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Why are the Relative Wages of Immigrants Declining? A Distributional Approach

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ABSTRACT

In this paper, we show that the decline in the relative wages of immigrants in Canada is far from homogenous over different points of the wage distribution. The well-documented decline in the immigrant-Canadian born mean wage gap hides a much larger decline at the low end of the wage distribution, while the gap hardly changed at the top end of the distribution. Using standard OLS regressions and new unconditional quantile regressions, we show that both the changes in the mean wage gap and in the gap at different quantiles are well explained by standard factors such as experience, education, and country of origin of immigrants. Interestingly, the most important source of change in the wages of immigrants relative to the Canadian born is the aging of the baby boom generation that has resulted in a relative increase in the labour market experience, and thus, in the wages, of Canadian born workers relative to immigrants.

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Executive Summary

A large body of literature has documented a steep deterioration in the relative earnings of immigrants in Canada over the last two or three decades (see for instance, Green and Worswick, 2004, and Aydemir and Skuterud, 2005). Several factors explain this negative trend in the economic performance of immigrants. In particular, secular changes in the country of origin of immigrants and the related decline in the returns to foreign work experience and language ability account for a substantial part of the decline. Entry labour market conditions are also highlighted.

With very few exceptions, however, existing studies only attempt to explain the decline in the *mean* wage of immigrants relative to natives. This decline may be hiding different trends across the wage distribution. Accordingly, the goal of this paper is to examine the changes in the immigrant-Canadian born wage gap at different points of the wage distribution and then explain these distributional changes using the standard explanatory factors used in the literature.

We use the unconditional quantile regression method of Firpo, Fortin, and Lemieux (2009) to perform our analysis for the period 1980-2000. Data is from the census master files for the years 1981 and 2001. We focus on individuals aged 16 to 65 and use weekly earnings of full-time workers as our main measure of wages. In computing weekly earnings, we only use wage and salary earnings.

Our descriptive statistics show that while male immigrants used to earn six percent more than Canadian-born workers in 1980 (difference of 0.06 log points), they now earn one percent less than Canadian-born workers in 2000. For women, the immigrant-Canadian born mean wage gap barely changed over time. These trends hide different changes across wage percentiles. Indeed, inequality expanded more dramatically among immigrants than the Canadian born, and immigrants at the low-end of the distribution lost considerable ground relative to the Canadian born. Accordingly, most of the growth in the immigrant-Canadian born wage gap happens at the lower end of the wage distribution.

Results for the mean wage gap

The decomposition of the mean wage gap for males shows that 5.3 points the change in the mean wage gap can be explained by the effect of changes in Canadian labour market experience. The factor driving this change is the aging of the baby boom generation. Because of this large demographic shift, the average experience of Canadian-born workers has increased substantially more than immigrants. The contribution of foreign experience is also large because of the steep decline in the return to foreign experience over time. Indeed, our results indicate a dramatic decline in the return to foreign experience, which goes from half of the return to Canadian experience in 1980 to essentially zero in 2000. Most of the effect of the foreign experience is offset, however, by the countervailing effect of the interaction term between Canadian and foreign

experience. Taken together, these two effects nonetheless explain another 2.2 percentage point change in the gap. Broadly speaking, experience effects alone go a long way towards explaining why the immigrant-Canadian born gap changed so much over time. Among the other explanatory factors, country of origin effects (place of birth plus mother tongue) account for a 0.063 decline while the educational upgrading of immigrants and the fact that immigrants tend to be located in places where wages are higher (CMA, Ontario and BC) has a reverse impact.

The mean wage gap changed much less for women than for men. Nevertheless, changes in Canadian experience and in country of origin each account for about a 4.8 percentage point decline in the mean wage gap, while location (province and CMA) goes the other way around. Other factors, including education and the return to foreign experience, play only a modest role.

Results for the quantile gaps

The decomposition results for the 10^{th}, 50^{th}, and 90^{th} quantiles are qualitatively similar to those for the mean. Canadian experience explains well the changes at these three quantiles, but its effect is largest at the bottom end. The reason is that there was a large concentration of young Canadian born workers with very low values of experience in 1980, which is precisely the place where returns to experience are the largest. The place of birth alone does not explain the observed changes very well, as it has a larger impact on changes at the top end than at the lower end of the wage distribution. So while country of origin explains well the mean decline in immigrant wages, it cannot account for the observed distributional changes. One factor that works better in this regard is education which has a larger positive impact at the top end, because returns to university education increased a lot over this period, and immigrant are relatively more likely to hold university degrees.

Overall, one of the most important source of change in the wages of immigrants relative to the Canadian born is the aging of the baby boom generation, which has resulted in a relative increase in the labour market experience, and thus in the wages, of Canadian-born workers relative to immigrants.

1. Introduction

Canada and the United States are generally regarded as successful examples of countries where immigrants are well integrated into the labour market and other aspects of society. The successful experience of immigrants in these two countries is often contrasted in the popular press with the situation in Europe where immigrants are not perceived to be doing as well as on the other side of the Atlantic.

On closer examination, however, the economic performance of immigrants in Canada and the United States is far from uniformly positive. In particular, a large body of literature has documented a steep deterioration in the relative earnings of immigrants in both Canada and the United States over the last two or three decades. For example, both Green and Worswick (2004) and Aydemir and Skuterud (2005) find that immigrants who arrived in Canada in the 1990s earned around 30 percent less than Canadian-born workers. By contrast, earlier cohorts of immigrants who arrived in the 1970s were earning about the same as Canadian-born workers. A number of U.S. studies, starting with Borjas (1985), document a similar decline in the relative earnings of U.S. immigrants. These studies point out to a number of possible explanations for the declining economic performance of immigrants. In particular, secular changes in the country of origin of immigrants account for a substantial part of the decline. While most immigrants in the 1960s were from Europe and the United States, about two thirds of immigrants who arrived in Canada in the 1980s and 1990s were from Asia, Africa, and Central and Southern American.

With very few exceptions, however, existing studies only attempt to explain the decline in the *mean* wage of immigrants relative to natives.[1] From a welfare perspective, however, it is essential to go beyond the mean and see how the whole distribution of wages of immigrants has changed relative to the Canadian born. For instance, the fact that recent immigrants earn substantially less, on average, than the Canadian born may be hiding important differences across subgroups of immigrants. Perhaps a substantial fraction of immigrants still do as well as or better as the Canadian born, while a large group of immigrants have very low earnings that makes it unlikely they will ever "catch-

[1] One important exception is DiNardo and Butcher (2002) who look at the whole distribution of wages for the United States.

up" and enjoy standards of living comparable to those of earlier immigrants or the Canadian born. When thinking about the prospects of successful integration of immigrants, it is thus essential to look at the whole distribution of earnings of wages relative to the Canadian born.

The goal of this paper is two-fold. We first want to describe the evolution of the wage distribution of immigrants relative to the Canadian born to see whether the well documented decline the mean relative wages of immigrants is spread over the whole wage distribution, or more concentrated in specific parts of the distribution, and in particular in the low-end of the distribution. We use simple quantile plots to illustrate these changes. The second goal is to try to explain these distributional changes using the standard explanatory factors used in the literature on the mean relative earnings of immigrants. In particular, recent studies by Green and Worswick (2004) and Aydemir and Skuterud (2005) find that secular changes in immigrants' country of origin, language ability, and the decline in the return to foreign labour market experience are the two leading explanations for the decline in the mean earnings of immigrants over time. In this study, we explore whether these factors and others can also account for observed changes in the earnings of immigrants at different points of the distribution.[2]

While the goal of the paper is relatively simple, trying to account for the role of different explanatory factors at different points of the earnings distribution is not an easy econometric problem. When looking at means, it is well known that OLS estimates can be used to perform a standard Oaxaca-Blinder decomposition that precisely accounts for the contribution of each explanatory factor to the overall mean gap. In the case of quantiles or other distributional statistics, however, comparable decomposition procedures have only been developed recently. In this paper, we use the unconditional quantile regression method of Firpo, Fortin, and Lemieux (2009) to decompose changes in the immigrant-Canadian born wage gap at different quantiles of the wage distribution. Since the wage distribution can be fully characterized in terms of its various quantiles, decomposing the immigrant-Canadian born wage gap at "enough" quantiles amounts to

[2] Picot and Hou (2003) is the only other study we know that looks at distributional issues, but the only focus on the low-income threshold, while we look through the entire wage distribution.

decomposing the whole difference in distributions between immigrants and the Canadian born.

