette et al. (2011) and Lamb (2013) nd negative earnings di erentials and lower rates of employment in comparison to the rest of the Canadian population[1]. All these papers point to education as the major impediment in the integration of Aboriginal peoples into the Canadian labor market. This situation is not unique to Canada. Similar tendencies have been documented for other countries, such as Australia (Jones (1993), Halchuk et al. (2006)) and the United States (Gitter and Reagan (2002)).

Education is undoubtedly an important factor contributing to the observed disparities in the labor market for Aboriginal peoples, but as noted by Hu et al. (2019), there are deeper reasons linked to information-processing skills, which a ect labor market outcomes and which are not necessarily connected to formal education. Literacy and numeracy skills, for example, up until recently were hard to quantify, and they remained under the shroud of unobserved heterogeneity. Programme for the International Assessment of Adult Competencies (PIAAC) is aimed at measuring skills of individuals and helps to illuminate certain outcomes of Indigenous peoples from di erent angles. Previous surveys that measured skills (PISA, ALLS and IALS) are not as comprehensive. PIAAC encompasses adults 16-65 years old and measures their skills across three domains of information-processing skills (discussed below).

It is not surprising that skills are innately linked to earnings for most people. Finnie and Meng (2002) nd that lower literacy levels account for a large income gap across many minority groups in Canada. Bonikowska et al. (2008) and Ferrer et al. (2006) show that the income gap between immigrants and the Canadian born is largely de ned by di erences in their literacy levels, even though the return on literacy is the same. Hanushek et al. (2015) show that for every population group earnings rise with an increase in information-processing skills. Mahboubi et al. (2017) nd that Canadian Indigenous peoples have lower skills in comparison to non-Aboriginal populations, and this gap is largely de ned by di erences in attained education. Arriagada and Hango

[1]Additional evidence is provided by Drost (1994), De Silva (1999), Walters et al. (2004) Hossain and Lamb (2012) and Feir (2013).

(2016) argue that in some instances highly skilled representatives of First Nations are still less likely to be employed than low-skilled non-Aboriginal populations. Finally, Biswal (2008

analysis. Section 6 examines how skill mismatch a ects wage di erentials among di erent population groups, and section 7 concludes.

3 Data Description

We employ microdata from the Canadian sample of the 2012 PIAAC survey, which was developed by the OECD and was conducted in more than 30 countries. PIAAC belongs to the family of surveys measuring competencies, e.g. the Program for International Student Assessment (PISA), International Adult Literacy Survey (IALS) and Adult Literacy and Lifeskills Survey (ALLS). It combines the best practices of the previous designs and measures adults' (16-65 years old) competencies across three information-processing domains: literacy, numeracy and problem-solving in technologically rich environments (PTRE). The survey de nes literacy as understanding, evaluating, using and engaging with written texts to participate in society, to achieve one's goals, and to develop one's knowledge and potential ; numeracy as the ability to access, use, interpret and communicate mathematical information and ideas, in order to engage in and manage the mathematical demands of a range of situations in adult life ; and PTRE as the ability to use digital technology, communication tools and networks to acquire and evaluate information, communicate with others and perform practical tasks . Respondents were able to choose paper- or computer-based tests in literacy and numeracy, but PTRE was administered only on computers. Hence, people who refused computer-based testing or did not have any computer experience did not participate in PTRE testing.[4]

Each domain of the information-processing skills is represented by ten plausible values measuring the skills of participating individuals on the scale from 0 to 500.[5] It is common in the design of competency tests to have an algorithm guiding each respondent

[4] Around 80% of non-Aboriginal populations have participated in computer-based testing. For Aboriginal peoples this indicator is lower (65-70% depending on the group).

[5] More information on the type of questions and scores interpretation is available from the PIAAC Reader's Companion.

through a subset of the test items, which helps to reduce the length of the assessment and increase participation. All answers are used to estimate a psychometric model based on Item Response Theory (IRT) (De Ayala (2013), Jakubowski (2013)). The purpose of the IRT model is to estimate respondents' unobserved abilities in each domain (literacy, numeracy and PTRE) using information on their observed performance in tasks that are associated with each domain. The number of potential tasks is in nite, and only their nite subset may be tested in practice. Hence, competency scores are imputed for respondents in tasks that they did not directly participate in, and plausible variables are designed to account for potential errors due to the imputation process. This methodology is meaningful for the whole population, but not for any single individual.

