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Abstract

This paper studies the difference in task supplies and economic status between natives and two generations of immigrants. I estimate differences in task supply and earnings between natives and immigrants in 1970 and 2015, which are the beginning and end of the fifth (and current) wave of immigration to Canada. Furthermore, using a three-fold Blinder-Oaxaca decomposition, I link the average weekly wage of workers to their task productivity, and try to find the effects of the returns to tasks as well as different task supplies on the average wage gap between natives and immigrants. Finally, I use ordered probit and logit models to demonstrate and measure the significant effects of immigrant status on an employee's labor market segment.

1 Introduction

According to Statistics Canada, Canada is currently experiencing its "fifth wave" of immigrants, which began in the 1970s. In this wave, immigrants have overwhelmingly been members of visible minorities from the developing world. This was influenced by the 1976 revision of the Immigration Act, which continues to be official government policy. Historically, the majority of immigrants coming to Canada were from Europe. As time passed, the number of new European immigrants entering the country steadily declined, while the number of immigrants originating from South and South-East Asia (India, China, the Philippines, and so on) rose dramatically. By the 1980s, these Asians became the largest ethnic group immigrating to Canada. Canadians do not have the stereotypical American "melting pot" and instead enjoy ethnic diversity. Canada is a multicultural society that depends on immigration as its key source of labor force growth (Bloom et al 1995, Baker and Benjamin 1994). There has been a lot of research on immigrants' performance in the North American labor market. Research on this topic has evolved from the original cross-sectional evidence on immigrants' economic assimilation (Chiswick 1978) through the study of the qualities of different immigration cohorts (Borjas 1985) to controversies over measurement issues (Lalonde and Topel 1992) and subsequent studies (Borjas 1993). Peri and Sparber (2009) define two intermediate tasks (communication and manual tasks) supplied in each occupation using O*NET data to study the effect of the immigrant share on native workers' provision of these two tasks in the US labor market. Following this research, I study the economic outcomes of different generations of immigrants to see if I can find any differences between the first generation immigrants and their children in the Canadian labor market. The outcomes I will focus on are earnings and task usage.

Chiswick (2003) argues that there is evidence of positive selection bias in migration in the US, that is, individuals who are relatively more skilled than their peers in their home country are more likely to migrate to the US. If this positive selection bias is present among immigrants in the US, then one could argue that selection bias should play an even greater role in Canada. US immigration policy emphasizes family unification to a greater extent than Canadian immigration policy. Canada's "point system" does take family ties into account, but substantial consideration is given to the amount of human capital attained by applicants (Baker and Benjamin, 1994). The goal of this stringent evaluation process is to simultaneously minimize racial discrimination when determining the eligibility of foreigners and to ensure that those who are entering into Canada can make a positive contribution to the economy. Therefore it may be

that second generation immigrants in Canada have higher levels of ability and motivation relative to third generation (and higher) immigrants if these traits are transmitted from parents to children. Black et al (2005) also suggested that "unobserved parental characteristics", such as patience or attitudes, could influence the development of children. Moreover, Warman et al (2019) claims that, although recent immigrants to Canada have had some difficulty fully realizing their potential suggested by their high levels of pre-immigration human capital, their children have integrated well and in many cases have surpassed the outcomes of the third or higher generation.

In this paper, I study differences in the economic performance of natives, and first generation immigrants, and second generation immigrants in 1970 and 2015. I choose the years 1970 and 2015 because they are the beginning of the fifth wave of immigration and the most recent census year in Canada, respectively. In addition to earnings, I compare the task supply performance of natives (third generation or more) and first and second generation immigrants in 1970 and 2015. Then, I link earnings and task supply performance together using a Oaxaca Decomposition. This sheds light on the relative importance of differences in task productivity and differences in the return to task productivity in determining weekly wage differences between natives and two generations of immigrants. Lastly, I investigate differences in the labor market segment that first and second generation immigrants work in. By presenting average marginal effects from ordered probit and logit models, I present the relative probabilities of working in each segment for first generation or second generation immigrants, compared to the third generation or higher (natives).

2 Literature Review

There is a large literature on differences in the outcomes of first generation immigrants, second generation immigrants, and natives. According to Lay and Nguyen (1998), in addition to the general daily hassles encountered by most people, immigrants often face chronic difficulties specific to the acculturation experience, including conflicts with family members, members of the ethnic ingroup, and members of ethnic outgroups. Moreover, it has been suggested that the children of immigrants born in Canada (i.e., second-generation immigrants) may experience different acculturative stressors from their parents (i.e., first-generation immigrants). In the discussion of minority student stressors, Saldaña (1994) includes issues such as the perceived lack of support from members of the ethnic ingroup, difficulties in romantic relationships with members of the ingroup (particularly the availability of dating partners), and being perceived

by the ethnic ingroup as behaving too much like outgroup members. Pawliuk, Grizenko, Chan-Yip, Gantous, Mathew, and Nguyen (1996) found that, although children's acculturation style was not related to their psychological functioning, the parents' acculturation style was an important predictor of their children's functioning.They argued that, because children were more acculturated into the mainstream society than their parents were, the more accepting parents were of the majority culture, the healthier was the psychological functioning in children. In their study of Chinese-Canadian youths, Lay and Verkuyten (1999) found that the life experience of these adolescents, particularly whether they are Canadian-born or foreign-born, has implications for ethnic identity and self-esteem.