The plan of the paper is as follows. In Section 2, we describe the (census) data and present a descriptive analysis of the distribution of immigrant and Canadian-born earnings. In section 3, we discuss the estimation method used to decompose quantiles and explain how different factors are expected to differentially impact the earnings of immigrants at different quantiles of the wage distribution. We present our main results in section 4 and conclude in section 5.

2. Data and Descriptive Statistics

2.1. Data

Since 1981, the Canadian Census has been collecting consistent information on immigrant status (including year of immigration and country of origin), educational attainment, earnings and work experience during the previous year (annual earnings from different sources, weeks worked, and full-time employment status), and other socio-economic characteristics of individuals.[3] The information on educational attainment is unusually rich. The Census provides detailed information on years of schooling and degrees and diplomas obtained. We combine these variables to compute the number of years of completed schooling, and to classify workers into six education groups: some elementary or secondary schooling, high school diploma, trade certificate, some post-secondary degree or diploma below a university bachelor's degree, university bachelor's degree, and post-graduate degree (Masters, PhD, and professional degrees).

Another advantage of the Census for studying immigration and wages is large sample sizes. In the Census, basic questions about demographics are asked to all individuals in the population. Twenty percent of individuals are also asked an additional set of questions (the "long form") about additional issues such as educational attainment, earnings and labour market activities. Data used in this study is drawn from the census master files, which include all individuals who completed the "long form". Statistics Canada makes available public use samples that are random samples of 10 to 15 percent

[3] Microdata are available for the 1971 census, but education is coded quite differently and it is not possible to compute weekly earnings directly (because the weeks worked variable is grouped in few categories).

(depending on the years) of individuals who completed the "long form". These represent samples of 2 to 3 percent of all individuals in the country. Besides the size of the sample, one important advantage of the master files is that information is more detailed than in the public use files (for instance, country of birth).[4] Following the existing literature, we focus our analysis on "adults" age 16 to 65 at the time of the Census (June).[5] We perform our analysis for the first (1981) and last (2001) year for which consistent data are available for educational achievement and earnings.[6]

One drawback of the Census for studying the evolution of the wage structure is that it only provides limited information on annual hours of work. As a result, it is not possible to construct a direct measure of average hourly wages by dividing annual earnings by annual hours of work.[7] Following Card and Lemieux (2001) and many U.S. studies such as Katz and Murphy (1992), we use weekly earnings of full-time workers as our main measure of wages. Following most of the literature, we only use wage and salary earnings for computing weekly earnings of full-time workers.[8] Finally, we trim all wage observations with weekly earnings below $75 (in $2000) since they yield implausibly low values for hourly wages.[9]

2.2. Descriptive Statistics.

Tables 1a and 1b show the means of the key variables used in the analysis of immigrant and Canadian-born workers in 1981 and 2001 for males and females, respectively. In all

[4] For instance, information on the country of origin is limited in public use files. In this regard, there is only one category for Asia in the 1981 public use file.

[5] The information on weeks worked and annual wage and salary earnings refers to the previous year. Thus, the individuals in our samples were age 15 to 64 during the period for which our wage measures apply.

[6] Question about educational achievement changed in the 2006 Census. Furthermore, while earnings and other income items were self reported prior to 2006, respondents were given the option of using their tax record items instead in the 2006 Census. Over 80 percent of respondents agreed to do so. So while the quality of income reports has arguably improved thanks to this change, it also makes the comparability with earlier censuses more challenging.

[7] The census asks about weeks of work and part-time/full-time status during the previous year, as well as actual weekly hours of work during the census week (in June). Since weekly hours of work vary considerably over time for many individuals, hours of work in the survey week is a poor proxy for average weekly hours of work during the previous year. In particular, many individuals who did not work during the Census week did work during the previous year.

[8] Another common practice in the literature that we do not follow here is to limit the sample to "full-year" workers who worked at least 49 or 50 weeks during the previous year. Using this alternative wage measure has little impact on the results.

[9] Since full-time workers work at least 30 hours a week, a full-time worker earning $75 a week makes at most $2.50 an hour. This represents less than half of the minimum wage in any province in 2000.

tables and figures, we report separate results for full-time men and women. As discussed earlier, we focus on full-time workers to get measures of earnings that are not contaminated by too much variation in hours of work. We report separate results for men and women since the earnings and participation rates of the two groups have evolved very differently over the last three decades. Starting with men, Table 1a shows that while immigrants used to earn six percent more than Canadian-born workers in 1980 (difference of 0.06 log points), they now earn one percent less than Canadian-born workers in 2000. This broadly confirms the findings of existing studies like Green and Worswick (2004) and Aydemir and Skuterud (2005) who both document a large decline in the earnings of new cohorts of immigrants throughout the 1980s and 1990s.

Turning to standard human capital variables, the table first compares the level of experience of immigrants and the Canadian born. Since actual labour market experience is not available in the census, we compute years of potential experience as age minus years of schooling minus 6. Following Green and Worswick (2004), we further divide years of experience of immigrants into years of experience in Canada and years of foreign experience, which are presumably not valued as much as Canadian experience in the Canadian labour market. Table 1a shows that years of Canadian experience of male immigrants increase from 15.7 to 16.4 between 1981 and 2001, which is half as much as the increase in experience for Canadian-born workers (for whom Canadian experience is the same as total potential experience). This large increase in years of experience of Canadian-born workers is a direct consequence of the aging of the baby-boom generation. We will later see that the growing experience gap between Canadian-born workers and immigrants is a surprisingly important source of change in the wage gap between these two groups of workers. Furthermore, foreign experience of immigrants declines by 0.9 years, which means that total experience (Canadian plus foreign) of immigrants declines by 0.2 year between 1981 and 2001.

For education, we group workers into six education categories based on their highest degree or diploma. For both immigrants and Canadian-born workers, there is a clear increase in the level education. Most noticeably, the fraction of workers without a high school diploma declines from around 40 percent in 1981 to slightly above 20 percent in 2001. Education at the top end (university bachelors and above) also increases

substantially for the Canadian born and especially immigrants. For instance, the fraction of immigrants with a post-graduate degree increases from 7.6 percent in 1981 to 12.7 percent in 2001, which is more than twice as large as the corresponding fraction for the Canadian born (5.5 percent). Looking more broadly at years of completed education confirms that immigrants are more educated than the Canadian born, and that the education gap is slightly growing over time. Given the strong link between wages and education, the large education upgrading between 1981 and 2001 should increase the wages of the Canadian born and, in particular, immigrants.

The next figures in Table 1a show that male immigrants are more likely to be married (in part because they are older), and more likely to know only English or neither French nor English than the Canadian born men. Essentially no Canadian born and very few immigrants respond that they neither know French nor English. Since this question about the knowledge of official languages may not measure the language abilities of immigrants very well, we also include information on the mother tongue for immigrants. While the fraction of male immigrants whose mother tongue is French is very small, the fraction of male immigrants whose mother tongue is English is almost 40 percent in 1981 but only 30 percent in 2001. This mostly reflects the well known changes in the distribution of country of origin that are also reported in Table 1a.

For the sake of simplicity, country of origin is grouped into eight categories.[10] As is well known, there has been a steep decline in the fraction of immigrants coming from Europe over the last few decades. Table 1a shows that immigrants from Western Europe and the United States accounted for over 63 percent of immigrants in 1981, but only 34 percent in 2001. By contrast, the fraction of immigrants from Asia increased from 13 to 37 percent over the same period. The fraction of immigrants from Africa and South and Central America (including the Caribbean) also increased substantially. This change in the composition of immigrants has been shown to have a negative impact on the relative wage of immigrants. The rest of the table shows that immigrants are disproportionately concentrated in high wage provinces (Ontario and British Columbia) and in large cities (CMA). As a result, we expect the relative location of immigrants to have a positive effect on their relative wages.