The survey contains information on 27,285 Canadians, which, combined with the implemented weights, represent around 24 million individuals aged 16-65 years. Oversampling of Indigenous peoples and immigrants allowed for the creation of representative samples of these groups (5,378 and 4,389 respectively). In addition to the information on latent plausible variables measuring competencies across the three domains, the survey also includes a rich background questionnaire comprising information on a large array of socio-demographic characteristics of respondents. The design of the survey utilizes the jackknife replication method with one unit removed to derive appropriate weights and variance estimates (with 80 replicate weights for each individual). To account for the sampling method, jackknife standard errors are

Canadian born (Xu et al. (2017)). As shown in this paper and other studies, this also holds true for overskilling and underskilling rates (Calhoun (2015), Mahboubi (2019)). When analyzing wage, we include only respondents who reported hourly earnings between 5$ and 1000$ Self-employed individuals did not report any earnings, so they were excluded from this analysis.

We do not include PTRE domain into our analysis by two reasons. First, the methodology for the employed methods of measuring skill mismatch in this paper has been developed only for literacy and numeracy. Second, around one third of Aboriginal peoples did not participate in computer-based testing, which would further decrease the statistical power of the analysis. We found that underskilling rates in literacy are higher for respondents who refused to take computer-based testing, so it is possible that the overskilling rates in literacy are slightly overestimated.

Finally, one of the main limitations of the PIAAC data is that Indigenous peoples of Canada are represented by Metis, Inuit and First Nations who live exclusively o -reserve. According to the 2011 National Household Survey only around 25% of Indigenous peoples live on reserves. However, it is exactly those people, who account for a large share of socio-economic discrepancies observed in the labor market (Pendakur and Pendakur (2011)). This should be kept in mind when interpreting the results of this analysis.

4 Methodology

There are no ideal measures of skill mismatch. Each method has its own advantages and disadvantages. Our methodology builds on Verdugo and Verdugo (1989) and research on skill mismatch discussed in the introduction. Any employed individual possesses certain skills, and a job has certain skill requirements. The di culty with measuring skill mismatch is that there are no perfect measures of either, so comparing them is even more challenging. Skill mismatch occurs when a worker's skills do not match the skills required by the job. PIAAC provides a measure of a worker's skills in

interest discerning between di erent population groups and a set of controls. The nal estimates are produced by averaging out the results among ten regression equations:

$$OS_{i;j}\ (US_{i;j}) = \quad _0 + \quad ^a_1 A_i + \quad ^b_2 I_i + \quad X_i + \quad _i \tag{1}$$

where $OS_{i;j}\ (US_{i;j})$ is a set of ten dummy variables of being either overskilled (underskilled) or not for each of the plausible values[7] $^a_1$ is a set of dummy variables for three Indigenous groups (A), i.e. Metis, Inuit and First Nations. $^b_2$ is a set of dummies for immigrants (I), including recent immigrants who landed in Canada ve or less years before the survey, and established immigrants, who landed in Canada more than ve years before the survey. The reference group is non-Aboriginal Canadian born. is a vector of coe cients for controls including age, education, marital status, number of children, parents' education, province, full- or part-time employment, and self-reported language ability.

We also run separate regressions for a subsample including only Indigenous peoples, which allows us to compare groups of Aboriginal populations amongst themselves.

$$OS^A_{i;j}\ (US^A_{i;j}) = \quad _0 + \quad _1 I_i + \quad _2 M_i + \quad X_i + \quad _i \tag{2}$$

where I_i de nes Inuit, M_i Metis, and First Nations is the reference group. For overskilling, we do not run another set of regressions for a di erent reference group (Metis), because there are almost no overskilled Inuit in the sample, so that exercise would be redundant. For underskilling, we provide additional results for a di erent reference group (Metis).

4.2 OECD method

The OECD method is based on Pellizzari and Fichen (2013) and is similar to the previous approach, because it aims at identifying variation in the skill requirements

[7] Note that in this case the reference group is the people who are matched, which does not include underskilled individuals.

be much broader. Finally, this method assumes that the skill distributions among underskilled, matched and overskilled workers are non-overlapping, when in practice it is hardly the case. In fact, Allen et al. (2013) shares these concerns indicating that relying on well-matched workers is redundant in practice.