In the US, it is widely believed that the socioeconomic performance of the children of immigrants far surpasses that of their parents. Chiswick (1977) and Carliner (1980) compared the earnings of various generations of workers in the US at a particular point in time, the 1970 decennial census. Borjas (2014) studied wage differentials across generations, and he found that the relative wages of immigrants have declined steadily since 1940, and second generation Americans earn more than both their parents and their children. However, when he controlled for education in the regression models, the difference between first Americans and their children's weekly earnings became much smaller. Borjas (2014) claimed much of the intergenerational progress observed between first and second generations can be explained by differences in educational attainment between these two groups, as the native-born children of immigrants go through the American education system.

Using data from the 1991 Canadian census, Pendakur and Pendakur (1998) concluded that both foreign-born (first generation) and Canadian-born (second generation and higher) visible minorities earned less than Canadian-born Caucasians. They suggested that this wage discrepancy is due to racial discrimination since it cannot be fully explained by observable characteristics. However, Hum and Simpson (1999) discovered no evidence of a wage gap between visible minority and non-visible minority groups. Bloom et al (1995) established that, using pooled 1971, 1981, and 1986 Canadian census data, assimilation was particularly slow for immigrant men from Asia, Africa, and Latin America relative to immigrant men from Europe and the United States.

Aydemir and Sweetman (2007) find that, the second generation in both the US and Canada has very good educational and labor market outcomes, which is similar to, and in some cases better than, the third generation, and clearly much better than the first generation. Meanwhile, they conclude that, in the US, current immigrant characteristics, holding the structure of educational attainment and earnings constant, are associated with lower outcomes in the

future than is the case for the current second generation, whereas in Canada the reverse can be expected. Warman et al (2019) indicate that the criteria employed in Skilled Worker, CEC, and PNP admission categories lead to the selection of immigrants likely to succeed in the Canadian labour market in more nuanced ways than merely choosing those with high education and good language skills in English or French. Their analysis suggests that selecting immigrants based on economic criteria in general and a points system (as in the Skilled Worker category) in particular both improves the outcomes of the Principal Applicant and also leads to higher earnings outcomes for the Child Arrival immigrants once they enter the labour market.

3 Data and Variables

3.1 Data Source

I use two of data sets in this paper. The first is Canadian census data published in the years 1971 and 2016, which refer to the data in the years 1970 and 2016. This data set is collected by Statistics Canada, and contains respondents' characteristics, including age, education attainment, ethnic information, immigration status, occupation, income, and so on. The second data set is the Canadian Career Handbook (CHA), which I will describe in more detail in Section 3.3.

3.1.1 Data Selection

The cleaned data set I use in this paper will only contain individuals who are between the ages of 18-65 and have identified themselves as working mainly full time in the years 1970 and 2015. In addition, I will exclude self-employee workers and those working on farms because I believe these workers' incomes will cause biases in the study since their incomes might not be a base on task supplies and educational attainments. Institution residents and part-time workers are also excluded from this study. Using the CHA data, I am able to classify occupations into labor market segments. Jobs in the Canadian labor market are classified into three segments, the primary upper tier, the primary lower tier, and the secondary segment. The key feature I use to assign occupations to segments is the degree of autonomy and skill professional required by them.

3.2 Independent Variables Description

In my empirical models, I have some key independent variables. I define first generation immigrants as those who were born outside Canada. For second generation immigrants, there are two different definitions. The first one is those born inside Canada with parents both born outside. The second one defines second generation immigrants as those born inside Canada with at least one parent born outside Canada. In this paper, I will use the second definition because I believe that even one foreign-born parent can influence their children with outside culture, ideas, education concepts, and so on. These will make second generation immigrants different from third generation immigrants and higher. Another key independent variable is a worker's language skill. In this paper, I define a worker as not a native speaker (nolang) if his or her most often used language at home is neither English nor French. Moreover, there would be an alternative way to approach the language proficiency variable as using place-specific language indicators (e.g. French for Quebec, both for NB, English for other provinces.), which I will explore in future work. This "nolang" is a dummy variable (nolang=1 means this worker does not speak English or French as a first language.). I believe a person who is capable of speaking the Canadian official languages at home could use them very well at work. Moreover, I have some other control variables in the empirical models including years of schooling, marital status, industry dummies, and metropolitan area dummies (CMAs).

3.3 Task Variables Generation

To assign task supplies to occupations, I will use a data set, the Canadian Career Handbook (CHA), which is also from Statistics Canada. This data set gives values indicating the aptitudes requirement in each occupation. Aptitudes in each occupation are categorized as: General Learning, Verbal, Numerical, Spatial Perception, Form Perception, Clerical Perception, Motor Coordination, Finger Dexterity, and Manual Dexterity. Each aptitude is given one of five values (1-5) to describe its grade among all working population[1]. I generate a new variable to describe the importance of each aptitude. I will use the median of each aptitude's ranking range among the entire working population to represent that aptitude's importance. For example, the median of the highest 10 percent is 0.95. Then, I will replace the value 1 by 0.95. Using this method, I will assign 0.75 for the value 2, 0.50 for 3, 0.25 for 4, and 0.05 for

[1]The value 1 means the aptitude for this occupation is the highest 10 percent among all the working population. The value 2 means the upper third, exclusive of the highest 10 percent. The value 3 means the middle third. The value 4 means the lowest third, exclusive of the lowest 10 percent. The value 5 means the lowest 10 percent.