[10] In the empirical analysis, we will use a very detailed list of countries of origin.

The pattern of descriptive statistics for Canadian-born and immigrant women is generally quite similar to the one for men with a couple of important exceptions. Most importantly, the wage gap between Canadian-born and immigrant women increase by only 0.02 log points, compared to 0.07 points for men. Second, compared to the case of men, Canadian-born women gained more in terms of Canadian experience relative to immigrant women, but less in terms of educational achievement.

2.3 Changes in the distribution of wages

A simple way of characterizing the changes in the wage distribution of immigrants and the Canadian born is to compute wage differences between the two groups (and over time) at each wage percentile. Figure 1a shows the 1980-2000 change in real log wages for immigrants and Canadian-born men considered separately. The solid line for the Canadian born shows a clear expansion in wage inequality over this period. While wages at the top-end of the distribution increased by close to 20 percent, wages at the bottom end declined by a comparable percentage. The changes are even more striking for immigrants. While immigrant wages at the top end of the distribution increased almost as much as for the Canadian born, immigrant wages at the bottom of the distribution declined by almost 30 percent in real terms. The figure clearly shows that inequality expanded more dramatically among immigrants than the Canadian born, and that immigrants at the low-end of the distribution lost considerable ground relative to the Canadian born. A very similar pattern can be observed for women in Figure 1b. So although the mean wage gap does not change as much for women as for men, as in the case of men most of the growth in the wage gap happens at the lower end of the distribution.

Figures 2a and 2b show instead the wage gap at each percentile between immigrants and the Canadian born in both 1980 and 2000. Consistent with Table 1a, Figure 2a confirms that immigrant men earned substantially more than the Canadian born in 1980. Interestingly, however, the difference is mostly due to the fact that immigrant men in lower percentiles of the wage distribution used to earn substantially more than Canadian-born men. By contrast, in 2000, all immigrant men except those in the very top percentiles of the wage distribution earn less than the Canadian born. The primary goal

of the paper is to try to account for these dramatic changes in the relative wages of immigrants at different percentiles of the distribution using Firpo, Fortin, and Lemieux (2009) unconditional quantile regression method described in the next section of the paper. The pattern of the wage gap at each percentile is similar for women (Figure 2b) except that immigrant women earn quite a bit more than Canadian-born women at the top end of the distribution (both in 1981 and 2001).

3. Estimation Method and decompositions

3.1 Standard decomposition

Before discussing how to decompose the wage gap between immigrants and the Canadian born at each percentile, it is useful to discuss the familiar case of the mean where the standard Oaxaca-Blinder decomposition can easily be used. Consider a standard (log) wage equation for immigrants

$$W_{it} = X_{it}\beta_{It} + u_{it}\,, \qquad (1a)$$

and for Canadian-born workers

$$W_{Ct} = X_{it}\beta_{Ct} + u_{it}\,, \qquad (1b)$$

at time *t*. Under the usual assumption that the error term u_{it} has a conditional mean of zero, given the covariates X_{it} ($E(u_{it} \mid X_{it})=0$), β_{It} and β_{Ct} can be consistently estimated using OLS, and the mean wage gap between immigrants and the Canadian born can be decomposed as:

$$\Delta_t = \overline{W}_{It} - \overline{W}_{Ct} = \overline{X}_{It}\beta_{It} - \overline{X}_{Ct}\beta_{Ct} = (\overline{X}_{It} - \overline{X}_{Ct})\beta_{Ct} + \overline{X}_{It}(\beta_{It} - \beta_{Ct}), \qquad (2)$$

where $\overline{W}_{Ct}$ and $\overline{W}_{It}$ are the mean wages for Canadian-born workers and immigrants, respectively, while $\overline{X}_{Ct}$ and $\overline{X}_{It}$ are the corresponding mean values of the explanatory variables. Note that some variables specific to immigrants, such as years of foreign experience and country of origin, only appear in the wage equation for immigrants. One simple way of capturing this in our framework is to set the corresponding values of these variables and the regression parameters for the Canadian born to zero.

We also consider a restricted version of the wage equation where the regression coefficients (except the constant) are constrained to be the same for immigrants and the Canadian born. This results in the wage equation

$$W_{it} = \delta_t I_{it} + X_{it}\beta_t + u_{it}, \qquad (3)$$

where I_{it} is a dichotomous variable indicating whether person *i* is an immigrant. Under this alternative assumption, the decomposition of the mean earnings gap can be written as:

$$\Delta_t = \overline{W}_{It} - \overline{W}_{Ct} = \delta_t + (\overline{X}_{It} - \overline{X}_{Ct})\beta_t , \quad (4)$$

where δ_t is the unexplained (or adjusted) part of the overall mean wage gap Δ_t, while $(\overline{X}_{It} - \overline{X}_{Ct})\beta_t$ is the part explained by differences in explanatory variables.

One advantage of this specification is that it makes it easier to decompose the evolution of the immigrant-Canadian born wage gap over time. For instance, the change in the wage gap from a base period *t*=0 to an end period *t*=1 is:

$$\Delta_1 - \Delta_0 = (\delta_1 - \delta_0) + (\overline{X}_{I1} - \overline{X}_{C1})\beta_1 - (\overline{X}_{I0} - \overline{X}_{C0})\beta_0 \quad (5)$$

3.2 Unconditional quantile regressions.

We would now like to perform a similar decomposition for the different quantiles of the wage distribution. Consider the τ^{th} quantile of the wage distribution for the Canadian born, $q_{Ct}(\tau)$, and for immigrants, $q_{It}(\tau)$. The quantile wage gap, $\Delta_t(\tau)$, is defined as

$$\Delta_t(\tau) = q_{It}(\tau) - q_{Ct}(\tau),$$

and the change in the quantile wage gap between time *t*=0 and *t*=1 is:

$$\Delta_1(\tau) - \Delta_0(\tau) = (q_{I1}(\tau) - q_{C1}(\tau)) - (q_{I0}(\tau) - q_{C0}(\tau)).$$

Firpo, Fortin, and Lemieux (2009) show that it is possible to decompose these quantile gaps by running regressions where the dependent variable W_{it} is replaced by the (recentered) influence function, which they call RIF_{it}. When the quantile of interest is $q(\tau)$, RIF_{it} is defined as:

$$RIF_{it} = q(\tau) + [1(W_{it} \geq q(\tau)) - (1-\tau)] / f(q(\tau)), \quad (6)$$

Where 1(.) is the indicator function (equals 1 when $W_{it} \geq q(\tau)$, 0 otherwise), and $f(q(\tau))$ is the wage density evaluated at the τ^{th} quantile. Since $1(W_{it} \geq q(\tau))$ is simply a dummy variable indicating whether a wage observation is above a given quantile while all other terms in equation (6) are constants, running a regression of RIF_{it} on the X variables essentially amounts (up to a linear transformation) to running a linear probability model for whether the wage for a given observation is above or below the quantile. The coefficients from a regression of RIF_{it} on the X_{it} variables are, thus, the same as in the

linear probability model except that they need to be divided by the density f(q(τ)). By analogy with the case of the mean considered above, consider the regression model:

$$RIF_{it} = \theta_t I_{it} + X_{it}\gamma_t + e_{it} \, . \qquad (7)$$

The coefficients have the same interpretation as in the case of the mean. The coefficient θ_t captures the adjusted, or unexplained quantile difference between immigrants and the Canadian born, while γ_t indicates the effects of the other covariates on the unconditional quantile. As in the case of the mean, equation (7) can also be used to decompose the quantile gap as:

$$\Delta_t(\tau) = \theta_t + (\overline{X}_{It} - \overline{X}_{Ct}) \gamma_t \, , \qquad (8)$$

Firpo, Fortin, and Lemieux (2009) discuss in much more detail the interpretation of these unconditional quantile regressions.[11] Re-explaining this in detail here would be beyond the scope of this paper. We nonetheless provide some intuition for the decomposition method in Figure 3. The figure shows an example of two cumulative (log) wage distributions for immigrants and the Canadian born. In the example, we assume that log wages are normally distributed with a standard deviation of .5 for both immigrants and the Canadian born. We also set the mean for the Canadian born at 2, and the mean for immigrants at 2.2 (20 percent gap in favour of immigrants).

