The wage gap between the public and the private sector among Canadian-born and immigrant workers

By Kaiyu Zheng

(Student No. 8169992)

Major paper presented to the Department of Economics of the University of Ottawa in partial fulfillment of the requirements of the M.A. Degree

Supervisor: Professor Gilles Grenier

ECO 6999

Ottawa, Ontario
April 2017

Abstract

Using data from the 2011 National Household Survey (NHS), this paper investigates the wage gap between the public sector and the private sector for the Canadian-born and immigrant male and female workers. The public sector includes public administration, educational services, and health care and social assistance, while the other industry categories define the private sector. The average annual wages of public sector employees are generally higher than those of their private sector counterparts with the same endowments. Thus, as was found in earlier studies, there exists a public sector wage premium in the Canadian labour market. The results of an Oaxaca decomposition indicate that immigrants enjoy a higher public sector wage premium than Canadian natives. Comparing Canadian natives to immigrants, the wage gap in favour of male natives is appreciably greater in the private sector than in the public sector, whereas the wage advantage to female natives is slightly larger in the public sector than in the private sector. For both natives and immigrants, wages increase importantly with educational attainment and work experience acquired in Canada in both public and private sectors.

1. Introduction

Canada is a traditional immigrant-receiving country that admits a large number of newcomers from all over the world every year. According to the 2011 Canadian National Household Survey (NHS), immigrants account for almost 21 percent of the total Canadian population. Immigrants are an important component of Canadian society.

There is no doubt that immigrants play a significant role in the Canadian labour market. The labour force brought by immigrants contributes to the acceleration of economic development and improvements of quality of life. A poor labour market performance of immigrants has an effect on the whole economy of Canada. The wages and employment rates of immigrants are lower than those of Canadian-born workers with equal qualifications. A possible explanation for this situation includes the lower quality of immigrants' human capital acquired in their country of birth. Hence, the foreign educational attainment and work experience are discounted significantly in the Canadian labour market. Additionally, even if immigrants' foreign certificate and Canadian natives' certificate are of equal quality, the former one is harder to be recognized in the labour market because of institutional reasons, like barriers to the effective integration of highly skilled immigrants. Improving the assimilation of immigrants in the labour market will benefit not only the immigrants themselves but also the economy of Canada as a whole.

One may wonder whether the assimilation of immigrants differs between the public and the private sectors. The public sector is defined as the part of the economy that provides various services by governments such as military, education, health and infrastructure. In contrast, the private sector includes businesses which intend to earn a profit for their owners

and are not controlled by the State. In this paper, I use the 2011 NHS industry data and follow Nadeau (2013) to define the public sector as including public administration, educational services, and health care and social assistance. The other industries are in the private sector.

There are several reasons why the wages between public and private sectors could be different. First, the most important explanation may be the distinct wage determination process that leads to a wage premium for public sector employees. According to Gunderson (1979), the basic difference with respect to wage setting is that the public sector wages are determined ultimately by political factors, whereas the private sector is subject to the profit constraint. Specifically, public sector wages are usually controlled by the political forces through institutional channels like unions. In comparison, the competitive market forces affect private sector wages significantly. Taking employment equity regulations as an example, the public sector has resources to implement such policies, but it is more difficult for the private sector to comply with such regulations. Second, as Nadeau (2013) points out, firms are on average larger in the public sector and are believed to be better able to evaluate international certificates. Therefore, the wage gap between Canada-born workers and immigrants in the public sector is expected to be smaller than in the private sector since immigrants' foreign qualifications are likely to get better recognition. Third, Mueller (1998) suggests that the fact that government services are usually considered to be essential implies that the demand for those services will be inelastic. This inelastic labour demand in turn leads to high wages because of a lower possibility to substitute other inputs for expensive public sector labour.

The purpose of this paper is to examine and analyse the wage gap between the public

and private sectors among Canadian natives and immigrants using the 2011 National Household Survey (NHS) data set. Regression analysis will be applied along with the Oaxaca decomposition technique. The earnings equations are estimated separately for public and private sector employees, and wage gaps across the two sectors will be decomposed into an explained part and an unexplained part.

This paper is organized as follows. Section 2 summarizes the key findings of studies that have focused on public-private sector and on natives-immigrants wage gaps. In section 3, I describe the data and provide summary statistics of the variables. Section 4 presents the econometric models and the methodology. Section 5 shows the empirical results and their interpretations. A brief conclusion is in section 6.

2. Literature Review

Normally, there is a rent or a premium associated with working in the public service. The cause of a wage premium for public sector employees is that wage setting in the public sector differs from that in the private sector. The public sector is motivated by political or re-election considerations, whereas the private sector is motivated by profits. Therefore, many studies have investigated the issue of the wage gap between public and private sectors in the labour markets of developed countries. In this section, I first summarize the research related to wage differentials between the public and the private sector in Canada, and then I focus on some studies on immigrant wage gaps.

One of the earliest studies comparing the public and the private sectors in Canada is Gunderson (1979). Using 1971 Census data, he estimates wage differentials with separate earnings equations for public and private sector employees. The public sector for this study is

defined as public administration and defense where hiring decisions are based on political concerns, while the private sector is limited to the manufacturing industry group where hiring is assumed to be based on profit considerations. The gross earning differential is 9.3 percent for males and 22.3 percent for females in favour of the public sector. Then the total wage gap is decomposed with the Blinder-Oaxaca method into a part due to productivity-related characteristics, such as education and experience, and a part due to a pure surplus payment for the same characteristics, known as the 'rent' or the 'wage premium'. After the decomposition, Gunderson finds that the economic rent in the public sector is 6.2 percent for males and 8.6 percent for females. The main reason for this economic rent is the payment of a relatively constant premium in the public sector rather than excessive returns to the positive wage-generating characteristics. In addition, this leads to the second essential result that the unskilled workers enjoy a more significant earnings advantage in the public sector than in the private sector, whereas the private sector shows a tendency to pay higher returns to education. The author finds that a large part of the public sector wage premium is enjoyed by females and low skilled workers, with the implication that the elimination or reduction of such a premium would conflict with policies designed to help those workers.

A follow-up study by Shapiro and Stelcner (1989) investigates the changes in the earnings gap across the Canadian public and private sectors over the decade 1970-1980. Based on the 1981 Canadian Census of Population, the authors apply the same Blinder–Oaxaca decomposition technique that Gunderson (1979) used to split the gross public-private sector wage differential into differences in observable characteristics and economic rents. The private sector is again limited to the manufacturing sector, whereas the public sector contains

only civilians in public administration and defense. The results show that the gross public sector wage premiums in Canada increased between 1970 and 1980. Specifically, the gross wage premium in the public sector enjoyed by males rose from 9.3 percent in 1970 to 19.1 percent in 1980, while that of females' increased from 22.3 percent to 27.2 percent. The change in the public-private wage gap for males can be mainly attributed to the improved endowment of public sector employees such as education, experience, and occupation. By contrast, the growth in the rent component of the wage premium explains the rise of the earning advantage for females in the public sector. Thus, the payments to females who work in the government are less related to their human capital than those of males.

Prescott and Wandschneider (1999) extend the previous studies by attempting to control for selection bias with respect to the choice of the sector of employment. Data from the Survey of Consumer Finances of 1991 and 1982 are used to distinguish between public and private sector workers. The authors distinguish public and private sector in the same way as the above studies, except that university teachers are placed in the public sector since they are highly unionized. Individuals are restricted to be full-year full-time workers. The authors test for the bias that may result from self-selection and find no such bias. In terms of personal characteristics, public sector employees are shown to have more years of education and labour market experience than their counterparts in the private sector, and this inter-sector educational gap is larger for female than for male workers. According to the decomposition analysis, the estimates of the unadjusted gross differences in earnings for males between public and private sectors are 19.8 percent in 1981 and 25 percent in 1991. For females, the unadjusted gross wage difference is 27.3 percent in 1981 and 42.9 percent in 1991.

Furthermore, the public sector premium component is defined as the difference between the returns to characteristics across the two sectors. The decomposition technique indicates that the public sector wage premiums for males in 1980 and 1990 are 15.1 percent and 14.3 percent respectively. For females, however, the public sector wage premium increased significantly from 15.7 percent in 1980 to 25 percent in 1990. Obviously, the growth of the unadjusted gross wage difference and of the public sector wage premium for females is remarkable over the ten-year interval.

Mueller (1998) applies quantile regressions to estimate earning differentials in the public and private sectors. The goal of quantile regressions is to evaluate gaps at various levels of the income distribution, such as among the high incomes or among the low incomes. The data used by the author is the 1990 Labour Market Activity Survey. Because of the budget deficits throughout the 1990s, Canadian governments attempted to decrease expenditures, which included cuts in payrolls. The evidence indicates that a wage premium does exist for workers in the public sector compared with their counterparts who have equivalent characteristics in the private sector. The only exception is for the male employees working for provincial governments who suffer a wage penalty. The federal government employees enjoy the largest wage premium. Moreover, the results from the quantile regression technique show that female employees and individuals at the lower tail of the wage distribution tend to enjoy significant rent payments from the public sector.