5.

Next, I can use the aptitude importance variable to define task requirements for each occupation. The task requirement can also be considered the task supply per unit of time or task productivity of employees with this occupation.[2] Similar to what Imai, Stacey and Warman (2019) and Warman and Worswick (2015) did in their papers, I will define three types of tasks: analytical (A), interactive (I), and manual (M). Analytical tasks are defined as a combination of General learning ability (G), numerical ability (N), spatial perception (S), and form perception (P), while interactive tasks are defined by the combination of Verbal ability (V) and clerical perception (Q). Finally, I combine the aptitude importance values of Motor coordination (K), finger dexterity (F), and manual dexterity (M) to define manual task. The method of the combination is to take the mean of these importance values for each type of task.

4 Empirical Framework

To do the empirical work, I estimate the following regression equation:

$$Y = \beta X + \alpha F + \gamma S + \delta C + \varepsilon \tag{1}$$

Y: The outcome variables (Natural logarithm of weekly wages or task supplies by workers).

X: Vector of standard demographic variables (age, age^2, age^3, schooling years/education attainment, language ability, industry, genders, marital status)

F: A dummy variable for first generation immigrants. (1: the first generation. 0: others)

S: A dummy variable for second generation immigrants. (1: the second generation. 0: others)

C: Census Metropolitan Areas (CMA).

To predict the segments first and second generation immigrants will be in, compared to the third generation and higher, I will assume the exact but unobservable human capital based on demographic characteristics for worker i is E_i^* i.e. $E^* = \beta X + \alpha F + \gamma S + \delta C + \varepsilon$ or simply,

[2]Since only full-time workers are included in this study, task supply per unit of time (task productivity) here could be treated as well as the aggregated task supply by a worker.

$E^* = Zw + \varepsilon$. Then, we will have

$$Seg_i = \begin{cases} 1 & if\ E_i^* \leq \theta_1 \\ 2 & if\ \theta_1 < E_i^* \leq \theta_2 \\ 3 & if\ E_i^* > \theta_2 \end{cases} \tag{2}$$

Here, "seg" represents job segments. "seg=1" represents the secondary segment while "2" means primary segment, lower tier, and "3" means primary segment, upper tier. "Z" is the combination matrix of all the independent variables on the RHS.

5 Empirical Results

5.1 Earnings

In this part, I estimate the following equation:

$$lnw = \beta X + \alpha F + \gamma S + \delta C + \varepsilon \tag{3}$$

Where "lnw" represents the natural logarithm of the employee's weekly wage.

The regression estimates presented in Table 1 briefly outline any noticeable differences in weekly wages between the three immigrant generations when controlling for language skill and education in two census years. The base group in each regression consists of third and higher generation immigrants. In this table, there are two columns of results for each year. One controls for observations' educational attainment, while the other does not. In 1970, immigrants in Canada were still overwhelmingly from European, as this year is considered the start of the fifth wave of immigration in Canada. At first glance, it appears that the two columns for this year give us two different results. When education is not controlled for, first generation immigrants look not very different from third and higher generation immigrants, in terms of weekly earnings. The second generation has 3% higher weekly wages than third generation immigrants. Limited proficiency in an official language also leads to a significant reduction in the weekly wage. However, after I control for years of schooling, things turn out to be different. First generation immigrants tend to have a weekly wage 2.2% lower than the third generation. The second generation does not have a very different weekly wage from third generation immigrants (only 1.1% higher) when education is controlled for. The effect of the weakness of language skill on earnings is also weakened when I control for education. The

coefficients on the gender and marital status variables are not affected very much by adding years of schooling to the regression. Female workers tend to earn a lower weekly wage while married workers tend to earn more.

The results suggest that, in 1970, the higher weekly wages of first and second generation immigrants is driven by their higher educational attainment, compared to third generation immigrants. After I control for years of education, first generation immigrants tend to earn a lower weekly wage than third generation immigrants, while second generation immigrants have a similar weekly wage as third generation immigrants. In addition, the lack of official language ability might also result from lower education attainment.

The third and fourth columns in the table present the results for the year 2015. In this year, Canada had been experiencing the fifth immigration wave for more than four decades. More and more immigrants from South Asia, China and the Caribbean were coming to Canada during those years. Because of the points-based immigration system, most immigrants have high educational attainment and a "not bad" Canadian official language ability. Therefore, in the year 2015, things look different from the year 1971. Without controlling for education, first generation immigrants appear to have 6.3% lower weekly wages and second generation immigrants have 2.7% higher wages, compared to third generation immigrants. Controlling for education, the wage gap between first generation immigrants and third generation immigrants widens to 11.5%. However, the wage gap between second generation immigrants and third generation narrows. The weekly wage of second generation immigrants is merely 0.9 percent higher than that of the third generation, controlling for educational attainment. The coefficients on the other three control variables are not affected by controlling for education quite as much.