Now, consider a specific quantile, say the median (τ=.5). In the distribution for the Canadian born, the median corresponds to the case where the cumulative probability is P_C=.5. Thus, the median is q_C for the Canadian born. The corresponding median for immigrants is q_I. We are interested in decomposing the median gap q_I-q_C , but doing so cannot be done using conventional methods. In contrast, however, it is much easier to decompose the probability gap P_C-P_I , where P_I indicates the fraction of immigrants who earn less than the median wage for the Canadian born, q_C. We can indeed construct a dummy variable $1(W_{it} \geq q_C)$, and then run a simple linear probability model (or a logit or probit) to do a standard Oaxaca-Blinder decomposition of the probability gap.

Looking at Figure 3, we see that the probability gap P_C-P_I and the median gap q_I-q_C are closely linked. The ratio of P_C-P_I over q_I-q_C is simply the slope of the cumulative distribution, i.e. the probability density function. Roughly speaking, one can

[11] See also Firpo, Fortin and Lemieux (2010) for a more general discussion of decomposition methods for quantiles and other distribution statistics.

simply perform a probability decomposition and then translate it into a median decomposition by dividing everything by the density, f(.). This provides the rough intuition for why the unconditional quantile regressions consists of running a model for the dummy variable divided by the density, where the density can be readily estimated using kernel density estimation methods.

4. Estimation Results

4.1 Results for the mean wage gap

Before attempting to decompose the full distribution of wages at different quantiles, we start with the standard case of the mean. Tables 2a and 2b show standard OLS estimates of the wage equation for the Canadian born, immigrants, and both groups pooled together in 1980 and 2000. First note that while there are some differences in the estimated coefficients for immigrants and the Canadian born, these differences are not too important qualitatively.[12] We will thus focus the discussion on the case of the pooled models in columns 3 and 6.

Starting with men (Table 2a), there is a large increase in the return to education over this period, which is consistent with Boudarbat, Lemieux, and Riddell (2006). For example, the wage gap between university graduates (with a bachelor's degree) and high school graduates (the base group) increases from 29 to 40 percent between 1980 and 2000. The return to Canadian experience also increases, but not as much as the return to education. Consistent with Green and Worswick (2004), we also find a dramatic decline in the return to foreign experience, which goes from half of the return to Canadian experience in 1980 to essentially zero in 2000. Note, however, that the interaction term between Canadian and foreign experience also declines substantially. The fact that the interaction term is negative means that workers with more foreign experience have a lower return to Canadian experience, which is consistent with the two forms of experience being substitutes for each other. To see this, consider total effective experience, E, as the sum of Canadian experience, E_C, and a fraction γ of foreign

[12] One exception is the return to education for women, which tends to be sizably larger for Canadian-born than immigrant women.

experience, E_F. With a standard quadratic model for experience, we get the wage equation (ignoring other wage determinants):

$$W = b_1E - b_2E^2 = b_1(E_C + \gamma E_F) - b_2(E_C + \gamma E_F)^2$$
$$= b_1E_C + b_1\gamma E_F - b_2E_C^2 - b_2(\gamma E_F)^2 - 2b_2\gamma E_C E_F$$

The decline in the return to foreign experience is consistent with γ going from about .46 in 1980 to close to zero in 2000. As a result, we also expect to see the interaction term (with a coefficient of $2b_2\gamma$) going close to zero as well. We will see later in the decompositions that the decline in the interaction term offsets most of the decline in the return to foreign experience. In other words, immigrants make up for the much smaller return to foreign experience by getting a larger return to Canadian experience.

Having a mother tongue (for immigrants) other than French or English, has a negative impact especially in 2000. Since we are using census master files, we have a detail breakdown of countries of origin. Thus, we include 68 dummy variables each representing a country of origin, and 7 other dummy variables for regions of origin regrouping the rest of the countries with a limited number of observations in 1980 or 2000 (results not shown in tables). The base group is the United Kingdom. In the existing literature, immigrants from the United Kingdom and the United States are often pooled together. With our detail breakdown of countries, it will be interesting to see whether immigrants from these two (traditional) sources of immigration behave in similar ways. The adjusted UK immigrants-Canadian born wage gap was 6.1 percent in favor of UK immigrants in 1980, and increased to about 9 percent in 2000. Meanwhile, immigrants from USA suffer a 1.5 percent wage gap compared to Canadian-born in 1980, but this gap was almost nil in 2000. On the other hand, there is a large and growing negative premium for immigrants from the two most important new immigration sources China and India. The wage gap was 20 percent in 1980 and 22 percent in 2000 for Chinese immigrants, and 7.5 percent and 11 percent for Indian immigrants. Overall, these results are similar to what has been found earlier in the literature regarding the effect of coming from non traditional countries. Yet, there are substantial differences in the earnings of immigrants from traditional source countries.

Returning to the top of the table, we see that, once we have controlled for all the explanatory factors, the immigrant-Canadian born wage gap increases from 6 percent in

1980 to 9 percent in 2000. So the 7 percentage point decline between 1980 and 2000 can *all* be explained by the regression models. Note, however, that the positive immigrant wage gaps of 6 and 9 percent only apply to the base group of immigrants who come from the United Kingdom, have English as their mother tongue, and have zero years of foreign experience.

A number of important regression results are different for men and women. In particular, Table 2b shows little change in the return to education over time for women, a result once again consistent with Boudarbat, Lemieux, and Riddell (2006). Interestingly, even in 1980 there was essentially no return to foreign experience for immigrant women. So the decline in the return to foreign experience is unlikely to play much of a role in the case of women. Note also that the return to Canadian experience increases more for women than men. This likely reflects the fact that women now have more actual labour market experience for a given level of potential experience, because of the secular increase in female employment rates, as opposed to a more standard increase in the return to experience. Similar to men, the immigrant wage gap expanded over time going from 2 to about 6 percent, but once again these gaps only apply to the base group of female immigrants.

Tables 3a and 3b show a detailed decomposition of the change in the wage gap based on equation (5). For men, Table 3a first shows that two thirds of the change in the gap (.053 out of 0.083) can be explained by the effect Canadian experience. The factor driving this change is the aging of the baby boom generation discussed earlier. Because of this large demographic shift, the average experience of Canadian-born workers has increased substantially more than immigrants.

Interestingly, the contribution of foreign experience is large because of the steep decline in the return to foreign experience documented in Table 2a. Most of this effect is offset, however, by the countervailing effect of the interaction term discussed above. Taken together, these two effects nonetheless explain another 2.2 percentage point change in the gap. Broadly speaking, experience effects alone go a long way towards explaining why the immigrant-Canadian born gap changed so much over time.

The other factors listed in the rest of the table more or less offset each other. Country of origin effects (place of birth plus mother tongue) account for a 0.063 decline

while the educational upgrading of immigrants and the fact that immigrants tend to be located in places where wages are higher (CMA, Ontario and BC) has a reverse impact.

As discussed earlier, the mean wage gap changed much less for women than for men. Nevertheless, Table 3b shows that, as in the case of men, changes in Canadian experience and in country of origin each accounts for about a 4.8 percentage point decline in the gap, while location (province and CMA) goes the other way around. Other factors, including education and the return to foreign experience, play only a modest role. As a result, the model slightly overexplains the actual change in the mean wage gap.

4.2 Results for the quantile gaps

The results of the unconditional quantile regressions for the 10^{th}, 50^{th} (median), and 90^{th} quantile are reported in Table 4a (men) and 4b (women). Note first that the results for the median are very similar to those from standard mean regressions reported in Table 2. Since means tend to be very similar to medians in practice, this gives us a lot of confidence on the reliability of the unconditional quantile regression method.