According to Tiagi (2010), based on data from the Canadian Labour Force Survey for September 2008, male workers' average wages in the public sector are approximately 31 percent higher than those in the private sector, whereas female workers earn approximately

51 percent more in the public sector than those in the private sector. However, a large proportion of this wage gap is due to employees' personal attributes and self-selection. For instance, public sector employees generally have higher educational attainment than private sector employees. An endogenous switching regression framework is used to determine pure wage differentials between the public and the private sector. The results indicate that the pure wage premium or economic rent received by public sector employees is 5.4 percent for males and 20 percent for females, relative to their counterparts in the private sector. Furthermore, the analysis with respect to self-selection points out that for both men and women, public sector employees are positively selected based on observables such as marital status, whereas private sector employees are negatively selected. More specifically, individuals who join the public sector tend to be positively selected on observables whereas those who join the private sector tend to be negatively selected on observables. This result is different from the previous study that found no effect of self-selection. Consequently, the changes in the public-private sector wage gap is remarkable after controlling for self-selection, and most of this gap is on account of differences in workers' endowments across the two sectors.

Nadeau (2009) extends the analysis by studying Francophone-Anglophone wage differentials in the public and private sectors of Canada. There was a remarkable decrease in the overall wage gap between Anglophones and Francophones in Canada from 1970 to 2000, and Quebec experienced the most dramatic drop, at 22.7 percent, among the Canadian provinces. This situation can be due to the increased educational attainment by Francophones, a stronger control by Francophones of the Quebec economy and the passing of language laws. However, the evolution of the Francophone-Anglophone wage gap is different in the public

and the private sectors, and in Quebec and outside Quebec. On the one hand, the public sector in Quebec is the only labour market where Francophones enjoy a wage premium, and it can be fully explained by the mother tongue effect. The increase in demand for French language skills contributes to a wage differential in favour of Francophone workers. Moreover, the wage gap in the Quebec private sector was 28.7 percent in favour of Anglophones in 1970, but it decreased significantly to 5.1 percent in 2000. The reason is related to the changes from negative to positive in the mother tongue effect representing a Francophone advantage and to the enhanced skills of Francophones. On the other hand, Francophones in the public sector outside Quebec enjoy a wage advantage during that time period because of the various attributes and growth in demand for English language skills. Also, the passage of language laws outside Quebec between the late 1960s and the early 1990s is shown not to affect this wage gap significantly. Finally, with regard to the private sector outside Quebec, the condition of the Francophone wage gap is similar to the one in Quebec, except that the magnitude of the observed gap is relatively smaller.

Hou and Coulombe (2010) further examine the earnings differentials in the public and private sectors, but they concentrate on the comparison between the Canadian-born visible minorities and the Whites. They eliminate immigrants because major visible minority groups consist mostly of recent immigrants whose qualifications are discounted in the labour market. Therefore, the earnings gaps between visible minorities and Whites will be overestimated if immigrants are included. They first consider the entire Canadian-born visible minorities as one group and then they separate them into the three largest groups: Blacks, Chinese and South Asians. The results show that visible minorities have much higher education attainment

but less working experience than Whites. The unadjusted earning gap in the public sector is relatively small but visible minority men and Black women in the private sector suffer a serious earning handicap in comparison with Whites. Those results suggest that most of the earning disadvantage against visible minorities comes from the private sector. On the other hand, after controlling for group differences like human capital and work characteristics, the results reveal that the adjusted earning gaps are very large between Chinese and White men in the private sector, but Chinese women even enjoy higher payments than White women in the private sector. The visible minorities from South Asia do not have important problems of earning inequality in the public sector, but they do have to face a wage gap in the private sector though it is not very big. In contrast, Blacks endure the greatest earning differentials in the private sector.

While the above studies did not specifically discuss the issue of immigration, it is well known that there are important differences between the native-born and immigrants in the Canadian labour market. Nadeau and Seckin (2010) compare the wage gap between immigrant males and Canadian born males in Quebec and the rest of Canada (ROC) during the period from 1980 to 2000. The main finding of their research is that the immigrant wage gap in Quebec is consistently and increasingly larger than that in the ROC. The wage gap is in favour of immigrants from the ROC before the early 1990s, but this advantage is transferred from immigrants to Canadian born workers in the period between 1990 and 2000. The major reason is that the origins of immigrants have been shifted from the US, the UK and Europe toward the non-traditional source countries. In Quebec, however, immigrants have never enjoyed an advantageous wage gap over the entire period. The worsening of the

Quebec-ROC immigrant wage gap can be mostly explained by the effect of the citizenship premium, which remains stable in the ROC but disappears in Quebec over the period. Furthermore, due to the passing of language laws and the independent point system of immigrant selection in Quebec, the impact of speaking French and immigration policies contribute to the increased differential in the immigrant wage gap between the ROC and Quebec. Discrimination is shown not to be an important cause of immigrants wage gap.

Coulombe, Grenier and Nadeau (2014) further study the immigrant wage gap by applying GDP per capita in immigrants' countries of birth as an indicator of the quality of the human capital. With a Blinder-Oaxaca decomposition method, they find that years of schooling and work experience have a positive effect on immigrants' wages. However, the most important finding is that immigrants' quality of human capital is considered by Canadian employers to be lower if the qualifications are acquired outside Canada. This means that immigrants will earn less than Canadian natives even though they have the same or more years of schooling and work experience. This is the main reason for the immigrant wage gap. In addition, the wage gap will be wider if immigrants come from countries such as India that have low GDP per capita. The quality of immigrants' human capital is discounted more heavily if it were acquired from a poor country.

Nadeau (2013) is the first study that addresses the issue of immigration in the context of the investigation of the wage gaps in the public versus private sectors. The 2006 Canadian census data is used and the definition of the public sector encompasses public administration and services (including defence services), education and health. This definition is broader than the one used in earlier studies such as Gunderson (1979). The results show that

immigrants earn between 3.0 and 3.5 percent less than Canada-born workers across the whole economy, even though immigrants have more years of schooling and of work experience. The main reasons for the wage gaps between immigrants and natives are the discounted foreign schooling and the work experience of immigrants', Nadeau finds that this situation in the private sector is more serious than that in the public sector. The most remarkable result is that there is no immigrant wage gap in the public sector, which means the entire wage gap results from the private sector. The schooling and work experience acquired from immigrants' countries of birth are significantly less rewarded in the private sector than in the public sector. Furthermore, the penalty of not knowing the official languages in the private sector is generally higher than in the public sector, and immigrants from non-traditional source countries are more at a disadvantage in the private sector than in the public sector. Finally, the results reveal that there is no discrimination against female immigrants in the public sector. If discrimination against immigrants exists in the labour market, it is entirely due to the private sector.

According to the literature mentioned above, a wage gap between public and private sectors does exist in the Canadian labour market. Employees in the public sector enjoy a wage premium compared to their counterparts in the private sector. Furthermore, the payment received by immigrants is less than that of Canadian-born workers, especially in the private sector. In the rest part of this paper, I will use the technique of the ordinary least square regression along with an Oaxaca decomposition to evaluate the wage gap between the public and private sectors among immigrant and Canadian-born workers.

3. Data

I use the 2011 National Household Survey (NHS) from Statistics Canada as my data set. The NHS aims to collect information about demographic, social, and economic characteristics of the Canadian population with a cross-sectional design. It excludes foreign residents, persons living in institutional collective dwellings, Canadian citizens living in other countries, and full-time members of the Canadian Forces stationed outside Canada. The NHS uses the 'individual' as the unit of observation and the sample size for the public use microdata is 887,012 observations, which represent 2.7 percent of the total population in Canada. There are several advantages to using this data set such as the large sample of immigrants and the detailed information about their country of birth or the background of their educational attainment. In addition, it separates industry sectors into twenty specific classifications, which allows the distinction between the public and the private sector. The survey also provides explicit information on the personal characteristics of the working-age population and on employment status.

3.1 Sample restrictions

In order to eliminate as many extraneous factors as possible, I impose some restrictions on the data set. The age group is constrained to be between 20 and 64 years old because the other respondents generally do not belong to the labour force. In regard to employment, the unpaid family workers and the self-employed individuals are dropped to keep employees only. In addition, the employees are limited to full-time, full-year workers with positive earnings; full-time full-year workers are defined as those who reported working 30 hours or more per week and 49 weeks or more during the year 2010. Employees with annual wages and salaries below $1,000 or above $200,000 are considered as outliers and removed from the sample.

Regarding the geographic restrictions, I simply eliminate people from Newfoundland and Labrador, Prince Edward Island, Nova Scotia, New Brunswick, and Northern Canada since very few immigrants live in those regions. Among the foreign-born, the non-permanent residents are not within the scope of the study because most of them will go back to their original country after the expiration of their work or study permit. Finally, males and females will be analysed separately. There are 198,662 observations remaining after the sample restrictions, with 152,955 Canadian-born individuals and 45,707 immigrants.