In 2015, the majority of immigrants in the Canadian labor market were from China, India, South Asia, and other developing countries. First and second generation immigrants appear to benefit from higher educational attainment, compared to the third generation. Controlling for education in the regression, first generation immigrants have an even bigger wage gap relative to the third generation. Meanwhile, second immigrants have earnings quite close to third generation immigrants when they have the same educational attainment. This might be evidence for the assumption that, second generation immigrants are more educated on average than natives (third and higher generation immigrants) in the Canadian labor market in recent years, which is claimed in many places.

These regression results lead to several conclusions about the economic performance of first and second generation immigrants in the Canadian labor market. First, since many recent

immigrants to Canada are from South Asia, China, Caribbean, and similar countries, the difference between the weekly earnings of the first generation and natives appears to be much wider in 2015 than in 1970. However, wage differences between second generation immigrants and natives are quite similar in these two census years, whether or not I control for education. In both years, second generation immigrants appear to obtain a higher wage through higher education attainment. When I control for education in the regressions, the difference between the second and third generations becomes very tiny but still positive. In 2015, official language ability plays a more important role in earnings. Finally, the gender pay gap is much smaller in 2015 than 1970, which might suggest a lessening of gender discrimination in the Canadian labor market.

5.2 Task Supplies

To study differences in task supplies of first and second generation immigrants, I will estimate the following empirical model:

$$T = \beta X + \alpha F + \gamma S + \delta C + \varepsilon \tag{4}$$

Here, T represents the task supplies which is A (analytical), I (interactive), and M (manual).

Table 2 presents results from twelve regressions. These results display differences in the three task supplies (analytical, interactive and manual) between three generations of immigrants in two census years. The differences between the two columns of results for each task supply in each census year is whether industry fixed effects are included in the regression. Each regression includes a control for education. In 1970, the results do not change much with the inclusion of industry fixed effects. In 1970, both first and second generation immigrants supply significantly more analytical tasks than third generation immigrants, although the difference is small. The difference between second and third generation immigrants (0.3%) is not as big as that between the first and third generations (around 0.7%). However, when looking at the supplies of interactive and manual tasks, first and second generation immigrants give the opposite result. Compared to third and higher generation immigrants, first generation immigrants supply fewer interactive tasks but more manual tasks, while second generation immigrants tend to supply more interactive tasks but somewhat fewer manual tasks.

As in 1970, industry dummies do not play an important role in the regressions for the year 2015. Different from 1970, first generation immigrants appear to supply fewer analytical and interactive tasks but more manual tasks than the third generation. Conversely, second

generation immigrants supply more analytical and interactive tasks but fewer manual tasks than the third generation with the baseline being the third generation or more.

Based on the results in this section, if we link wage differences between natives and immigrants to task supply differences, we can draw some interesting conclusions. The wage gap between first generation immigrants and natives is smaller in 1970 than that in 2015. In fact, in 1970, first generations earned more than natives before controlling for education. This may be the result of different immigration source countries and different task supplies from first generation immigrants in these two years. In addition, first generation immigrants and natives could receive different returns to their task supplies when working, which might lead to a lessening of the earnings gap as well. Task supply performance is similar between second generation immigrants in 1970 and 2015, which might partly explain the similarity in the earnings of the second generation and natives in these two years.

5.3 Blinder-Oaxaca Decomposition

In this section, I explore the effect of task supplies on the average earnings gap between the two generations of immigrants and natives. I will apply a decomposition method to do this. Many previous studies use a similar methodology to study systematic differences in labor market outcomes by group (sex, race, and so on). The procedure is known in the literature as the Blinder-Oaxaca decomposition (Blinder (1973); Oaxaca (1973)). It divides the wage differential between two groups into a part that is "explained" by group differences in productivity characteristics, such as education or work experience, and a residual part that cannot be explained by such differences. This "unexplained" part is often used as a measure for discrimination, but it also subsumes the effects of group differences in unobserved characteristics. Most applications of the technique can be found in the labor market and discrimination literature (for meta studies, see, e.g., Stanley and Jarrell (1998) or Weichselbaumer and Winter-Ebmer (2005)). However, the method can also be useful in my study. I will apply a threefold decomposition method, which I will describe in detail below.

5.3.1 Methods and Formulas

Given two groups, 1 and 2; outcomes of these two groups, Y_1 and Y_2; and a combination of predictors. In my study, these two groups are either first generation immigrants and natives or second generation immigrants and natives. Outcomes are (log) weekly wages of natives, first generation immigrants, and second generation immigrants, and are denoted w_n, w_f, and w_s,

respectively. Task productivity variables and demographic characteristics such as age, female, education and so on are predictors.

Now, I can derive the the mean outcome difference as

$$\begin{aligned} R &= E(Y_1) - E(Y_2) \\ &= E(w_i) - E(w_n) \end{aligned}$$

Where i∈(f,s), n=natives, f=the first generation immigrants, s=the second generation immigrants, and w is log weekly wages.