Generally speaking, factors that we think matter most at the bottom of the distribution should have a larger impact on the 10^{th} quantile than on the 90^{th} quantile, and vice versa. This is indeed what we tend to find in the regression estimates. For instance, being a high school dropout has a much more negative impact on the 10^{th} quantile than on the median or the 90^{th} quantile, while the positive impact of a post-graduate degree is much larger at the 90^{th} quantile. We then use the regression results to perform a decomposition of the changes in the quantile wage gaps. Tables 5a(men) and 5b (women) provide results similar to those in Tables 3a and 3b (mean) for the three quantiles analyzed in Table 4. We also estimate (but do not report in the tables) models for each quantile from the 5^{th} to the 95^{th} (5, 10, 15, 20,…,95), and report both the adjusted and unadjusted quantile gaps in Figures 4a (men) and 4b (women).

The unadjusted gaps in Figure 4 are very similar to those reported in Figure 2 for both men and women. Once the gaps are adjusted using the unconditional quantile regressions, however, the resulting adjusted gaps for 1980 and 2000 are very close to each other, except perhaps at the very top of the distribution. This is particularly striking in the case of men in Figure 4a. As in the case of the mean, the large changes in the

immigrant-Canadian born quantile wage gaps between 1980 and 2000 can, thus, essentially be explained to a large extent by the regression models. Figure 5 plots the changes in the adjusted and unadjusted gaps, which clearly illustrates how well our models explain the dramatic changes in the relative wages of immigrants throughout the wage distribution. For instance, the models explain essentially all the 10-15 percent decline in the relative wages of immigrant men at the bottom end of the distribution. The more modest change for women at the bottom end is also well explained (Figure 5b). The only part of the distribution where a substantial wage gap is unexplained is at the top end (80^{th} percentile and above) of the wage distribution, where immigrants are actually predicted to do better than the Canadian-born after all other factors have been adjusted for.

The detailed decomposition results in Table 5 for the 10^{th}, 50^{th}, and 90^{th} quantiles are qualitatively similar to those for the mean only presented in Table 3. Recall from Figures 4 and 5 that the explained change in the gap is much larger at the bottom end than at the top end of the wage distribution. Table 5 shows that, once again, Canadian experience explains well the changes, this time at the different quantiles. The effect of experience is indeed largest at the bottom end. The reason is that there was a large concentration of young Canadian born workers with very low values of experience in 1980, which is precisely the place where returns to experience are the largest.

Looking at place of birth alone does not explain the observed changes very well, as it has a larger impact on changes at the top end than at the lower end. In the case of men (Table 5a), we get an effect of -.035 at the bottom end compared to -0.136 at the top end. So while country of origin explains well the mean decline in immigrant wages, it cannot account for the observed distributional changes. One factor that works better in this regard is education which has a larger positive impact at the top end, because returns to university education increased a lot over this period, and immigrant are relatively more likely to hold university degrees.

Finally, note that, as in Figure 5, Table 5 shows that there is a substantial unexplained positive relative growth in the wages of immigrants for both men and women. In fact, the unexplained gaps at the 10^{th}, 50^{th} are essentially zero, and more than 9 percentage points at the 90^{th} for men. For women, the unexplained gaps at the 10^{th} is

insignificant, but goes to 3.1 percentage points at the 50th and 4.1 percentage points at the 90th.

5. Conclusion

In this paper, we show that the decline in the relative wages of immigrants in Canada is far from homogenous at different points of the wage distribution. For example, the 7 percent decline in the immigrant-Canadian born mean wage gap for men between 1980 and 2000 hides a much larger decline at the low end of the wage distribution, while the gap hardly changed at the top end of the distribution. For women, the immigrant-Canadian born mean wage gap barely changed over time. Yet, the wage distribution shows significant changes both at the bottom and top end. Using standard OLS regressions and new unconditional quantile regressions, we show that changes in both the mean wage gap and the gap at different quantiles are well explained by standard factors such as experience, education, and country of origin of immigrants. Interestingly, one of the most important source of change in the wages of immigrants relative to the Canadian born is the aging of the baby boom generation, which has resulted in a relative increase in the labour market experience, and thus in the wages, of Canadian-born workers relative to immigrants.

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Figure 1(a): Change in Log Wage of Full-time Males
By Percentile from 1980 to 2000

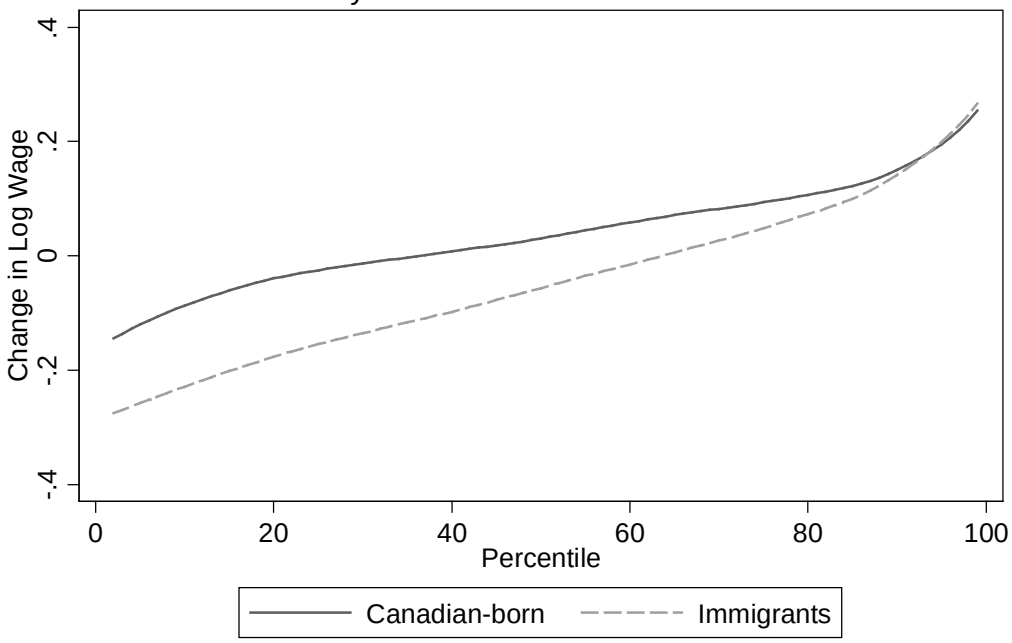

Figure 1(b): Change in Log Wage of Full-time Females
By Percentile from 1980 to 2000

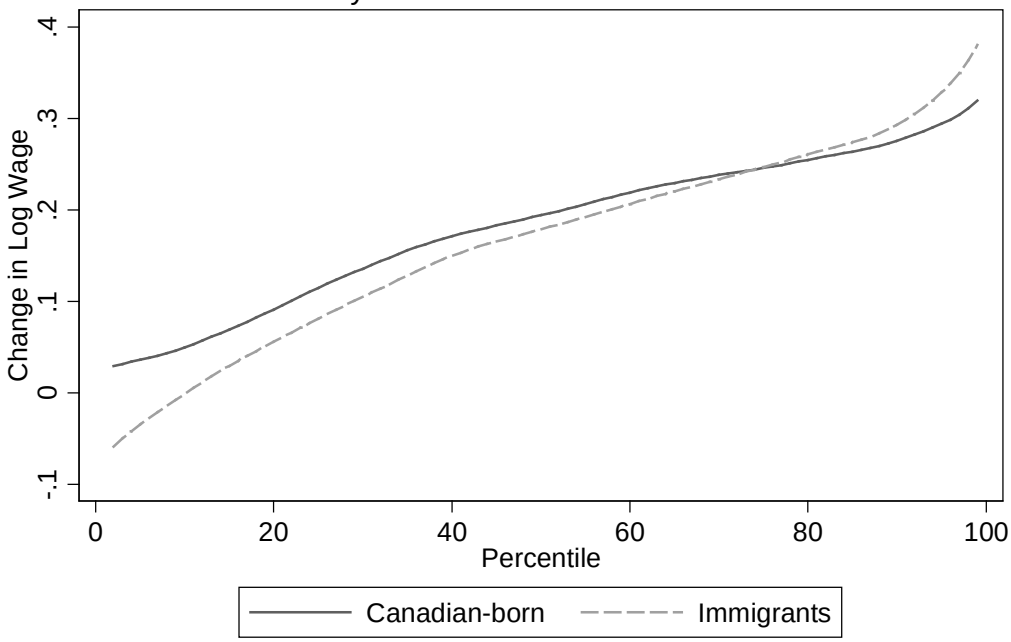

Figure 2(a): Immigrant-Canadian Born Wage Gap for Full-time Males
By Percentile in 1980 and 2000