4.3 Krahn and Lowe Method

In this section we develop a measure of skill mismatch based on Krahn and Lowe methodology (Krahn and Lowe (1998)). We identify skills required by a job based on how frequently individuals carry out di erent tasks in literacy and numeracy at their workplaces. The latter information is contained in the survey: the respondents are asked how frequently they perform various activities in one of the information-processing domains. For literacy, an example would be reading (and writing) reports, journals, nancial statements, diagrams, maps or schematics and other publications; for numeracy using a calculator, preparing charts, applying simple algebra or advanced math/statistics etc. There are around 15 questions in total.

The frequency of using each of the activities is measured on a scale from 1 (never use) to 5 (use every day). We subdivide activities into three categories: reading, writing, and numeracy and then calculate the average among the answers within each of the groups rounding it to the lowest integer. As a result, we derive 4 skill levels required by the job with 1 being the lowest required skill level and 4 being the highest required skill level. The received values for reading and writing groups are averaged to produce a literacy index. Without any further alterations, the value for the numeracy group is transformed into a numeracy index.

Using calculated literacy and numeracy indices as a proxy for the required skill level, we then compare these with the respondents' actual skills as measured by the test

4[9]. A two-level di erence between the required and the actual skill level constitutes a skill mismatch.[10] For example, if a respondent has a skill level 1 in literacy, and the required skill level in literacy for the job is 3 or 4, then this worker will be deemed as underskilled. Likewise, if a worker's skill in numeracy is 4, and the job requirement in numeracy is skill level 2 or 1, then he/she will be deemed as overskilled.

As previously, we estimate two regressions one for the whole sample and a second for subsample of Aboriginal peoples using the developed measures of overskilling and underskilling in this section. The main shortcoming of this approach is that it equalizes the frequency with which a worker uses skills at the job with the skills actually required by his/her job. However, the particular skills of the worker have most likely selected him/her into the position requiring a di erent frequency for using those skills. Allen et al. (2013) show that there is indeed positive correlation between the two. In addition, the way calculated literacy and numeracy indices are matched to respondents' skill levels is somewhat arbitrary, because they are measured on di erent scales.

5 Results

Tables 1 and 2 present summary statistics for the sample revealing a stark di erence in the observed distributions of socio-demographic characteristics between Inuit and other population groups. In particular, we see that Inuit education is signi cantly skewed toward lower levels (Hu et al. (2019) also point this out), and most of the sample is concentrated in the territories. They are younger, and more than 60% do not have a single parent who attained upper secondary education. Other Indigenous peoples are to a larger extent in line with non-Aboriginal Canadian born, with the exception of their location across provinces and the presence of a spouse.

Table 3 provides average unconditional scores in literacy and numeracy eBl2u0 0 1 RG

di erent population groups. It is not clear if there is signi cant di erence between the

be the case. First Nations, on the other hand, have the highest underskilling rates in

to socio-demographic characteristics. To do that, we estimate an adapted version of the regression speci ed by Hu et al. (2019), where we gradually add ancillary controls:

$$\ln w_i = {}_0 + {}^{a}_{1}A_i + {}^{b}_{2}I_i + {}^{c}S^{l;n}_{ij} + {}^{d}OS^{l;n}_{ijk} + X_i + {}_i \qquad (3)$$

where $\ln w_i$ is the natural logarithm of hourly wage. In addition to dummies for Aboriginal peoples (A_i) and immigrants (I_i) as well as controls for socio-demographic variables, this regression also includes a respondent's skill level in both literacy and numeracy ($S^{l;n}_i$) and whether he/she is over- or underskilled in literacy and numeracy ($OS^{l;n}_i$). Subscript i indicates the unique observation$j = 1;::::;10$ stands for plausible values, and$k = f\,RM;OECD;K\ \&\,Lg$ represents measures of overskilling calculated based on the discussed methods: realized matches, OECD, and Krahn and Lowe.