Now, I assume

$$w_i = X_i'\beta_i + \varepsilon_i \tag{5}$$

Where i=n,f,s; X is a matrix of independent variables including task variables and the independent variables in Equation (4). I can derive the native-first generation immigrant wage gap (see Winsborough and Dickinson (1971); Jones and Kelley (1984); and Daymont and Andrisani (1984)) which is

$$\begin{aligned} R_1 = E(w_{f)} - E(w_n) = \underbrace{\{E(X_f) - E(X_n)\}'\beta_n}_{endowments} + \underbrace{E(X_n)'(\beta_f - \beta_n)}_{coefficients} + \\ \underbrace{\{E(X_f) - E(X_n)\}'(\beta_f - \beta_n)}_{interactions} \end{aligned} \tag{6}$$

This is a "threefold" decomposition; that is, the outcome difference is divided into three components: endowments effects, coefficients effects, and interactions effects. Since in this paper, I just want to study the effects of the task supply productivity on the wage differences, Equation (6) could be rewritten as

$$\begin{aligned} R_1 = E(w_{f)} - E(w_n) = \underbrace{\{E(T_f) - E(T_n)\}'\eta_n}_{endowments} + \underbrace{E(T_n)'(\eta_f - \eta_n)}_{coefficients} + \\ \underbrace{\{E(T_f) - E(T_n)\}'(\eta_f - \eta_n)}_{interactions} + \upsilon \end{aligned} \tag{7}$$

Where T is a matrix of of task shares (analytical, interactive, manual), η is a matrix of coefficients on the task shares, and υ contains the terms in the decomposition associated with variables other than task supplies. Using the same method, I can decompose the native-second

generation immigrant wage gap as

$$R_2 = E(w_{s)} - E(w_n) = \underbrace{\{E(T_s) - E(T_n)\}'\eta_n}_{endowments} + \underbrace{E(T_n)'(\eta_s - \eta_n)}_{coefficients} + \underbrace{\{E(T_s) - E(T_n)\}'(\eta_s - \eta_n)}_{interactions} + \upsilon \tag{8}$$

I use Stata to obtain the Blinder-Oaxaca decomposition results (see Jan (2008)).

Table 3 presents results for model (3.5). All the regressions control for both education and industry fixed effects. From this table, we can see that the three task supplies have similar effects on earnings for all three types of employees in both census years. Supplying more analytical and interactive tasks benefits employees' weekly wages, while manual task supply hurts them. This finding matches my prediction that analytical and interactive task supply is rewarded while manual task supply is "punished" in the Canadian labor market. Naturally, there are some differences in effects of task supply in these two years. In 2015, the increase in the weekly wage driven by a 1% increase in analytical task supply from all the three types of employees is larger than it is in 1970. Furthermore, the returns to interactive task supply are smaller in 2015. Finally, the negative effect of manual task supply on wages become even larger in 2015, compared to 1970. Similar to what we saw in Table 3, the lack of official language ability hurts weekly earnings even more in 2015, and the gender wage gap shrinks at the same time.

As showed by equations (7) & (8), I will use the different returns to tasks, different task supplies per unit of time, and their interactions to decompose the weekly wage gap between natives (the third generation or more) and first and second generation immigrants.

Table 4 presents results for the Blinder-Oaxaca decomposition. Panel A gives the amount of the wage gap explained by differences in task supply, while Panel B shows the amount of the wage gap explained by the different returns to tasks. First of all, I will focus on the year 1971. In 1970, on average, both first and second generation immigrants earn a statistically significantly larger weekly wage than natives (the third generation or more). First generation immigrants earn 8.9% more per week than natives, while the second generation earns 10.9% more. Based on the results in Table 3, in 1970, both generations of immigrants have advantages in the return to analytical and interactive tasks. However, the penalty from manual task productivity is the largest for secondary generation immigrants and smallest for first generation immigrants. In Panel B of Table 4, we can see that the higher return to

interactive task supply generates a (significant) 3.7% widening of the wage gap between first generation immigrants and natives. The returns to analytical and manual task supply of first generation immigrants tend to widen the wage gap insignificantly. From Panel A, the amounts of the wage gap explained by different task supplies are all statistically significant but very tiny, which is very similar to the results given by the interactions in Panel C.

Turning to the wage gap between natives and second generation immigrants, we can see that the biggest effect on the wage gap is also from the higher return to interactive task supply of second generation immigrants, which leads to a 6.2% widening in the gap. The higher return to second generation immigrants' analytical task supply leads to a (significant) 1.3% increase in the wage gap, while the larger penalty from manual task supply significantly reduces the wage gap by 2%. Meanwhile, similar to the native-first generation immigrant wage gap, the endowments and interaction effects are both small in comparison to the overall wage difference between second generation immigrants and natives.

The third and fourth columns of Table 4 present results for 2015. Here, things look a little different. The mean weekly wage of first generation immigrants is 2.2% lower than natives (the third generation or more), but the weekly earnings of second generation immigrants are 9.3% higher than those of natives. Both differences are statistically significant. From Table 4, in 2015, natives have a significant advantage over first generation immigrants in the supply of analytical and interactive tasks, controlling for educational attainment and industry fixed effects. Naturally, if we assume a diminishing marginal return in the production process, we would predict a significantly lower return to natives' analytical and interactive task supply compared with a first generation immigrant with the same demographic characteristics. In Table 4, we can see that higher the returns to analytical and interactive tasks for first generation immigrants leads to a significant 3.5% and 4.9% narrowing in the weekly wage gap with natives. The larger wage penalty from manual task supply widens the wage gap by 0.8%, which is statistically insignificant.