The public sector is defined based on the 2011 NHS industry data according to the NAICS 2007 and, as in Nadeau (2013), encompasses public administration, educational services, and health care and social assistance. The other industry categories are included in the private sector.

3.2 Dependent variable

The dependent variable in my model is the natural logarithm of annual wages. The annual wages are reported for persons in private households, and they stand for the gross wages and salaries before deductions for such items as income tax, pensions and Employment Insurance.

3.3 Independent variables

The independent variables of the model can be classified into five categories: human capital, demographic characteristics, language skill, immigration, and geographic characteristics. All the variables in these five categories are assumed to have effects on the wages of Canadian-born and immigrant workers in the public and private sectors.

The human capital variables include years of schooling, years of experience, years of

experience squared, and country of post-secondary study. The 2011 NHS does not provide a value for years of schooling, but it does report a person's most advanced certificate, diploma or degree. Therefore, based on this information, I construct individuals' years of schooling in the way described in Appendix Table A1. Another important indicator of human capital is working experience, which is defined as age minus years of schooling minus 6, and it is restricted to non-negative numbers. The age groups in the original data are coded in a five-year categorical form, which I convert into continuous form for the purpose of convenient calculation on experience by assigning the midpoint of each category.[1] Finally, for the variable of post-secondary study, Canada is assigned the value of one to represent individuals who obtain their highest post-secondary certificate, diploma or degree in the country of Canada, and is assigned the value of zero for those who obtained their degree in a foreign country, or who obtained secondary education or less in Canada or elsewhere.

The demographic characteristics include marital status and gender. The marital status is divided into two groups: married and not married. The variable of married is defined as either being legally married (and not separated) or living common law, whereas not married includes never legally married, separated, divorced, and widowed. The reference group for marital status is not married. In addition, gender is included in the demographic characteristics, but since males and females are going to be discussed separately in this paper, I use a dummy variable to represent gender, which is equal to one for males and zero for females.

For language skills, I use the variable knowledge of the official languages as evaluated

[1] For example, the number of 32 is assigned to age group between 30 and 34 years old, and the number of 37 is assigned to age group between 35 and 39 years old, respectively.

by the respondents. The four categories are exactly the same as that from 2011 NHS: English only, French only, Both English and French, and Neither English nor French. Canadian natives are assumed to know at least one of the official languages. Therefore, the variable of Neither English nor French is estimated only for immigrants. I will consider the variable of English only as my reference group.

The immigration variables include immigrant status, years since migration and place of birth. Immigrant status is a dummy variable so as to distinguish between immigrants and Canadian-born workers. The years since migration show how many years the immigrants have lived in Canada. It is calculated as 2010 minus year of immigration, while year of immigration refers to the year during which the immigrant first obtained his or her landed immigrant status. Furthermore, place of birth refers to the country or region of the world in which the immigrants are born. It is partitioned into seven groups: North America, South America, Europe, Africa, China, India, and Others. The first three groups contain traditional immigration source countries, but China and India have become the new immigration source countries that contribute large shares of the immigrant population. North America will be used as reference group.

Lastly, the geographic characteristics consist of province of residence and census metropolitan area (CMA). The provinces of residence are Ontario, Quebec, Manitoba, Saskatchewan, Alberta, and British Columbia. Ontario will be used as reference group. Manitoba and Saskatchewan will be combined as one group and analysed together. Moreover, the CMA categories include Toronto that will be the reference group, Montreal, Vancouver, and Rest of Canada.

In addition to the independent variables mentioned above, the existence of unions may play an important role in the wage gap between the public and the private sector. However, due to the lack of information in the data set, I cannot present a quantitative analysis of that role. Nevertheless, it is worth noting is that generally unions matter more in the public sector than in the private sector.

3.4 Summary statistics

Table 1 and Table 2 present summary statistics by sector of employment and immigrant status for males and females respectively. First, the mean annual wages for male immigrants in the public sector are exactly the same as those for the Canadian-born group. However, the male immigrants in the private sector earn on average $2,500 or 4.1 percent annually less than Canadian-born workers. Therefore, this result reveals that for male employees, there is no important immigrant wage gap in the public sector; the entire gross wage gap comes from the private sector. Secondly, for females, there are wage gaps in favour of Canadian-born workers in both public and private sectors. The mean annual wage for female natives in the public sector is around $1,600 or 2.9 percent larger than that of immigrants, while the wage gap in the private sector is slightly smaller than that in the public sector, which accounts for $1,200 or 2.7 percent. Thirdly, for both men and women, average annual wages in the public sector are higher than those in the private sector. For example, the average annual wage for male Canadian natives in the public sector is $69,800, whereas the average annual wage in the private sector is $61,200. Similarly, female Canadian-born workers in the public sector earn on average $56,600 annually, which is $10,300 greater than for their counterparts in the private sector. Note that although the mean annual wage for women in the public sector is

lower than the mean annual wage paid to men in the public sector, the wage differential between public and private sector is higher for women than for men. Specifically, the female Canadian natives in the public sector earn approximately 22.3 percent more than their counterparts in the private sector, whereas the public sector annual wage for male Canadian natives is approximately 14.0 percent higher than the private sector annual wage. The average annual wage received by immigrants in the public sector is also greater than that in the private sector. Thus, the results suggests a wage premium for the public sector employees, in particular the public sector female employees.

In addition to the average annual wage, another interesting finding is that the probability of working in the public sector for immigrants is significantly lower than that for Canadian-born workers. Within the sample of 198,662 observations, 15.1 percent of male immigrants, compared with 20.3 percent of male Canadian-born, work in the public sector, while 33.0 percent of female immigrants, compared with 42.9 percent of female Canadian natives, work in the public sector. The reason why immigrants are less likely to work in the public sector than Canadian natives is because many jobs in the public sector require Canadian citizenship, especially in federal public administration. In addition, many jobs in the health sector, such as physicians and nurses, are regulated by professional orders, which makes them less accessible to immigrants.

Regarding workers' characteristics, whether in the public or private sector, the male immigrants have more years of schooling than their Canadian-born counterparts, but years of schooling attained by female immigrants are about the same as those of female Canadian-born workers. Moreover, there is a gap in favour of immigrants with respect to

years of working experience for both men and women in the public and private sectors. This indicates that immigrants in both private and public sectors suffer earning disadvantages in spite of having better or equal educational attainment and labour market experience than the Canadian-born. In addition, about 80 percent of Canadian natives in the public sector received a Canadian highest post-secondary degree, whereas it is the case for only half of the immigrants in the public sector. The rest, 20 percent of Canadian natives and 50 percent of immigrants, either have no post-secondary educations or acquired post-secondary degrees outside Canada. In the private sector, the proportion of Canadian-born natives who received a Canadian highest post-secondary degree is around 60 percent compared with 34 percent for immigrants. Again, among the other 40 percent of Canadian natives and 66 percent of immigrants, some have no post-secondary educations and some have post-secondary degrees outside Canada.

A look at the marital status variable reveals that the proportion of immigrants who are married is larger than that of the Canadian natives, no matter which sector they belong to. For instance, 79.4 percent of male immigrants in the public sector are married relative to 74.6 for Canadian natives. Also, employees in the public sector are more likely to be married than those in the private sector.

The statistics for official languages show that English is the dominant language in Canada for both natives and immigrants. The percentage of immigrants who speak English only is much larger than that of Canadian natives, whereas Canadian natives account for a higher percentage of those speaking French only. The percentage of immigrants with the knowledge of French is relatively smaller than that of Canadian natives. The number of

workers who can speak both English and French is higher in the public than in the private sector, for both immigrant and native males and females.

For the immigrants, the number of years since migration is larger for those in the public sector than for those in the private sector. The differences are 3.2 years for males and 2.5 years for females, respectively. The reasons may include citizenship requirements and more selective hiring processes in the public sector. Looking at the places of birth, for both males and females, there are almost 30 percent of immigrants in the public sector and 25 percent of immigrants in the private sector who were born in Europe. China is the largest single country of immigration that accounts for about 10 percent of the total. Furthermore, for both males and females, immigrants originating from Europe and North America are relatively more likely to work in the public sector, while the Chinese and Indian immigrants are relatively more likely to be employed in the private sector.

Finally, the values of the geographic variables show that Ontario is the most popular province for immigrants, with more than half of them living there. In contrast, the proportion of Canadian-born workers who live there is approximately 38 percent for both males and females. Furthermore, the population of Canadian natives living in Quebec is more than twice as large as that of immigrants. Canadian natives are also more likely than immigrants to live in Manitoba, Saskatchewan and Alberta, with the exception of the public sector employees of Alberta. Additionally, immigrants consider British Columbia as their second best residence after Ontario since 15 percent of males and 16 percent of female live there, compared with 12 percent of male and 11 percent of female Canadian natives. Looking at the CMAs, Canadian-born workers are less likely to live in large metropolitan areas than immigrants,

with around 70 percent of them living in the rest of Canada. Toronto is doubtless the city that contains the highest proportion of immigrants, followed by Vancouver and Montreal.