7 Conclusion

An extensive literature has documented that the Aboriginal peoples of Canada face challenges on the labor market. In addition to a potentially larger impact of economic forces on their well-being, Indigenous populations are unique in their ties with home reservations. The combination of those two factors may contribute to a more prevalent skill mismatch. The focus of this paper is on the skill mismatch rates among the Indigenous peoples of Canada. Using the PIAAC survey we have constructed several measures of skill mismatch and compared over- and underskilling rates across di erent population groups. We showed that there is a large degree of variation in over- and underskilling rates for Canadian Aboriginal peoples, especially across di erent provinces. We have also tested whether Aboriginal peoples were more likely to be over- or underskilled than non-Aboriginal Canadian born and we did not nd any signi cant di erences in the overskilling rates (except for a small e ect for First Nations males in numeracy). For underskilling, however, we nd that First Nations males are almost twice as likely to be underskilled in literacy, and First Nations females are twice as likely to be underskilled in numeracy. Inuit peoples are signi cantly more likely to be underskilled in both literacy and numeracy unconditional of the gender.

Each of the three measures of skill mismatch that was used in this analysis has advantages and disadvantages. Both those skills required by a profession and those skills possessed by an individual are unobservable and di cult to measure. Identifying a mismatch between the two is an even greater challenge. We have employed several methods to measure skill mismatch, and they all showed some variation in the over- and underskilling rates among the groups of Aboriginal peoples. While not all signi cant, the estimates produced by these various methods were similar. We believe that despite the discussed shortcomings of each of the methods individually, together they provide compelling evidence that underskilling is serious issue for the Aboriginal peoples of Canada. This issue can be addressed through policies aimed at further improving access to education and providing various training programs. The latter should take

into account the revealed gender di erences in literacy and numeracy.

Lastly, we have examined the wage di erentials among di erent population groups controlling for the skill mismatch. Previous research has shown that wage di erentials are larger for Aboriginal peoples' males than females. Controlling for over- and underskilling in literacy and numeracy did not change the picture. First Nations males and females were still found to earn lower wages in comparison to non-Aboriginal Canadian born. These gaps were larger for males who were overskilled, and for females who were underskilled.

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Table 2: Summary statistics, females

	First Nations	Metis	Inuit	Rec. imm.	Est. imm.	Can. born
Education						
Less than high school diploma	11.89	8.39	46.94	2.66	6.44	6.92
High school diploma	20.06	21.7	15.65	10.36	12.77	19.7
Below bachelor's degree	45.62	47.67	29.93	23.67	27.62	43.18
Bachelor's degree	17.83	17.44	7.48	38.17	33.86	22.31
First prof. degree, master's or PhD	4.61	4.79	0	25.15	19.31	7.89
O cial language ability						
Poor or can't speak	0	0	0	3.25	3.86	0
Fair	0	0	0	13.91	10.19	0
Good	0	0	0	27.22	23.74	0
Very good	100	100	100	55.62	62.22	100
Spouse						
No spouse	32.83	23.82	31.65	15.71	14.18	16.01
Has a spouse	67.17	76.18	68.35	84.29	85.82	83.99
Age group						
25-34 years	21.69	22.77	39.19	47.63	16.62	21.41

Table 3: Mean literacy and numeracy scores for di erent population groups

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Mean	SE	Mean	SE	Mean	SE	Mean	SE
First Nations	258.1	(4.659)	262.4	(5.348)	248.1	(5.225)	240.5	(6.848)
Metis	274.6	(4.879)	282.4	(4.406)	269.2	(5.103)	262.9	(4.747)
Inuit	226.1	(12.14)	225.7	(10.70)	215.1	(12.87)	203.2	(10.33)
Recent Immigrants (5 years since landing)	261.6	(4.227)	259.5	(3.821)	263.8	(4.651)	245.4	(3.847)
Established Immigrants (> 5 years since landing)	262.1	(2.222)	257.0	(2.635)	264.3	(2.351)	245.7	(2.582)
Non-Aboriginal Canadian Born	284.6	(1.128)	285.8	(1.162)	282.9	(1.106)	272.2	(1.263)

Notes: the table provides survey-weighted means averaged across ten plausible values. Jackknife standard errors are in parenthesis.