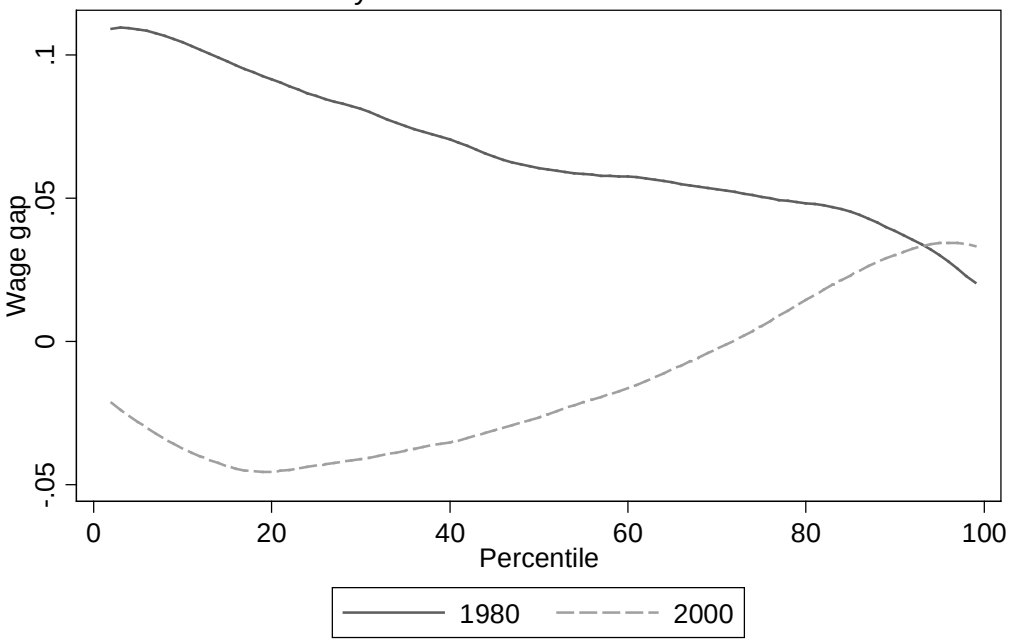

Figure 2(b): Immigrant-Canadian Born Wage Gap for Full-time Females
By Percentile in 1980 and 2000

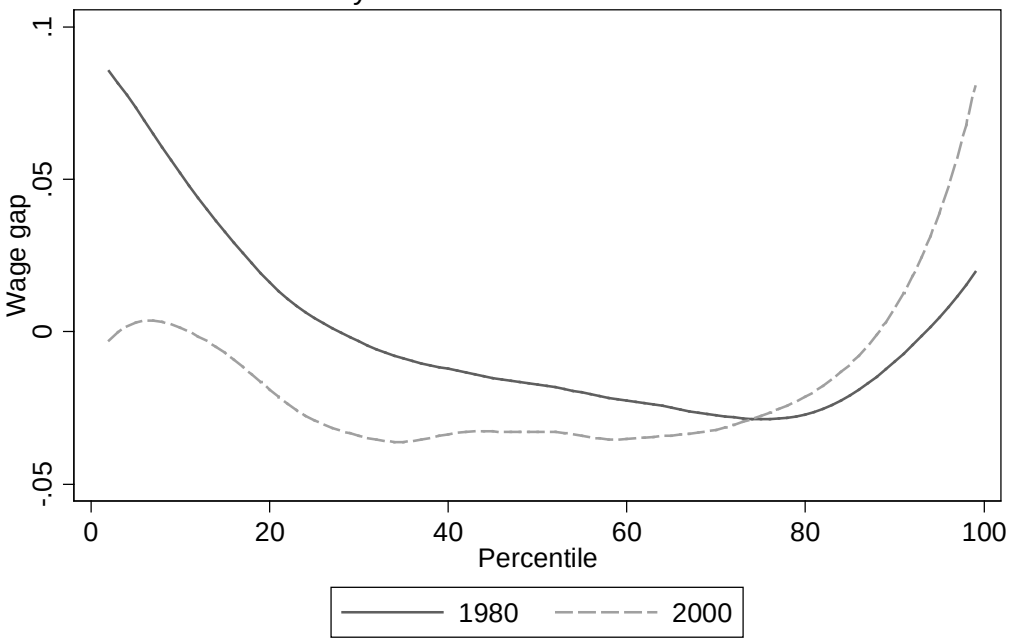

Figure 3: Relationship Between Differences in Wage Quantiles and Probabilities

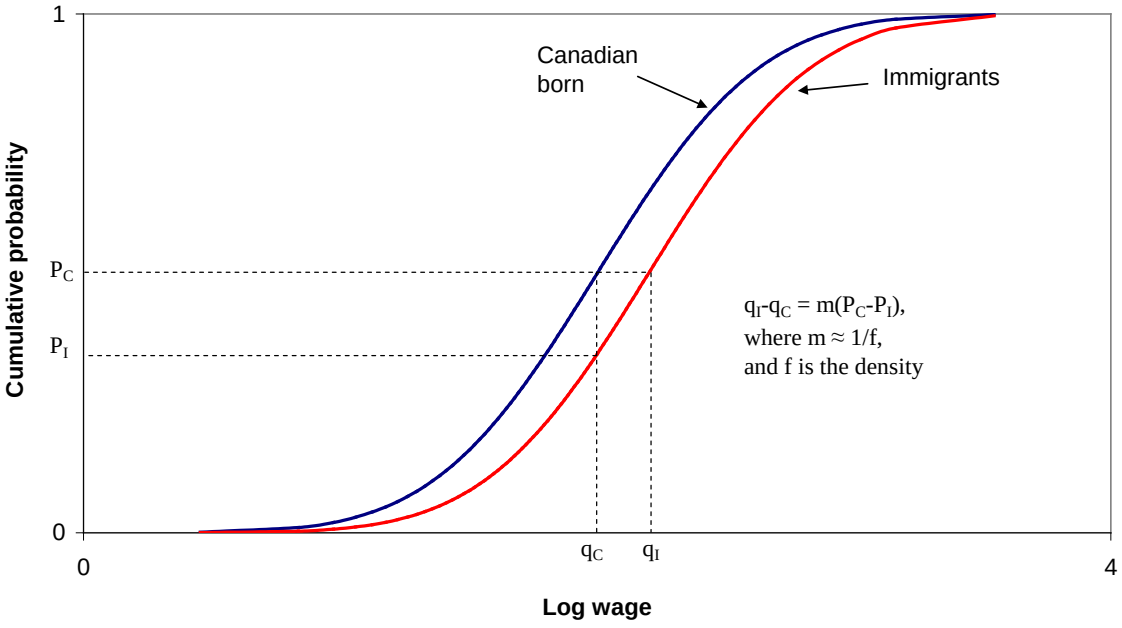

Figure 4a: Unadjusted and Adjusted (using Unconditional Quantile Regressions) Immigrant-Canadian Born Wage Gap by Percentile, Full-Time Males