4. Econometric model

In this section, I provide an overview of the econometric model used to estimate the wage gap between Canadian-born and immigrant workers in the public and private sectors. The first statistical framework is ordinary least square (OLS) regression, and then the technique of Oaxaca decomposition is applied to analyze the components of the wage differentials between public and private sectors.

4.1 Common OLS regression wage regressions for both Canadian-born and immigrant

The specification of this regression is the same for the Canadian-born and the immigrants and does not include the variables that are specific to immigrants. Let the superscripts j denote an individual who is either Canadian-born (C) or immigrant (I), and let G and P denote public (government) and private sectors, respectively. Then the OLS regressions for Canadian natives and immigrants are specified as

$$ln\,(wage)_G^j = X_G^j \beta_G^j + \varepsilon_G^j \quad (1a)$$

$$ln\,(wage)_P^j = X_P^j \beta_P^j + \varepsilon_P^j \quad (1b)$$

where $ln(wage)^j$ represent the natural logarithm of the annual wage of an individual in group j. X^j denotes a vector of four of the categories of independent variables described above, which are human capital, demographic, language skill, and geographic characteristics. β^j is a vector of coefficients for the explanatory variables to be estimated, and ε^j is an error term that is assumed to be independent of all explanatory variables and to follow multivariate normal distribution with mean zero and covariance matrix Σ.

4.2 Specific OLS wage regression for immigrants

In addition to the above model, I estimate another model that includes variables that are specific to immigrants (years since migration and country of origin). Let the superscripts *I* denote immigrants. Then the regression for immigrants is now modeled as

$$ln\ (wage)_G^I = X_G^I \beta_G^I + Y_G^I \gamma_G^I + \varepsilon_G^I \quad (2a)$$

$$ln\ (wage)_P^I = X_P^I \beta_P^I + Y_P^I \gamma_G^I + \varepsilon_P^I \quad (2b)$$

where $ln(wage)^I$ represent the natural logarithm of the annual wage just for immigrants. The component of X^I is the same as mentioned above. Furthermore, Y^I denote a vector of immigrant specific characteristics that include years since migration and place of birth, and γ^I denote a vector of its coefficients to be estimated. ε^I is the associated error term.

4.3 Oaxaca decomposition

In addition to the above methodology, the Oaxaca decomposition technique is applied to decompose the wage gaps between public and private sectors among immigrants and among Canadian-born workers. The wage gap is decomposed into an explained part and unexplained part. Again, let the superscripts *j* denote an individual who is either Canadian natives or immigrants, and let *G* and *P* denote public and private sector, respectively. Then

$$\overline{ln(wage)}_G^j = \bar{X}_G^j \beta_G^j \quad (3a)$$

$$\overline{ln(wage)}_P^j = \bar{X}_P^j \beta_P^j \quad (3b)$$

where the bar signs over variables indicate the mean values. Therefore, the Oaxaca decomposition for the average logarithmic annual wage gap between public and private sector is modeled as

$$\overline{ln(wage)}_G^j - \overline{ln(wage)}_P^j = \bar{X}_G^j\beta_G^j - \bar{X}_P^j\beta_P^j + \bar{X}_P^j\beta_G^j - \bar{X}_P^j\beta_G^j$$

$$= (\bar{X}_G^j - \bar{X}_P^j)\,\beta_G^j + \bar{X}_P^j(\beta_G^j - \beta_P^j) \quad (3c)$$

The first term of right-hand-side in the decomposition (3c) is the explained component of wage gap. This component represents public-private sector wage gap due to observed productivity-related characteristics in the different categories. This wage gap is evaluated with the coefficients of the public sector employees. The second term of right-hand-side in the decomposition (3c) is the unexplained component of wage gap. This component represents public-private sector wage gap due to differences in coefficients. According to the previous literature , this component is known as the public sector wage premium or wage rent that is defined as differences between the returns to characteristics across the two sectors. Note that the two specifications of equations (1a), (1b), and (2a), (2b) will be used in the Oaxaca decomposition.

5. Empirical results

In this section, the empirical results are presented and discussed. Table 3 to Table 6 first provide the results of the wage regression equations for males and females respectively. The coefficient estimates of the explanatory variables will be analyzed to explain wage gaps between Canadian natives and immigrants in the public and private sectors. Table 7 and Table 8 report Oaxaca decompositions of the public-private sector wage gap in order to investigate public sector wage premium.

5.1 OLS regression results for male workers

5.1.1 Returns to characteristics in the public sector

As shown in Table 3, the estimated coefficient of years of schooling for male natives is

the same as that of the immigrants with the regression specific to them, but it is higher than that of immigrants with the common regression in the public sector. The return to years of experience is higher for Canadian natives (evaluated at zero years of experience) than for immigrants regardless of the immigrant specification. Furthermore, the estimated returns to human capital variables are all statistically significant, which means the wages of both native and immigrant males in the public sector increase with educational attainment and work experience. However, the coefficient of post-secondary study in Canada for male natives is smaller than that of immigrants with the common regression, but much greater than that of immigrants in the specific immigrant regression. Hence, the returns to foreign schooling are valued significantly less than those of domestic schooling in the public sector since almost half of male immigrants' educational attainments are acquired outside Canada.

In terms of demographic characteristics, the married male natives and immigrants with the common regression earn respectively 14 percent and 7.8 percent more than their unmarried counterparts, and the estimated coefficients are statistically significant. The return to married male natives in the public sector is larger than that of married immigrants regardless of the immigrant specification.

Considering language skills, there is no doubt that the return to the knowledge of both English and French is much higher than that of English only in the public sector. In addition, the public sector rewards knowing English only to knowing French only since Canadian natives and immigrants in the common regression will earn respectively 6.4 percent and 14.1 percent less if they only know French. Finally, the wage of male immigrants in the public sector is negatively influenced if they can speak neither English nor French.

In the immigrant specifications, years since migration contribute to the wages received by male immigrants in the public sector, with an increase of 0.6 percent per year. Furthermore, compared to North America, all the place of birth variables have negative effects on the wages of immigrants obtained in the public sector, with the exception of Europe.

Finally, the geographic variables indicate that only male employees who live in Alberta earn more than those who live in Ontario, with a premium of 8.1 percent for Canadian natives and of 2.0 percent for immigrants. The other provinces of residence are all negatively related to Ontario in terms of wages in the public sector. The Canadian natives who reside in Quebec suffer the most wage disadvantages, while for immigrants, those in Manitoba and Saskatchewan receive the lowest wages compared to those in Ontario. In addition, only individuals living in Montreal, particularly the immigrants, earn less than residents of Toronto. The return to living in Vancouver for natives is higher than that of immigrants, while the reverse situation happens in the ROC.

5.1.2 Returns to characteristics in the private sector

According to Table 4, the return to years of schooling for male immigrants is slightly lower than that of Canadian natives in the private sector. Canadian natives earn about 2 percentage points more per year of experience than their counterparts in the private sector (evaluated at zero years of experience). For the variable of post-secondary study in Canada, it is noteworthy that its estimated coefficient for the immigrants in the common regression in the private sector is 11.2 percentage points higher than that of the Canadian natives. This can be explained by that the majority of the Canadian-born in the reference category have no post-secondary education. However, immigrants' highest post-secondary certificates are

shown to be valued significantly in the private sector if they are obtained in Canada.

The magnitude of the coefficient for married male natives in the private sector is 6.9 percentage points higher than that of married immigrants. The coefficients are all statistically significant at the one percent level.

For language skills, the penalty for not knowing one of Canada's official languages is 18.4 percent for male immigrants in the private sector when considering the immigrant specific regression. In addition, the advantages to Canadian natives is 3.4 percent if they can speak both English and French, which is 3.1 percentage points less than that of immigrants with the common regression, but 1.2 percentage points greater than that of immigrants in the specific regression. The sign of coefficient for French only is negative compared to English only, and the magnitude is larger for immigrants in the specific regression.

In terms of the immigrant specific variables, the annual wages of male immigrants in the private sector increase 0.6 percent with each additional year since migration. Compared to North America, only the variables of China and Others among the places of birth have negative effects on the wages of immigrants. The other places of birth are all positively related to immigrants' wages, especially the origins from Europe.