Table 4: Overskilling rates for di erent population groups

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Percent	SE	Percent	SE	Percent	SE	Percent	SE
Realized Matches								
First Nations	11.803	(4.003)	10.691	(3.353)	10.415	(2.682)	7.201	(2.807)
Metis	21.102	(5.621)	17.301	(5.853)	21.810	(5.413)	11.391	(4.046)
Inuit								
Recent Immigrants (5 years since landing)	14.757	(2.925)	11.977	(3.335)	20.419	(4.301)	11.323	(2.870)
Established Immigrants (> 5 years since landing)	11.973	(1.741)	9.019	(1.967)	15.873	(1.977)	9.042	(2.045)
Non-Aboriginal Canadian Born	20.957	(1.005)	16.741	(0.978)	21.740	(1.047)	14.222	(1.033)
OECD Method								
First Nations	3.525	(1.487)	3.645>-326(di(.48e51)-2644(14.222)-2645((1.033))]TJ/F80 5.9776 Tf 0 -15.94 Td [(O1y)36 c8)]TJ/F80 5.9 30					
5 years since landing)	>15.757	(2.f 7.878	11.977	(3.33a545(þ76 Tf 0 -15.97325((4.30 c8)]T88080 5.9 30aT56634Non-Ab)-32(or1ts)-l Cana724N				
Recent Immigrants (5								

Table 6: Odds of being overskilled, full sample, di erent methods

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Realized Matches								
First Nations	0.672	(0.506)	0.722	(0.428)	0.536*	(0.366)	0.563	(0.497)
Metis	1.349	(0.404)	1.029	(0.558)	1.248	(0.406)	0.806	(0.463)
Inuit								
Recent Immigrants (5 years since landing)	0.524*	(0.336)	0.422*	(0.440)	0.629	(0.319)	0.446*	(0.466)
Established Immigrants (> 5 years since landing)	0.469***	(0.218)	0.448**	(0.342)	0.564**	(0.258)	0.416**	(0.414)
OECD Method								
First Nations	0.528	(0.543)	0.768	(0.493)	0.465	(0.539)	0.401	(0.873)
Metis	2.018	(0.515)	0.980	(0.722)	1.722	(0.554)	0.735	(1.114)
Inuit								
Recent Immigrants (5 years since landing)	0.533	(0.457)	0.547	(0.597)	0.663	(0.409)	0.530	(0.740)
Established Immigrants (> 5 years since landing)	0.477*	(0.375)	0.505	(0.556)	0.571*	(0.321)	0.554	(0.628)
Krahn and Lowe Method								
First Nations	1.347	(0.555)	0.974	(0.448)	1.206	(0.423)	0.662	(0.425)
Metis	1.173	(0.476)	1.507	(0.534)	0.903	(0.328)	0.918	(0.449)
Inuit								
Recent Immigrants (5 years since landing)	0.612	(0.624)	0.497	(0.495)	0.840	(0.341)	0.333***	(0.326)
Established Immigrants (> 5 years since landing)	0.550	(0.401)	0.582	(0.342)	0.772	(0.237)	0.627**	(0.227)

Notes: statistical signi cance is represented by * for 10%, ** for 5% and *** for 1%. Reference group is non-Aboriginal Canadian born. Jackknife standard errors are in parenthesis. Controls include age, education, children, self-assessed language ability, parents' education, spouse, full- or part-time employment, and province of residence.

Table 7: Odds of being underskilled, full sample, di erent methods

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Realized Matches								
First Nations	1.821**	(0.290)	1.570	(0.279)	1.744	(0.407)	2.059***	(0.270)
Metis	1.310	(0.471)	0.852	(0.361)	1.224	(0.424)	1.015	(0.374)
Inuit	5.963*	(0.960)	5.002***	(0.539)	7.525**	(0.980)	5.153***	(0.550)
Recent Immigrants (5 years since landing)	2.585**	(0.371)	3.381***	(0.273)	2.835***	(0.360)	3.770***	(0.265)
Established Immigrants (> 5 years since landing)	2.288***	(0.216)	2.680***	(0.255)	2.479***	(0.247)	2.414***	(0.223)
OECD Method								
First Nations	1.797	(1.204)	1.671	(1.038)	2.303	(0.998)	2.071	(0.671)
Metis	0.956	(1.018)	0.857	(0.721)	0.958	(0.995)	0.859	(0.651)
Inuit	3.069	(0.695)	6.078	(1.156)	3.936*	(0.779)	5.187**	(0.807)
Recent Immigrants (5 years since landing)	4.105*	(0.750)	4.200**	(0.698)	2.914	(0.766)	3.795*	(0.771)
Established Immigrants (> 5 years since landing)	3.530**	(0.559)	3.439**	(0.522)	3.751**	(0.614)	3.107**	(0.495)
Krahn and Lowe Method								
First Nations	1.610	(0.530)	2.047	(0.435)	1.539	(0.481)	1.394	(0.296)
Metis	0.933	(0.531)	1.218	(0.403)	0.819	(0.501)	0.927	(0.351)
Inuit	1.346	(0.600)	4.466***	(0.539)	4.210	(1.612)	1.047	(0.528)
Recent Immigrants (5 years since landing)	1.464	(0.407)	3.847***	(0.423)	1.871	(0.419)	3.178***	(0.393)
Established Immigrants (> 5 years since landing)	1.661*	(0.296)	3.561***	(0.342)	2.093***	(0.276)	2.372***	(0.265)