The effects of the endowments and interactions are relatively small again. Generally, if I do not control for education and industry fixed effects, first generation immigrants tend to supply more analytical and interactive tasks than natives, which in fact narrows the weekly wage gap between natives and first generation immigrants. Therefore, the smaller mean weekly wage earned by first generation immigrants is driven by other factors such as a discrimination in the return to immigrants' educational attainment, compared with a similar native. However, foreign degrees being less valued is conjecture on my study, and it would be quantified in future work using the relevant census variable.

Regarding the wage gap between natives and second generation immigrants in 2015, we can see that the most significant driver is the difference in the return to manual task supply, which narrows the gap by 3.3%. Meanwhile, most of the endowments and interactions effects are very small except the higher analytical task productivity of second generation immigrants which widens the wage gap by about 2%.

From this exercise, we can learn some things. First of all, immigrants seem to be more rewarded for "high skill" tasks than natives, and this has a significant effect on their relative earnings. Moreover, task provision and the return to task provision for both generations has not changed much from 1970 to 2015, even though their relative earnings have changed (especially first generation immigrants). So, this change in immigrants' relative earnings is not driven by the fact that immigrants are performing systematically different tasks, or being rewarded differently for tasks.

5.4 Segment Prediction

In this part, I will use ordered probit and ordered logit models to predict the labor market segments (primary upper tier, primary lower tier, and secondary segment) that first and second generation immigrants work in, using the third generation as the base group.

Probit and logit coefficients do not have a straightforward intuitive interpretation. So, I will present average marginal effects. I define

$$\begin{aligned} P(seg_i = n|Z) &= P(\theta_{n-1} < E_i^* < \theta_n) \\ &= P(\theta_{n-1} < w'Z_i + \varepsilon < \theta_n) \\ &= \Phi(\theta_n - w'Z_i) - \Phi(\theta_{n-1} - w'Z_i) \\ &= F(w'Z_i) \end{aligned}$$

Here, n=1, 2, 3. Marginal effect at point Z_i is $\frac{\partial E[seg|Z]}{\partial Z}|_{Z=Z_i} = \frac{\partial F(w'Z)}{\partial Z}|_{Z=Z_i} = f(w'Z_i)w$. Then, I define the average marginal effect of a variable x_k on being "seg n" as

$$\frac{w_k}{N}\sum_{i=1}^{N} f_{seg=n}(w'Z_i) \tag{9}$$

if x_k is continuous. If x_k is discrete, the average partial effect is the average of the discrete differences in the predicted probabilities.

Tables 5 and 6 present the estimated effect of immigrant status on labor market segmen-

tation. Table 5 applies the ordered probit estimation while Table 6 uses the ordered logit estimation. All the coefficients in these two tables are statistically significant at the 1% level, which indicates that the generation dummies do impact which segment an employee should be in both in the past and present. All the Chi square values of LR (likelihood-ratio) tests are quite large, which supports the importance of the immigrant generation to segmentation in the Canadian labor market as well. Generally, we can see that, whether or not we control or education in the regressions, first generation immigrants tend to work in lower segments while second generation immigrants tend to work in the higher ones, compared to natives (the third and more generation immigrants). However, these two tables only give us a sense of the sign of the effect of immigrant status on segmentation. To understand the magnitude of the impact, I will derive average marginal effects.

5.4.1 Average Marginal Effects on Immigrants' Segmentation

Tables 7 & 8 present average marginal effects (AME) of immigrant status on segmentation based on the ordered probit and logit estimates presented above.

Table 7 presents results based on ordered probit estimates. Taking a look at the results for the year 1971, with natives as the baseline, we can see that controlling for education does not impact the AME of being a first generation immigrant very much, while the impact of being a second generation immigrant appears to be more significant. After I control for education in the probit model, the effects of being a second generation immigrant tend to be smaller. Based on these results, being a first generation immigrant leads to a 2% reduction in the probability of working in the upper tier segment, a 0.9% increase in the likelihood of working in the lower tier, and a 1.2% increase in the probability of being a secondary-segment worker. Before controlling for education in the probit model, second generation immigrants tend to be 1.7% more likely to be in the upper tier, 0.7% less likely to be in the lower tier, and 1% less likely to be in the secondary segment, compared with the third and higher generation immigrants. When I control for workers' education, all these segmentation differences become quite a bit smaller, but the signs remain the same.

In the results for the year 2016, the education control has a larger effect on the first generation immigrants' segmentation tendency. After I control for educational attainment, the relative tendency of a first generation immigrant to be in the upper tier is decreased from -1.4% to -4.3%, while the relative tendency to be in the lower tier and secondary segment is increased from 0.6% and 0.8% to 1.8% and 2.5%, respectively. Similar to 1971, before

controlling for education in the probit model, second generation immigrants tend to be 2.4% more likely to be in the upper tier, 1% less likely to be in the lower tier, and 1.4% less likely to be in the secondary segment, compared with third and higher generation immigrants. After I control for workers' education, all these segmentation differences shrink in magnitude, but the signs stay the same. These findings are consistent with those in the wage difference study that both of the two generations of immigrants benefit from their higher educational attainments when compared to the third generation. Table 8 gives a similar estimation as Table 7 with ordered logit models instead of ordered probit models. All the values in this table are quite close to Table 7, which support the comments I gave in last paragraph.