Based on the results of geographic variables, it is interesting to observe that the returns to immigrants living in the Manitoba & Saskatchewan group and in British Columbia, compared to those living in Ontario, are negative, but that those of Canadian natives living in these two locations are positive. In addition, for both Canadian natives and immigrants in the private sector, individuals residing in Quebec suffer wage disadvantages compared to those living in Ontario, whereas positives returns are enjoyed by those who reside in Alberta. The

explanation for this phenomenon is that the industry of oil exploitation enhances the economic development in Alberta. Compared to Toronto, the coefficient of Montreal is positive for immigrants in the common regression model but negative in the immigrant specific model, and the reverse situation happens for immigrants in Vancouver. The return to immigrants in the ROC is greater than for those in Toronto. Furthermore, all the male natives in the private sector who reside in metropolises other than Toronto will earn less than those who live in Toronto.

5.1.3 Differences in returns to characteristics across sectors

Compared to the public sector, the returns to years of schooling in the private sector are greater for both male natives and immigrants. Educational attainment is rewarded more prominently in the private sector. However, for two immigrants with same years of experience, the earnings will be 1.2 percentage points less per year for the one who works in private sector. For the variable of post-secondary study in Canada, it is noteworthy that its estimated coefficient for male immigrants in the private sector is much larger than that in the public sector. This suggests that immigrants' highest post-secondary certificates are valued significantly in the private sector if they are attained in Canada.

In regard to marital status, the returns to married male employees in the private sector are on average higher than those in the public sector.

The signs of the estimated coefficients for official language in the private sector are the same as those in the public sector. The advantage to bilingualism is generally higher in the public sector. For a male immigrant who cannot speak either English or French, the penalty is much greater if he is working in the private sector.

The estimated coefficients of years since migration are identical across sectors. Moreover, in both sectors, European immigrants earn more than North American immigrants, and the European immigrants earn 8.7 percentage points more if they work in the private sector. For the other places of birth, the estimated coefficients of South America, Africa and India are negative in the public sector, but they become positive in the private sector compared to North America.

Considering province of residence, the private sector male employees who live in Alberta generally earn more than their counterparts in the public sector. Another interesting result is that the return to natives in the public sector who live in the Manitoba & Saskatchewan group and in British Columbia, compared to Ontario, is negative, whereas it becomes positive if they work in the private sector. Additionally, Montreal residents earn less than those in Toronto whether they are Canadian natives or immigrants, and in both the public and the private sector. For the Canadian natives residing in Vancouver and the ROC, it is preferable for them to work in the public sector

5.2 OLS regression results for female workers

5.2.1 Returns to characteristics in the public sector

Based on results from Table 5, female immigrants with the common regression have a huge 4.8 percentage point lower return to education than their Canada-born counterparts in the public sector. In contrast, the return to post-secondary study in Canada is higher for immigrants than for native born women. The explanation is that most of the Canadian-born in the reference category have no post-secondary education. However, it still implies that immigrants' educational attainments are encouraged more in the public sector as long as they

are acquired in Canada. The coefficients of the human capital variables are all positive and statistically significant at the 1 percent level.

Female married immigrants with the specific immigrant regression earn less than those who are not married, though the magnitude is actually almost zero. The return to being married for female natives is 1.5 percent compared to those not married natives in the public sector and statistically significant at 5 percent level.

About language skills, the advantage of knowing both official languages is higher for female immigrants than for Canadian natives in the public sector.

The return to years since migration for female immigrants in the public sector is 0.7 percent. Furthermore, the signs of coefficients for places of birth are all negative with the exception of China, and the magnitude of India is the largest of all, accounting for -7.4 percent.

With respect to geographic variables, Alberta still has wage advantages compared to Ontario, especially for female natives in the public sector. The returns to the other provinces of residence are all negative in relation to Ontario for both female natives and immigrants. Moreover, a woman living in Montreal earns less than in Toronto, but this disadvantage is lower if she is born in Canada. The immigrants with the common regression can earn 11.1 percentage points more than Canadian natives when they live in the ROC, whereas they will earn 2.1 percentage points less than their native counterparts if they live in Vancouver.

5.2.2 Returns to characteristics in the private sector

Table 6 indicates that the return to years of schooling in the private sector is 3.0 percentage points higher for female natives then for female immigrants, and the difference is

1.5 percentage points for the return to years of experience. Furthermore, the difference in wages received by immigrants in the common regression compared to Canadian natives is 19.7 percentage points if they acquired their highest post-secondary certificates in Canada. Keep in mind that the reference category includes those with no post-secondary degree who studied in Canada.

Compared to women in the private sector who are not married, the return to married Canadian-born females is 4.4 percent and it is statistically significant at the 1 percent level, while that of married female immigrants in the common regression model is only 0.9 percent and not statistically significant.

Considering language skills, the penalty to women in the private sector who can speak French only is about the same for the Canadian natives and the immigrants. Compared to English only, the return to bilingualism is 8.3 percentage points lower for the Canadian natives than for the immigrants in the common regression model.

The effect of years since migration for female immigrants in the private sector is 0.6 percent and statistically significant at the 1 percent level. Moreover, the returns to female immigrants who are born in South America, Europe and China are positive compared to those of immigrants from North America, and Europe has the largest magnitude with 8.0 percent higher earnings than the reference group of women from North America.

For both female natives and immigrants in the private sector, the sign of the coefficient for Alberta is positive, indicating a higher wage than that in Ontario, whereas the coefficients for Quebec and British Columbia are negative. The return to immigrants in the common regression model is 14.8 percentage point lower than that of Canadian natives with respect to

residence in Alberta. The coefficient of the Manitoba & Saskatchewan group is positive for Canadian natives but negative for immigrants. Additionally, the wage of a woman in the private sector is negatively affected in comparison to Toronto if she lives in Montreal or the ROC. The coefficient of Vancouver is negative for Canadian natives and immigrants in the common regression, but it changes to positive for immigrants in the immigrant specifications.

5.2.3 Differences in returns to characteristics across sectors

The difference between female natives and immigrants in the common regression in return to years of schooling is 1.1-percentage point higher in the public sector than in the private sector, which suggests that the gap regarding return to educational attainment is wider in the public sector. By contrast, the difference in return to years of schooling between male natives and immigrants in the common regression was almost the same across the sectors. There is almost no difference with respect to the effect of years of experience across sectors for both natives and immigrants. The return to post-secondary study in Canada is highest for female immigrants working in the private sector.

Considering marital status, only the coefficient of married female immigrants with the immigrant specific regression model in the public sector is negative compared to the reference group of not married. The return to married natives is 2.9 percentage points much greater in the private sector than in the public sector.

In comparison to English only, the penalty of knowing French only or neither English nor French is larger in the private sector, whereas bilingualism is rewarded more in the public sector for both female natives and immigrants. For male immigrants, however, the penalty of knowing French only was higher in the public sector, while that of knowing neither English

nor French was greater in the private sector. The return to bilingualism for male natives is larger in the public sector.

The earning differentials in terms of the effect of years since migration across sectors are extremely small. For place of birth, the private sector immigrants from South America, Europe and China can earn positive wages compared to those from North America, whereas the return to the public sector immigrants is positive only if they come from China. A European immigrant female can enjoy a high 8.0 percent wage advantage if she works in the private sector.

For both female natives and immigrants, the estimated coefficients of Quebec and British Columbia are negative, compared to the reference category of Ontario, whereas the returns to living in Alberta are positive and their magnitudes are generally larger in the private sector. For the residents of Manitoba and Saskatchewan, only the private sector natives enjoy a wage advantage. Furthermore, both female natives and immigrants living in Montreal earn less than those living in Toronto. For the variable of Vancouver, the wage gap is in favour of female natives in the public sector, but it is in favour of immigrants in the private sector. Only the public sector immigrant women residing in the ROC show a positive effect on their wages in comparison to those of Toronto.

5.3 Oaxaca decomposition

5.3.1 Decomposition of public-private sector wage gap for males

The results of the Oaxaca decomposition are shown in Table 7. According to first column, the public-private sector total wage gap for male natives is 19.5 percent in favour of the public sector. The explained and unexplained part account for 12.4 and 7.1 percentage points

respectively. Therefore, the wage gap due to differences in endowments for the Canadian-born males is higher than the one due to the public sector wage premium. Education and experience taken together represent 11.3 percentage points in the explained part, which indicates that the different levels of human capital across sectors account significantly in the endowment component of the sectorial wage differentials. A negative sign for province of residence shows an advantage in the private sector, but the magnitude is not very large. The contributions of CMA and of other characteristics are also relatively small in the explained part. In the unexplained part, a negative 19.2 percentage points for education and experience (mainly due to education) indicates a large disadvantage to the public sector in the returns to human capital. The positive signs of official language and CMA in the unexplained part suggest an advantage to the public sector, whereas the signs of marital status and province of residence are negative. However, the 28.9 percent effect of the constant term, which represents some unknown factors, in the unexplained part is large enough to offset those advantages to the private sector.