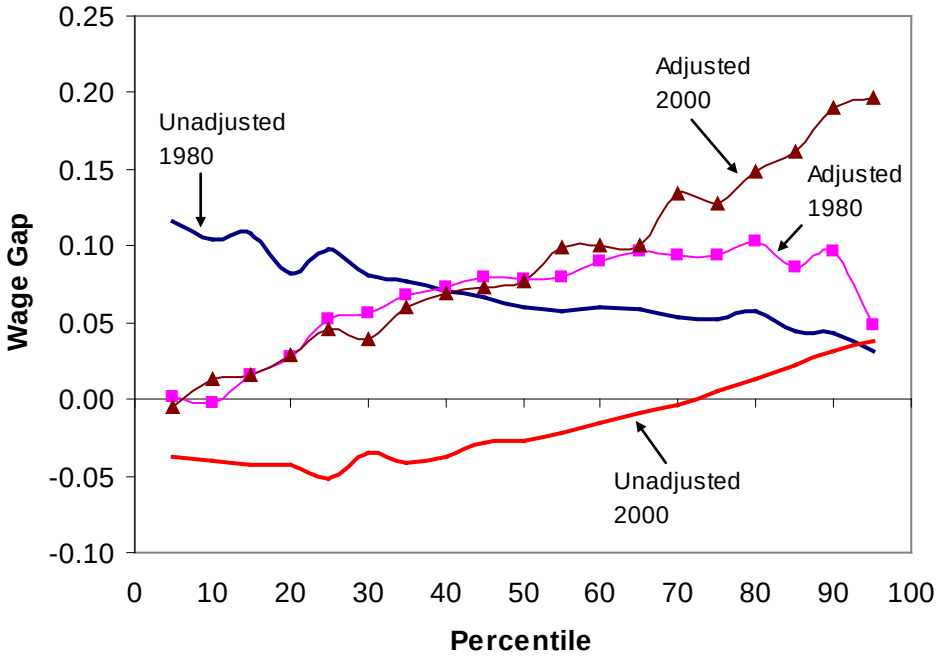

Figure 4b: Unadjusted and Adjusted (using Unconditional Quantile Regressions) Immigrant-Canadian Born Wage Gap by Percentile, Full-Time Females

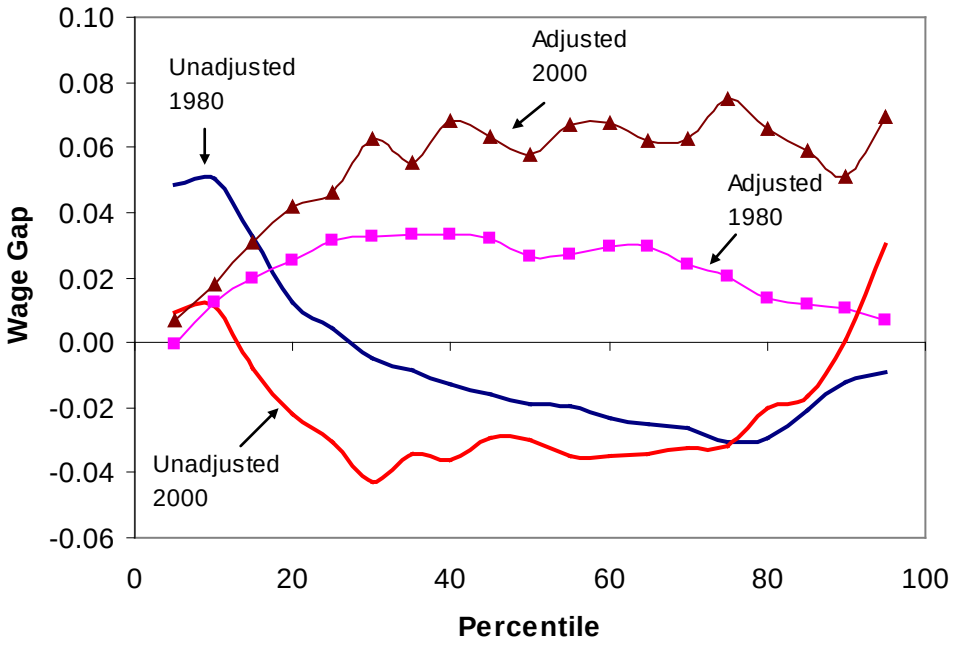

Figure 5a: Unadjusted and Adjusted (1980-2000) Change in the Immigrant-Canadian Born Wage Gap by Percentile, Full-Time Males

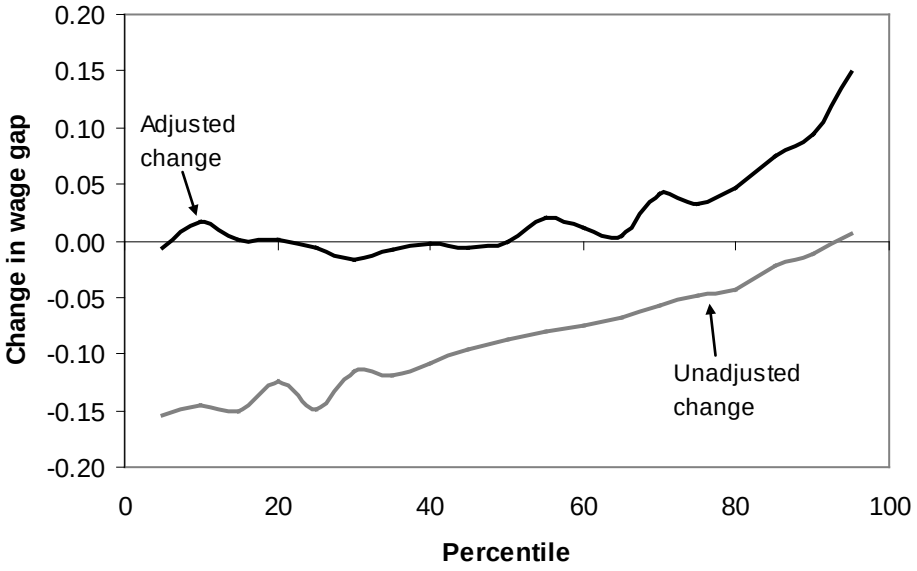

Figure 5b: Unadjusted and Adjusted (1980-2000) Change in the Immigrant-Canadian Born Wage Gap by Percentile, Full-Time Females

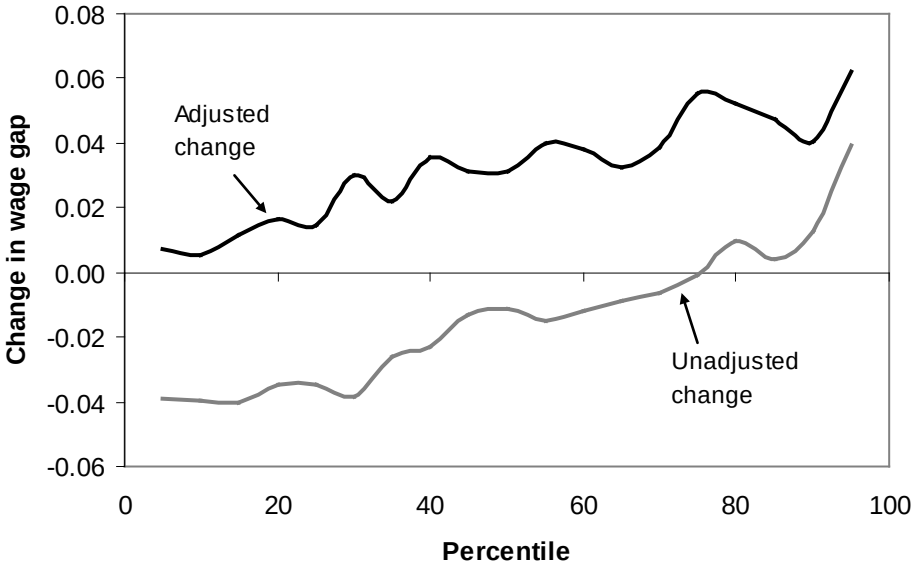

Table 1a: Sample Means, Males

	1981		2001	
	Cdn born	Immigrant	Cdn born	Immigrant
Log weekly wage	6.63	6.69	6.66	6.65
Canadian experience	18.4	15.7	19.8	16.4
Foreign experience	-	7.2	-	6.3
Age	36.2	41.2	39.4	43.3
Schooling				
Less than HS	0.421	0.372	0.225	0.206
High School degree	0.210	0.133	0.246	0.185
Trade Certificate	0.150	0.204	0.170	0.139
Post-secondary	0.105	0.132	0.186	0.183
Bachelors' degree	0.074	0.084	0.118	0.160
Post-graduate	0.039	0.076	0.055	0.127
Years of schooling	11.8	12.3	13.5	14.2
Married	0.701	0.810	0.678	0.778
Language				
English only	0.639	0.801	0.651	0.816
French only	0.144	0.028	0.124	0.024
Bilingual	0.217	0.141	0.225	0.135
Neither fr. nor eng.	-	0.030	-	0.025
Mother tongue				
English	-	0.384	-	0.302
French	-	0.037	-	0.036
Country of Origin				
UK and US	-	0.264		0.150
Western Europe	-	0.368		0.192
Eastern Europe	-	0.122		0.097
Asia	-	0.134		0.366
Africa	-	0.029		0.059
S-C America	-	0.069		0.123
Rest of world	-	0.010		0.010
CMA	0.560	0.820	0.602	0.896
Province				
Maritimes	0.099	0.018	0.090	0.014
Quebec	0.285	0.139	0.268	0.123
Ontario	0.324	0.550	0.338	0.574
Manitoba	0.041	0.033	0.039	0.027
Saskatchewan	0.037	0.012	0.034	0.007
Alberta	0.103	0.095	0.116	0.090
British Columbia	0.110	0.153	0.115	0.165
Number of Observations	461,815	213,182	501,741	231,884