From the exercise in this subsection, here are some key points I learn. First, segmentation results look "worse" for first generation immigrants than the wage results did. It looks like first generation immigrants are "boxed out" of the upper tier – they earn more than natives in 1970, but are still less likely to work in the upper tier, which is interesting. Moreover, first generation immigrants do a lot worse conditional on years of education in 2015 than 1970. They are much less likely to work in the upper tier conditional on educational attainment. This is consistent with the discrimination against those with a foreign educational background story that mentioned in this study.

6 Conclusion

In this paper, I examined how first and second generation immigrants behave differently from natives, which is shorthand for third generation immigrants or higher, in many aspects of the Canadian labor market. I use data from two census years, 1971 and 2016, because 1970 is considered to be start of the fifth immigration wave in Canada, and 2016 is the most recent Canadian census year. Using these data, I explore differences in earnings, task supply, and segmentation between the two generations of immigrants and natives.

I find that first generation immigrants perform differently from natives in terms of weekly earnings and task supplies. First of all, there has been a decline in the performance of first generation immigrants over time, especially conditional on educational attainment. This is apparent in both earnings and labor market segments. Secondly, second generation immigrants have not changed quite much (in terms of relative performance) from 1970 to 2015. They seem to do better than natives because they are more educated on average. Lastly, the change in immigrants' fortunes cannot be explained by the fact that the tasks they perform in the labor market have changed, or that they are rewarded differently for performing certain tasks.

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A tables

Table 1: Estimates of log weekly wages by immigrant generation status

	1971		2016	
	I	II	V	VI
First Generation	0.013***	-0.022***	-0.063***	-0.115***
	0.001	*0.001*	*0.002*	*0.002*
Second Generation	0.028***	0.011***	0.027***	0.009***
	0.001	*0.001*	*0.002*	*0.002*
Non-official Language	-0.121***	-0.020***	-0.207***	-0.209***
	0.002	*0.002*	*0.002*	*0.002*
Female	-0.532***	-0.511***	-0.225***	-0.211***
	0.001	*0.001*	*0.001*	*0.001*
Married	0.065***	0.076***	0.126***	0.103***
	0.001	*0.001*	*0.001*	*0.001*
Education Controlled	NO	YES	NO	YES
obs	1,583,380	1,583,380	1,872,670	1,872,670

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. A person is a female when the variable "female" equals 1. A person is never married when the variable "marital" equals 0. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 2: Estimates of task supplies by immigrant generation status

	1971		2016	
	A	A	A	A
First Generation	0.008***	0.006***	-0.019***	-0.014***
	0.000	*0.000*	*0.000*	*0.000*
Second Generation	0.003***	0.003***	0.004***	0.003***
	0.000	*0.000*	*0.000*	*0.000*
	I	I	I	I
First Generation	-0.024***	-0.015***	-0.046***	-0.033***
	0.000	*0.000*	*0.000*	*0.000*
Second Generation	0.011***	0.010***	0.010***	0.006***
	0.000	*0.000*	*0.000*	*0.000*
	M	M	M	M
First Generation	0.009***	0.005***	0.010***	0.011***
	0.000	*0.000*	*0.000*	*0.000*
Second Generation	*-0.001****	*-0.001****	*-0.003****	*-0.002****
	0.000	*0.000*	*0.000*	*0.000*
Industry Controlled	NO	YES	NO	YES
obs	1,583,380	1,583,380	1,872,670	1,872,670

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 3: Estimates of log weekly wages by immigrant generation status and task

	1971			2016		
	Natives	First Gen.	Second Gen.	Natives	First Gen.	Second Gen.
Analytical	0.409***	0.434***	0.446***	0.642***	0.742***	0.671***
	0.007	*0.010*	*0.011*	*0.007*	*0.011*	*0.014*
Interactive	0.268***	0.358***	0.412***	0.176***	0.292***	0.203***
	0.006	*0.009*	*0.010*	*0.006*	*0.011*	*0.014*
Manual	-0.189***	-0.175***	-0.245***	-0.443***	-0.467***	-0.522***
	0.007	*0.010*	*0.011*	*0.007*	*0.011*	*0.014*
Non-official Language	-0.031***	-0.044***	-0.058***	-0.153***	-0.167***	-0.098***
	0.017	*0.002*	*0.009*	*0.007*	*0.002*	*0.006*
Female	-0.465***	-0.530***	-0.617***	-0.225***	-0.185***	-0.190***
	0.002	*0.003*	*0.003*	*0.002*	*0.003*	*0.003*
Married	0.081***	0.053***	0.035***	0.107***	0.027***	0.127***
	0.001	*0.002*	*0.003*	*0.001*	*0.003*	*0.003*
Ind. Controlled	YES	YES	YES	YES	YES	YES
Education Controlled	YES	YES	YES	YES	YES	YES
obs	874,135	371,145	338,100	1,116,651	436,616	279,936

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. A person is a female when the variable "female" equals 1. A person is never married when the variable "marital" equals 0. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 4: Blinder-Oaxaca Decomposition Results