The second column in Table 7 reports that the total public-private wage gap for male immigrants is 23.1 percent, which is 3.6 percentage points higher than that of Canadian natives. However, in the regression model that is common the Canadian natives and the immigrants, 10.5 percentage points are included in the explained part and 12.6 percentage points are included in the unexplained part, which indicates that the wage gap for immigrant males is due more to the public sector wage premium than to differences in endowments. The effects of education, official language and province of residence in the explained part for immigrants with the common regression model are almost the same as those of the Canadian

natives. It is worthwhile to note that the effect of experience in the explained part is 1.7 percentage point smaller for immigrants in the common regression model than for Canadian natives. Therefore, Canadian natives' stock of experience is higher in the public sector. The contribution of marital status decreases significantly in the explained part but the effect of CMA is more important compared to that of Canadian natives. Considering the unexplained part, the disadvantage to the public sector due to education is 1.9 percentage points more for immigrants in the common regression model than that of Canadian natives. The effect of experience for immigrants in the common regression is now in favour of the public sector, accounting for 12 percentage points. Compared to Canadian natives, there are no important changes in the contributions of marital status and of official language for immigrants in the common regression model. The province of residence becomes an advantage to the public sector, whereas the CMA is in favour of the private sector. However, the entire disadvantage to the public sector in the unexplained part is again counterbalanced by a large 25.7 percentage point effect of the constant term.

With the immigrant specific model shown in the third column of Table 7, the explained part of the public-private wage gap for male immigrants increases to 13.0 percentage points, which is 3.0 percentage points higher than the unexplained part. Therefore, the differences in endowments of male immigrants with the immigrant specific regression model contribute more to explaining the sectorial wage gap than the public sector wage premium. There are no major changes in the components of the explained part compared to the common regression model, except that CMA can explain 0.6 fewer percentage points for the endowment differentials. The 2.9 percentage point effect of the immigrant variables indicates that those

characteristics play an important contribution to the advantage of public sector immigrants. Immigrant males in the public sector have more years since migration and come from better countries than those in the private sector. Furthermore, the negative 16.0 percentage point effect of education in the unexplained part implies a smaller advantage of 4.3 percentage points to the private sector in comparison to immigrants in the common regression. The signs of marital status and CMA are still negative but their total magnitudes decreases by 1.5 percentage points, which means that more advantages are attributed to the public sector. The immigrant variables in the unexplained part become in favour of the private sector, accounting for a negative 4.3 percentage points. The constant term effect for immigrants in the specific regression is 5.7-percentage point lower than that of immigrants in the common regression model.

5.3.2 Decomposition of public-private sector wage gap for females

Based on the first column in Table 8, the total public-private sector wage gap for female natives is 25.4 percent, which is 5.9 percentage points larger than for males. The sectorial wage gap is constituted of 14.6 percentage points in the explained part and 10.8 percentage points in the unexplained part. Thus, the sectorial wage gap for native females is dominated by their superior endowment in the public sector. Within the explained part, human capital characteristics, with 13.8 percentage points due to education together with 0.8 percentage points due to experience, are the most important contributors. The negative effects of province of residence and CMA indicate a disadvantage to the public sector, whereas marital status and official language are in favour of the public sector. Compared to a negative 18.4 percent effect of education in the unexplained part for male natives, the coefficient of

education for female natives is a positive 4.2 percent that represents advantages to the public sector. The official language and CMA effects in the unexplained part favour positively the public sector, and this is especially the case for the CMA that accounts for 9.0 percentage points. The other characteristics are all in favour of the private sector. However, these disadvantages to the public sector are offset by a 7.6 percentage point effect of the constant term in the unexplained part.

For the female immigrants, the public-private sector total wage gap of 24.0 percent is slightly lower than that of Canadian natives. However, as shown in the common regression model in the second column of Table 8, the unexplained part of the gap for immigrants is larger than the explained part, with a 4.8 percentage point difference. Therefore, the sectorial wage gap for female immigrants is due mainly to the public sector wage premium, which is consistent with what was found for male immigrants in the common regression. In the explained part, the advantage of education to the public sector immigrants is 6.0 percentage points lower than that of Canadian natives. The contribution of experience for female immigrants is similar to that of Canadian natives. The advantage to the public sector caused by the official language characteristics of the immigrants in the common regression model is 0.8 percentage points more than that of the Canadian natives, and the CMA effect becomes in favour of the public sector. Unlike female natives but similar to both male immigrants and natives, education in the unexplained part for female immigrants is in favour of the private sector. In contrast to female natives, the experience of female immigrants in the unexplained part has positive effect on the public sector. The effects of the other characteristics for female immigrants have the same signs as those for Canadian natives, but their magnitudes are lower.

The constant term for the immigrants in the common regression model accounts for 26.6 percentage points, which is much larger than for the Canadian natives.

The last column of Table 8 shows the results for the immigrant specific regression model. The explained part grows by 1.3 percentage points compared to the common regression model, but it is still smaller than the unexplained part. The immigrant variables show that female immigrants have better characteristics in the public sector which represent 1.9 percentage points. The effect of marital status is zero and the contribution of CMA is reduced slightly by 0.4 percentage points. All the effects of the other productivity-related characteristics in the immigrant specific model in the explained part are similar to those in the common regression model. With regard to the unexplained part, the signs are consistent with those in the second column. The negative effect to the public sector caused by education is reduced by 3.8 percentage points in the specific regression model. The negative 4.6 percentage point effect of the coefficients of the immigrant variables indicates a disadvantage to the public sector. Again, the constant term effect of immigrants with the specific regression is large, but its 1.1 percentage point lower than that of immigrants in the common regression model.

6. Conclusion

This paper examined the public-private sector wage gap between Canadian natives and immigrants based on the 2011 NHS data set. I first investigated some of the previous literature in relation to this issue, and then I constructed my own econometric model using OLS regression and Oaxaca decomposition methodology. The private sector consists of all the industry categories from the 2011 NHS data, with the exception of public administration,

educational services, and health care and social assistance, which define the public sector. There are three main conclusions from my study.

First, I find that the average annual wages in the public sector are generally higher than those of the private sector for both male and female employees. This result corroborates the finding of Tiaga (2010) that the public-private wage gaps for male and female workers were respectively 31 percent and 51 percent. I find no wage gap between male natives and immigrants in the public sector, but male natives in the private sector annually earn $2,500 more than their counterparts in the public sector. The wage gaps between female natives and female immigrants in the public and private sector are $1,600 and $1,200 respectively. For males, the years of schooling and experience are on average larger for male immigrants than for Canadian natives, no matter which sector they are in, whereas those of female immigrants are about the same as those of Canadian natives in both sectors. Both male and female immigrants are more likely to be married than Canadian natives. English is the most prevailing official language in the labour market of Canada. Among places of birth, Europe is an important source of immigrants, but China and India are the most important single countries for immigrants. The geographic variables indicate that immigrants prefer living in the large provinces and metropolitan areas.

My second main result is that the returns to years of schooling in the private sector are generally greater than those in the public sector for both male natives and immigrants, but this situation is less obvious for the females. This may be explained by the fact that the public sector generally has better anti-discrimination policies than the private sector. Both male and female immigrants' highest post-secondary certificates are rewarded significantly in the

private sector as long as they are acquired in Canada. In both sectors, an employee who is married and who knows both English and French has a higher wage, and the annual wage of an immigrant increases by 0.6 percent for each additional year since migration. All immigrants from Europe enjoy a wage advantage relative to other places of birth with the exception of females in the public sector. Whether for natives or immigrants, for males or females, or for public or private sector, the wage in Alberta higher than that in Ontario, whereas the return to Montreal residents is negative relative to that of Toronto residents.

Finally, I find that the sex of an immigrant matters when it comes to understanding the gap between the public and the private sector. In particular, the Oaxaca decompositions show that the public-private wage gap is 3.6 percentage points higher for male immigrants and 1.4 percentage points lower for female immigrants than that of their Canadian natives counterparts. The explained part is larger than the unexplained part for both male and female natives. For the immigrants, however, the unexplained part is always larger than the explained part, except for male immigrants with the immigrant specific regression. Therefore, the sectorial wage gap of Canadian natives is explained relatively more by the difference in productivity-related characteristics, whereas the gap of immigrants is largely due to public sector wage premium. In addition, the contribution of education and experience in the explained part of the wage gap is remarkably in favour of the public sector. All the other characteristics in the explained part also favour the public sector, with the exception of province of residence. In contrast, the effects of characteristics such as education and experience in the unexplained part show negatives signs, indicating a disadvantage to the public sector. However, those disadvantages are offset by a large constant term effect in the

unexplained part.

To sum up, workers in the public sector earn more than their counterparts with the same endowments in the private sector. Comparing Canadian natives to immigrants, the wage advantage to male natives is significantly greater in the private sector, whereas the wage gap in favour of female natives is slightly higher in the public sector. Educational attainment and work experience acquired in Canada play an important role in determining wages of Canadian natives and immigrants in both sectors.

In order to alleviate the wage gaps between the public and the private sector, it is important for the governments to implement anti-discrimination policy that contributes to the equity of wages. In addition, governments should facilitate the recognition of immigrants' foreign certificates, making immigrants more likely to earn a wage that corresponds to their educational attainment. Finally, according to Coulombe, Grenier and Nadeau (2014), it may be more efficient to select immigrants based on cognitive and professional accreditation tests, instead of on the stock of education and work experience.