Notes: statistical signi cance is represented by * for 10%, ** for 5% and *** for 1%. Reference group is non-Aboriginal Canadian born. Jackknife standard errors are in parenthesis. Controls include age, education, children, self-assessed language ability, parents' education, spouse, full- or part-time employment, and province of residence.

Table 8: Odds of being overskilled, subsample of Aboriginal peoples

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Realized Matches								
Intercept	0.245	(1.974)	0.778	(1.745)	0.191	(1.618)	0.215	(1.551)
Metis	1.493	(0.747)	1.534	(0.820)	1.479	(0.615)	1.580	(0.602)
Inuit								
25-34 years	1.206	(1.199)	0.465	(1.244)	1.795	(0.760)	1.906	(0.737)
45-54 years	1.634	(1.156)	0.663	(0.762)	1.171	(0.974)	1.142	(0.962)
55-65 years	1.706	(1.079)	1.118	(1.072)	1.427	(1.083)	1.268	(1.159)
No children	1.252	(0.891)	1.177	(0.848)	1.030	(0.896)	1.097	(0.916)
Youngest child > 12 years	0.608	(0.973)	0.710	(0.757)	0.748	(0.932)	0.803	(0.992)
Less than high school diploma	0.138	(1.714)	0.136	(1.844)	0.112	(1.462)	0.136	(1.528)
High school diploma	0.543	(1.163)	0.436	(0.979)	0.153	(1.156)	0.166	(1.181)
Below bachelor's degree	0.590	(0.983)	0.381	(0.640)	0.402	(0.839)	0.409	(0.824)
First prof. degree, master's or PhD	0.723	(1.868)	0.559	(1.001)	0.220	(1.701)	0.350	(1.589)
Employment type	0.741	(0.847)	0.670	(0.745)	0.788	(1.096)	0.639	(1.022)
Neither attained upper secondary	0.480	(0.861)	0.345	(0.893)	0.537	(0.910)	0.592	(0.841)
One attained post-sec. non-tertiary	0.657	(0.787)	0.703	(0.717)	1.048	(0.694)	0.978	(0.686)
Atlantic provinces	1.119	(1.204)	0.994	(1.036)	0.730	(1.506)	0.724	(1.465)
Quebec	1.460	(1.628)	0.876	(1.508)	1.135	(1.453)	0.945	(1.448)
Prairies	1.943	(1.019)	0.900	(0.838)	2.142	(0.664)	1.790	(0.739)
British Columbia	2.044	(1.082)	0.858	(1.082)	2.393	(0.934)	1.937	(0.982)
Territories	0.922	(1.394)	0.590	(1.301)	0.710	(1.345)	0.705	(1.324)
Has a spouse	0.852	(0.863)	1.021	(0.958)	1.470	(1.079)	1.495	(1.073)
Urban status	1.904	(1.054)	0.871	(1.084)	2.514	(0.892)	2.260	(0.877)
OECD Method								
Metis	0.890	(0.721)	0.944	(0.739)	1.334	(0.709)	1.334	(0.709)
Inuit								
Krahn and Lowe Method								
Metis	0.892	(0.672)	0.873	(0.682)	1.021	(0.502)	1.211	(0.565)
Inuit								

Notes: statistical signi cance is represented by * for 10%, ** for 5% and *** for 1%. Reference groups are as follows: Aboriginal peoples First Nations, age 35-44 years old, children youngest child 12 years, education bachelor's degree, parents' education at least one parent has attained tertiary, province Ontario, spouse no spouse, employment type full-time, urban status rural. OECD and Krahn and Lowe Methods include the same controls. Jackknife standard errors are in parenthesis.