Panel A: Explain by different tasks (Endowments)				
	1971		2016	
	N vs F	N vs S	N vs F	N vs S
Analytical	0.003***	0.002***	0.012***	0.016***
	0.000	*0.000*	*0.000*	*0.000*
Interactive	-0.007***	0.005***	0.003***	0.007***
	0.000	*0.000*	*0.000*	*0.000*
Manual	0.001***	0.002***	0.005***	0.006***
	0.000	*0.000*	*0.000*	*0.000*
Panel B: Explain by return to tasks (Coeffcients)				
	1971		2016	
	N vs F	N vs S	N vs F	N vs S
Analytical	0.009	0.013***	0.035***	0.009
	0.005	*0.006*	*0.006*	*0.007*
Interactive	0.037***	0.062***	0.049***	0.013
	0.005	*0.005*	*0.006*	*0.007*
Manual	0.007	-0.020***	-0.008	-0.033***
	0.005	*0.005*	*0.005*	*0.005*
Panel C: Explain by interactions				
	1971		2016	
	N vs F	N vs S	N vs F	N vs S
Analytical	0.000	0.000***	0.001***	0.001
	0.000	*0.000*	*0.000*	*0.000*
Interactive	-0.002***	0.002***	0.002***	0.001
	0.000	*0.000*	*0.000*	*0.001*
Manual	0.000	-0.000***	0.000	0.001***
	0.000	*0.000*	*0.000*	*0.000*
Difference	0.089***	0.109***	-0.022***	0.093***
	0.001	*0.002*	*0.001*	*0.002*

Note: Standard errors are given in italics. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower. This table displays the wage mean gap decomposition between the first generation immigrants and the natives as well as those between the second generation immigrants and the natives in 1970 and 2015. The gaps are decomposed as Equation 7 & 8 showed.

Table 5: Estimates of segmentation by immigrant generation status and probit

	1971		2016	
	I	II	III	IV
First Generation	-0.078***	-0.099***	-0.051***	-0.161***
	0.003	*0.003*	*0.002*	*0.002*
Second Generation	0.071***	0.022***	0.085***	0.043***
	0.003	*0.003*	*0.002*	*0.002*
LR chi^2	363327.97	550180.20	663441.49	858186.55
Education Controlled	NO	YES	NO	YES
obs	1,573,834	1,573,834	2,440,492	2,440,492

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 6: Estimates of segmentation by immigrant generation status and logit

	1971		2016	
	I	II	III	IV
First Generation	-0.122***	-0.171***	-0.076***	-0.275***
	0.005	*0.005*	*0.004*	*0.004*
Second Generation	0.124***	0.042***	0.144***	0.072***
	0.005	*0.005*	*0.004*	*0.004*
LR chi^2	404614.07	579458.84	666859.73	873238.60
Education Controlled	NO	YES	NO	YES
obs	1,573,834	1,573,834	2,440,492	2,440,492

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 7: Predicts of average marginal effects of probit model by immigrant generation status

		1971		2016	
		I	II	III	IV
First Generation	Seg I	-0.019*** *0.001*	-0.022*** *0.001*	-0.014*** *0.001*	-0.043*** *0.001*
	Seg II	0.008*** *0.000*	0.009*** *0.000*	0.006*** *0.000*	0.018*** *0.000*
	Seg III	0.011*** *0.000*	0.013*** *0.000*	0.008*** *0.000*	0.025*** *0.000*
Second Generation	Seg I	0.017*** *0.001*	0.005*** *0.001*	0.024*** *0.001*	0.011*** *0.001*
	Seg II	-0.007*** *0.000*	-0.002*** *0.000*	-0.010*** *0.000*	-0.005*** *0.000*
	Seg III	-0.010*** *0.000*	-0.003*** *0.000*	-0.014*** *0.000*	-0.007*** *0.000*
Edu controlled		NO	YES	NO	YES
obs		1,573,834	1,573,834	2,440,492	2,440,492

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.

Table 8: Predicts of average marginal effects of logit model by immigrant generation status

		1971		2016	
		I	II	III	IV
First Generation	Seg I	-0.016*** *0.001*	-0.020*** *0.001*	-0.012*** *0.001*	-0.042*** *0.001*
	Seg II	0.008*** *0.000*	0.009*** *0.000*	0.005*** *0.000*	0.019*** *0.000*
	Seg III	0.009*** *0.000*	0.011*** *0.000*	0.007*** *0.000*	0.023*** *0.000*
Second Generation	Seg I	0.016*** *0.001*	0.005*** *0.001*	0.023*** *0.001*	0.011*** *0.001*
	Seg II	-0.008*** *0.000*	-0.002*** *0.000*	-0.010*** *0.000*	-0.005*** *0.000*
	Seg III	-0.009*** *0.000*	-0.003*** *0.000*	-0.013*** *0.000*	-0.006*** *0.000*
Edu controlled		NO	YES	NO	YES
obs		1,573,834	1,573,834	2,440,492	2,440,492

Note: Standard errors are given in italics. The baseline is the third generation immigrants and more. *: Statistically significant at the 10% level or lower. **: Statistically significant at the 5% level or lower. ***: Statistically significant at the 1% level or lower.