References

Coulombe, Serge, Gilles Grenier and Serge Nadeau. (2014). Human capital quality and the immigrant wage gap. *IZA Journal of Migration*, 3(1), 1-22.

Gunderson, Morley. (1979). Earnings differentials between the public and private Sectors. *Canadian Journal of Economics*, 12(2), 228-242.

Hou, Feng and Simon Coulombe. (2010). Earnings Gaps for Canadian Born Visible Minorities in the Public and Private Sectors. *Canadian Public Policy*, 36(3), 29-43.

Mueller, Richard E. (1999). Public-private sector wage differentials in Canada: evidence from quantile regressions. *Economic Letters*, 60(2), 229-235.

Nadeau, Serge. (2010). Another look at the Francophone wage gap in Canada: public and private sectors, Québec and outside Québec. *Canadian Public Policy*, 36(2), 159-179.

Nadeau, Serge. (2013). *The Immigrant Wage Gap in Canada: Differences between the Public and the Private Sector*. Department of Economics, University of Ottawa, Working Paper No. 1301E.

Nadeau, Serge and Aylin Seckin. (2010). The Immigrant Wage Gap in Canada: Quebec and the Rest of Canada. *Canadian Public Policy*, 37(1), 265-285.

Prescott, David and Bo Wandschneider. (1999). Public/private sector wage differentials in Canada–evidence from the 1991 and 1982 surveys of consumer finance. *Applied Economics*, 31(6), 723–731

Shapiro, Daniel M. and Morton Stelcner. (1989). Canadian Public–Private Sector Earnings Differentials, 1970–1980. *Industrial Relations*, 28(1), 72–81.

Tiagi, Raaj. (2010). Public Sector Wage Premium in Canada: Evidence from Labour Force Survey. *LABOUR*, 24(4), 456–473.

Table 1: Common characteristics of Canadian-born and immigrants, males

Variables	Public sector		Private sector	
	Canadian-born	Immigrant	Canadian-born	Immigrant
Annual wages	69,800	69,800	61,200	58,700
***Ln* Annual wages**	11.042	11.018	10.847	10.787
Years of schooling	14.7	15.7	13.1	14.0
Years of experience	22.6	23.9	21.9	24.0
Post-secondary study in Canada	.785	.533	.609	.347
Marital status				
Married	.746	.794	.672	.787
Not married	.254	.206	.328	.213
Official language				
English only	.597	.755	.656	.815
French only	.104	.035	.123	.028
Both English and French	.299	.201	.220	.130
Neither English nor French[2]	-	.009	-	.027
Years since migration	-	22.7	-	19.5
Place of birth				
North America	-	.119	-	.101
South America	-	.036	-	.051
Europe	-	.311	-	.256
Africa	-	.106	-	.070
China	-	.090	-	.114
India	-	.066	-	.096
Others	-	.211	-	.276
Province of residence				
Ontario	.384	.515	.376	.566
Quebec	.291	.163	.283	.138
Manitoba & Saskatchewan	.091	.050	.080	.038
Alberta	.114	.120	.140	.105
British Columbia	.120	.152	.121	.154
Census metropolitan area (CMA)				
Toronto	.095	.310	.121	.423
Montreal	.108	.128	.128	.123
Vancouver	.049	.103	.059	.128
Rest of Canada (ROC)	.747	.459	.693	.326
Number of observations	16,746	3,737	65,652	21,079

[2] This variable was not included for the Canadian-born because the number of observations was too small.

Table 2: Common characteristics of Canadian-born and immigrants, females

Variables	Public sector		Private sector	
	Canadian-born	Immigrant	Canadian-born	Immigrant
Annual wages	56,600	55,000	46,300	45,100
***Ln* Annual wages**	10.813	10.762	10.559	10.522
Years of schooling	14.8	14.9	13.3	13.8
Years of experience	21.9	24.3	22.0	24.0
Post-secondary study in Canada	.838	.542	.596	.339
Marital status				
Married	.678	.703	.626	.703
Not married	.322	.297	.374	.297
Official language				
English only	.589	.785	.630	.819
French only	.148	.043	.135	.026
Both English and French	.264	.164	.235	.118
Neither English nor French[3]	-	.008	-	.037
Years since migration	-	22.4	-	19.9
Place of birth				
North America	-	.153	-	.099
South America	-	.045	-	.054
Europe	-	.287	-	.248
Africa	-	.072	-	.051
China	-	.086	-	.142
India	-	.068	-	.091
Others	-	.237	-	.276
Province of residence				
Ontario	.388	.555	.388	.596
Quebec	.299	.136	.298	.121
Manitoba & Saskatchewan	.090	.041	.074	.030
Alberta	.110	.106	.128	.095
British Columbia	.113	.160	.113	.158
Census metropolitan area (CMA)				
Toronto	.100	.362	.142	.461
Montreal	.118	.112	.149	.108
Vancouver	.048	.115	.056	.134
Rest of Canada (ROC)	.735	.410	.654	.296
Number of observations	30,273	6,888	40,284	14,003

[3] This variable was not included for the Canadian-born because the number of observations was too small.

Table 3: OLS regression results of the public sector, males

	Public sector		
	Canada-born with common regression	**Immigrant with common regression**	**Immigrant with specific regression**
A. Education			
Years of schooling	.047*** (.002)	.039*** (.003)	.046*** (.003)
Post-secondary study in Canada	.072*** (.012)	.096*** (.019)	.013 (.024)
B. Experience			
Years of experience	.047*** (.002)	.039*** (.004)	.037*** (.005)
Years of experience^2 ×1000	-.822*** (.039)	-.593*** (.084)	-.658*** (.092)
C. Marital status (Reference group: not married)			
Married	.140*** (.009)	.078*** (.024)	.109*** (.025)
D. Official language (Reference group: English only)			
French only	-.064*** (.019)	-.141** (.057)	-.132** (.063)
Both English and French	.056*** (.012)	.053* (.028)	.066** (.031)
Neither English nor French[4]	-	-.084 (.111)	-.083 (.118)
E. Immigrant variables			
Years since migration	-	-	.006*** (.001)
Place of birth (Reference group: North America)			
South America	-	-	-.006 (.050)
Europe	-	-	.031 (.025)
Africa	-	-	-.071* (.041)

[4] This variable was not included for the Canadian-born because the number of observations was too small.

China	-	-	-.011 (.035)
India	-	-	-.036 (.050)
Others	-	-	-.107*** (.032)
F. Province of residence (Reference group: Ontario)			
Quebec	-.174*** (.015)	-.140** (.059)	-.119** (.058)
Manitoba & Saskatchewan	-.107*** (.015)	-.151*** (.039)	-.173*** (.047)
Alberta	.081*** (.013)	.020 (.032)	.050 (.032)
British Columbia	-.073*** (.016)	-.001 (.036)	-.014 (.041)
G. Census metropolitan area (CMA) (Reference group: Toronto)			
Montreal	-.026 (.021)	-.081 (.064)	-.110* (.064)
Vancouver	.069*** (.026)	.009 (.051)	.019 (.064)
Rest of Canada (ROC)	.006 (.015)	.109*** (.025)	.077*** (.026)
Constant	9.678*** (.035)	9.757*** (.066)	9.655*** (.089)
R-squared	0.206	0.143	0.189
Number of observations	16,746	3,737	3,737

Notes: Standard errors are in parentheses.

* statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Table 4: OLS regression results of the private sector, males

	Private sector		
	Canada-born with common regression	**Immigrant with common regression**	**Immigrant with specific regression**
A. Education			
Years of schooling	.061*** (.001)	.051*** (.002)	.055*** (.002)
Post-secondary study in Canada	.071*** (.007)	.183*** (.010)	.110*** (.012)
B. Experience			
Years of experience	.045*** (.001)	.028*** (.002)	.025*** (.002)
Years of experience^2 ×1000	-.722*** (.018)	-.400*** (.036)	-.444*** (.037)
C. Marital status (Reference group: not married)			
Married	.210*** (.005)	.141*** (.012)	.158*** (.013)
D. Official language (Reference group: English only)			
French only	-.071*** (.013)	-.067** (.031)	-.083** (.032)
Both English and French	.034*** (.009)	.065*** (.019)	.022 (.0198)
Neither English nor French[5]	-	-.248*** (.030)	-.184*** (.032)
E. Immigrant variables			
Years since migration	-	-	.006*** (.001)
Place of birth (Reference group: North America)			
South America	-	-	.002 (.026)
Europe	-	-	.118*** (.016)
Africa	-	-	.050** (.021)

[5] This variable was not included for the Canadian-born because the number of observations was too small.