Table 10: Odds of being underskilled, subsample of Aboriginal peoples, di erent reference group

	Literacy				Numeracy			
	Male		Female		Male		Female	
	Odds	SE	Odds	SE	Odds	SE	Odds	SE
Realized Matches								
First Nations	0.598	(0.321)	1.609	(0.482)	1.378	(0.608)	1.837	(0.479)
Inuit	0.285	(1.430)	2.103	(0.714)	6.082	(1.428)	2.508	(0.755)
OECD Method								
First Nations	1.519	(0.891)	1.519	(0.891)	1.590	(0.898)	1.913	(0.787)
Inuit	1.160	(1.170)	1.160	(1.170)	1.567	(1.734)	3.638	(1.736)
Krahn and Lowe Method								
First Nations	1.657	(0.738)	1.588	(0.760)	1.431	(0.635)	1.303	(0.597)
Inuit	0.940	(0.999)	1.033	(0.999)	4.928	(2.152)	1.385	(1.728)

Notes: statistical signi cance is represented by * for 10%, ** for 5% and *** for 1%. Reference group for Aboriginal peoples Metis. Controls include age, education, children, self-assessed language ability, parents' education, spouse, full- or part-time employment, and province of residence. Jackknife standard errors are in parenthesis.

Table 11: Overskilling rates by province of residence

Atlantic Region		Quebec		Ontario		Prairies		British Columbia		Territories	
Percent	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE	Percent	SE

Table 13: Di erences in Log Hourly Wages

	Basic Controls		+ Education		+ Skills Noc WorkExp		+ Overskilling		+Underskilling (-Overskilling)	
	Est.	SE	Est.	SE	Est.	SE	Est.	SE	Est.	SE
Males										
First Nations	-0.220***	(0.038)	-0.138***	(0.033)	-0.129***	(0.041)	-0.153***	(0.048)	-0.127***	(0.048)
Metis	-0.088***	(0.032)	-0.038	(0.035)	-0.017	(0.040)	-0.030	(0.048)	-0.003	(0.041)
Inuit	-0.115	(0.137)	0.036	(0.147)	0.130	(0.123)	0.203	(0.208)	0.075	(0.141)
Recent Immigrants	-0.251***	(0.044)	-0.388***	(0.047)	-0.258***	(0.043)	-0.269***	(0.054)	-0.286***	(0.050)
Established Immigrants	-0.037	(0.039)	-0.111***	(0.040)	-0.067*	(0.039)	-0.075*	(0.041)	-0.084*	(0.048)
R^2	0.274		0.380		0.464		0.488		0.459	
Observations	5952		5559		5202		4195		4027	
Females										
First Nations	-0.170***	(0.033)	-0.110***	(0.033)	-0.078**	(0.031)	-0.057*	(0.035)	-0.084***	(0.035)
Metis	0.018	(0.061)	0.082	(0.072)	0.113	(0.079)	0.090	(0.092)	0.139	(0.097)
Inuit	-0.124	(0.082)	0.029	(0.078)	0.093*	(0.053)	0.170*	(0.095)	0.079	(0.057)
Recent Immigrants	-0.101**	(0.043)	-0.259***	(0.046)	-0.101**	(0.042)	-0.121**	(0.054)	-0.089*	(0.046)
Established Immigrants	0.014	(0.033)	-0.068**	(0.031)	0.019	(0.028)	0.022	(0.035)	0.030	(0.032)
R^2	0.229		0.382		0.449		0.464		0.443	
Observations	6487		6047		5294		4004		4491	

Notes: statistical signi cance is represented by * for 10%, ** for 5% and *** for 1%. Reference group is non-Aboriginal Canadian born. Jackknife standard errors are in parenthesis. Basic controls include age, children, self-assessed language ability, parents' education, spouse, full- or part-time employment, and province of residence. Skills, overskilling, and underskilling include both literacy and numeracy. The results for over- and underskilling are presented only for the realized matches approach. Other methods provide similar estimates, and are available on request.