China	-	-	-.007 (.020)
India	-	-	.004 (.021)
Others	-	-	-.052*** (.016)
F. Province of residence (Reference group: Ontario)			
Quebec	-.132*** (.012)	-.266*** (.044)	-.171*** (.051)
Manitoba & Saskatchewan	.015* (.009)	-.130*** (.024)	-.096*** (.026)
Alberta	.239*** (.008)	.083*** (.018)	.127*** (.020)
British Columbia	.020* (.0104)	-.005 (.028)	-.038 (.034)
G. Census metropolitan area (CMA) (Reference group: Toronto)			
Montreal	-.009 (.012)	.067 (.043)	-.008 (.049)
Vancouver	-.026* (.016)	-.009 (.031)	.030 (.037)
Rest of Canada (ROC)	-.090*** (.008)	.089*** (.013)	.045*** (.015)
Constant	9.387*** (.021)	9.500*** (.032)	9.436*** (.048)
R-squared	0.216	0.132	0.153
Number of observations	65,652	21,079	21,079

Notes: Standard errors are in parentheses.
* statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Table 5: OLS regression results of the public sector, females

	Public sector		
	Canada-born with common regression	**Immigrant with common regression**	**Immigrant with specific regression**
A. Education			
Years of schooling	.088*** (.002)	.047*** (.003)	.058*** (.004)
Post-secondary study in Canada	.032*** (.012)	.129*** (.015)	.057*** (.017)
B. Experience			
Years of experience	.039*** (.001)	.032*** (.003)	.030*** (.003)
Years of experience^2 ×1000	-.577*** (.028)	-.444*** (.063)	-.506*** (.067)
C. Marital status (Reference group: not married)			
Married	.015** (.007)	.001 (.016)	-.002 (.017)
D. Official language (Reference group: English only)			
French only	-.018 (.014)	.002 (.050)	.017 (.053)
Both English and French	.098*** (.010)	.146*** (.025)	.128*** (.026)
Neither English nor French[6]	-	-.136 (.094)	-.033 (.084)
E. Immigrant variables			
Years since migration	-	-	.007*** (.001)
Place of birth (Reference group: North America)			
South America	-	-	-.059 (.042)
Europe	-	-	-.031 (.020)
Africa	-	-	-.049 (.035)

[6] This variable was not included for the Canadian-born because the number of observations was too small.

China	-	-	.004 (.030)
India	-	-	-.074** (.036)
Others	-	-	-.059** (.023)
F. Province of residence (Reference group: Ontario)			
Quebec	-.182*** (.012)	-.145** (.057)	-.188** (.093)
Manitoba & Saskatchewan	-.032*** (.012)	-.175*** (.043)	-.156*** (.045)
Alberta	.068*** (.011)	.006 (.027)	.031 (.030)
British Columbia	-.072*** (.012)	-.010 (.035)	-.022 (.040)
G. Census metropolitan area (CMA) (Reference group: Toronto)			
Montreal	-.063*** (.015)	-.174*** (.059)	-.129 (.095)
Vancouver	.009 (.021)	-.012 (.042)	-.003 (.047)
Rest of Canada (ROC)	-.050*** (.011)	.061*** (.020)	.033 (.022)
Constant	9.051*** (.036)	9.533*** (.062)	9.398*** (.081)
R-squared	0.209	0.115	0.144
Number of observations	30,273	6,888	6,888

Notes: Standard errors are in parentheses.

* statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Table 6: OLS regression results of the private sector, females

	Private sector		
	Canada-born with common regression	**Immigrant with common regression**	**Immigrant with specific regression**
A. Education			
Years of schooling	.086*** (.002)	.056*** (.002)	.064*** (.003)
Post-secondary study in Canada	.008 (.010)	.205*** (.013)	.125*** (.015)
B. Experience			
Years of experience	.045*** (.001)	.030*** (.002)	.027*** (.002)
Years of experience^2 ×1000	-.700*** (.022)	-.401*** (.042)	-.439*** (.044)
C. Marital status (Reference group: not married)			
Married	.044*** (.006)	.009 (.012)	.018 (.013)
D. Official language (Reference group: English only)			
French only	-.112*** (.016)	-.129*** (.044)	-.116** (.048)
Both English and French	.050*** (.012)	.133*** (.024)	.099*** (.025)
Neither English nor French[7]	-	-.248*** (.031)	-.180*** (.033)
E. Immigrant variables			
Years since migration	-	-	.006*** (.001)
Place of birth (Reference group: North America)			
South America	-	-	.016 (.028)
Europe	-	-	.080*** (.020)
Africa	-	-	-.007 (.033)

[7] This variable was not included for the Canadian-born because the number of observations was too small.

China	-	-	.040* (.023)
India	-	-	-.072*** (.026)
Others	-		-.027 (.020)
F. Province of residence (Reference group: Ontario)			
Quebec	-.121*** (.015)	-.081 (.056)	-.050 (.088)
Manitoba & Saskatchewan	.023* (.012)	-.101*** (.032)	-.066* (.034)
Alberta	.213*** (.010)	.065*** (.024)	.112*** (.026)
British Columbia	-.019 (.014)	-.076* (.042)	-.125** (.056)
G. Census metropolitan area (CMA) (Reference group: Toronto)			
Montreal	-.041*** (.015)	-.129** (.054)	-.154* (.086)
Vancouver	-.055*** (.021)	-.011 (.045)	.045 (.058)
Rest of Canada (ROC)	-.188*** (.010)	-.002 (.017)	-.034* (.020)
Constant	8.975*** (.031)	9.267*** (.043)	9.142*** (.063)
R-squared	0.195	0.124	0.147
Number of observations	40,284	14,003	14,003

Notes: Standard errors are in parentheses.
* statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Table 7: Oaxaca decomposition of public-private sector wage gap, males

	Canada-born with common regression	Immigrant with common regression	Immigrant with specific regression
Overall			
Public sector (group 1)	11.042***	11.018***	11.018***
Private sector (group 2)	10.847***	10.787***	10.787***
Difference	.195***	.231***	.231***
Explained	.124***	.105***	.130***
Unexplained	.071***	.126***	.100***
Explained part			
A. Education	.089***	.085***	.082***
B. Experience	.024***	.007**	.009***
C. Marital status	.010***	.001	.001
D. Official language	.006***	.004	.005*
E. Immigrant variables	-	-	.029***
F. Province of residence	-.005***	-.005**	-.003
G. Census metropolitan area (CMA)	.0002	.014***	.008**
Unexplained part			
A. Education	-.184***	-.203***	-.160***
B. Experience	-.008	.120***	.121**
C. Marital status	-.047***	-.050**	-.039*
D. Official language	.006	.001	.007
E. Immigrant variables	-	-	-.043
F. Province of residence	-.055***	.011	.001
G. Census metropolitan area (CMA)	.070***	-.010	-.006
Constant	.289***	.257***	.220***
Number of observations	82,398	24,816	24,816

Notes: * statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Table 8: Oaxaca decomposition of public-private sector wage gap, females

	Canada-born with common regression	Immigrant with common regression	Immigrant with specific regression
Overall			
Public sector (group 1)	10.813***	10.762***	10.762***
Private sector (group 2)	10.559***	10.522***	10.522***
Difference	.254***	.240***	.240***
Explained	.146***	.096***	.109***
Unexplained	.108***	.144***	.131***
Explained part			
A. Education	.138***	.078***	.078***
B. Experience	.008***	.007***	.007***
C. Marital status	.001**	-9.97e-07	-1.56e-06
D. Official language	.003***	.011***	.007**
E. Immigrant variables	-	-	.019***
F. Province of residence	-.002***	-.004***	-.004**
G. Census metropolitan area (CMA)	-.002***	.007***	.003
Unexplained part			
A. Education	.042	-.153***	-.115**
B. Experience	-.059***	.020	.033
C. Marital status	-.018***	-.006	-.014
D. Official language	.024***	.009	.012**
E. Immigrant variables	-	-	-.046
F. Province of residence	-.047***	-.005	-.010
G. Census metropolitan area (CMA)	.090***	.014	.013
Constant	.076**	.266***	.255***
Number of observations	70,557	20,891	20,891

Notes: * statistically significant at 10% level; ** statistically significant at 5% level; *** statistically significant at 1% level.

Appendix

Table A1: Construction of number of years of schooling variable

Highest certificate, diploma or degree	Estimated years of schooling
No certificate, diploma or degree	8
High school diploma or equivalent	12
Trades certificate or diploma (other than apprenticeship)； Registered Apprenticeship certificate； College, CEGEP or other non-university certificate or diploma from a program of 3 months to less than 1 year	13
College, CEGEP or other non-university certificate or diploma from a program of 1 year to 2 years	14
College, CEGEP or other non-university certificate or diploma from a program of more than 2 years； University certificate or diploma below bachelor level	15
Bachelor's degree	16
University certificate or diploma above bachelor Level； Degree in medicine, dentistry, veterinary medicine or optometry	17
Master's degree	18
Earned doctorate degree	22