Table 1b: Sample Means, Females

	1981		2001	
	Cdn born	Immigrant	Cdn born	Immigrant
Log weekly wage	6.21	6.21	6.39	6.37
Canadian experience	15.5	13.9	19.1	15.9
Foreign experience	-	7.1	-	6.0
Age	33.7	38.7	39.1	42.2
Schooling				
Less than HS	0.349	0.428	0.158	0.201
High School degree	0.287	0.198	0.257	0.215
Trade Certificate	0.076	0.099	0.091	0.079
Post-secondary	0.186	0.159	0.278	0.241
Bachelors' degree	0.076	0.075	0.153	0.168
Post-graduate	0.026	0.040	0.062	0.096
Years of schooling	12.2	11.7	14.0	14.0
Married	0.597	0.711	0.649	0.705
Language				
English only	0.640	0.790	0.628	0.812
French only	0.157	0.035	0.131	0.027
Bilingual	0.203	0.121	0.241	0.128
Neither fr. nor eng.	-	0.054	-	0.033
Mother tongue				
English	-	0.425	-	0.325
French	-	0.039	-	0.036
Country of Origin				
UK and US		0,268		0,153
Western Europe		0,318		0,161
Eastern Europe		0,102		0,095
Asia		0,158		0,382
Africa		0,030		0,050
S-C America		0,108		0,147
Rest of world		0,012		0,011
CMA	0.619	0.861	0.640	0.910
Province				
Maritimes	0.091	0.016	0.091	0.012
Quebec	0.280	0.141	0.270	0.116
Ontario	0.339	0.577	0.345	0.587
Manitoba	0.043	0.035	0.039	0.026
Saskatchewan	0.037	0.011	0.035	0.007
Alberta	0.104	0.083	0.108	0.085
British Columbia	0.106	0.137	0.110	0.168
Number of Observations	260,039	118,911	368,782	175,359

Table 2a: OLS regressions, log weekly wage for full-time males

	1980			2000		
	Cdn born (1)	Immigrant (2)	Pooled (3)	Cdn born (4)	Immigrant (5)	Pooled (6)
Immigrant			**0.061*** **			**0.089*** **
			(0.003)			(0.004)
Cdn experience	0.034***	0.040***	0.035***	0.039***	0.033***	0.039***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)
Cdn exper squared	-0.059***	-0.072***	-0.060***	-0.065***	-0.055***	-0.064***
	(0.000)	(0.001)	(0.000)	(0.001)	(0.001)	(0.001)
Foreign exper.		0.017***	0.016***		-0.001	0.001
		(0.000)	(0.000)		(0.001)	(0.001)
For exper squared		-0.037***	-0.036***		-0.005**	-0.005**
		(0.001)	(0.001)		(0.002)	(0.002)
Cdn-for experience interaction		-0.076***	-0.067***		-0.020***	-0.033***
		(0.002)	(0.001)		(0.003)	(0.002)
HS dropout	-0.120***	-0.068***	-0.113***	-0.084***	-0.045***	-0.078***
	(0.002)	(0.004)	(0.002)	(0.003)	(0.004)	(0.002)
Trade certif.	0.027***	0.047***	0.029***	0.081***	0.098***	0.084***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.005)	(0.002)
Some Post-sec.	0.104***	0.134***	0.109***	0.162***	0.158***	0.162***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.004)	(0.002)
Bachelors degree	0.290***	0.282***	0.287***	0.410***	0.353***	0.398***
	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)	(0.003)
Post-graduate	0.422***	0.437***	0.424***	0.530***	0.506***	0.524***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.005)	(0.003)
Single	-0.128***	-0.113***	-0.126***	-0.129***	-0.077***	-0.123***
	(0.004)	(0.006)	(0.004)	(0.004)	(0.007)	(0.004)
Married	0.107***	0.086***	0.103***	0.095***	0.084***	0.093***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.006)	(0.003)
Bilingual	0.014***	0.018***	0.015***	0.015***	0.037***	0.019***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.006)	(0.003)
French only	-0.048***	-0.078***	-0.048***	-0.053***	-0.074***	-0.049***
	(0.004)	(0.008)	(0.003)	(0.005)	(0.011)	(0.004)
Neither fr nor eng		-0.043***	-0.034***		-0.100***	-0.081***
		(0.007)	(0.007)		(0.010)	(0.010)
Mother tongue neither fr or eng		-0.035***	-0.036***		-0.050***	-0.053***
		(0.004)	(0.004)		(0.005)	(0.005)
Mother tongue French		0.008	-0.007		-0.006	-0.019*
		(0.009)	(0.009)		(0.011)	(0.011)
CMA	0.053***	0.035***	0.051***	0.066***	0.050***	0.065***
	(0.002)	(0.003)	(0.001)	(0.002)	(0.005)	(0.002)

N.F.L.	-0.094***	0.011	-0.097***	-0.155***	-0.058*	-0.160***
	(0.005)	(0.021)	(0.005)	(0.007)	(0.034)	(0.007)
P.E.I.	-0.224***	-0.277***	-0.232***	-0.259***	-0.236***	-0.266***
	(0.010)	(0.039)	(0.010)	(0.012)	(0.052)	(0.012)
Nova Scotia	-0.129***	-0.083***	-0.131***	-0.203***	-0.209***	-0.209***
	(0.004)	(0.012)	(0.004)	(0.005)	(0.018)	(0.005)
New Brunswick	-0.103***	-0.070***	-0.107***	-0.179***	-0.128***	-0.186***
	(0.004)	(0.015)	(0.004)	(0.005)	(0.021)	(0.005)
Quebec	-0.019***	-0.061***	-0.027***	-0.116***	-0.199***	-0.131***
	(0.003)	(0.004)	(0.003)	(0.004)	(0.006)	(0.003)
Manitoba	-0.072***	-0.077***	-0.075***	-0.187***	-0.202***	-0.193***
	(0.004)	(0.006)	(0.003)	(0.004)	(0.008)	(0.004)
Saskatchewan	-0.015***	-0.019*	-0.019***	-0.165***	-0.176***	-0.172***
	(0.005)	(0.010)	(0.004)	(0.005)	(0.015)	(0.005)
Alberta	0.138***	0.102***	0.130***	-0.000	-0.065***	-0.014***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.005)	(0.003)
BC	0.152***	0.089***	0.136***	-0.009***	-0.072***	-0.024***
	(0.003)	(0.003)	(0.002)	(0.003)	(0.004)	(0.003)
Other controls						
Country of birth[(a)] (Ref. = UK)	NO	YES	YES	NO	YES	YES
Observations	461,815	213,182	674,997	501,741	231,884	733,625
R-squared	0.24	0.22	0.23	0.23	0.21	0.22

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) 75 different countries and regions of origin (with the base group) are included.

Table 2b: OLS regressions, log weekly wage for full-time females

	1980			2000		
	Cdn born (1)	Immigrant (2)	Pooled (3)	Cdn born (4)	Immigrant (5)	Pooled (6)
Immigrant			**0.020*** **			**0.056*** **
			(0.003)			(0.005)
Cdn experience	0.027***	0.034***	0.028***	0.038***	0.035***	0.037***
	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)
Cdn experience squared	-0.049***	-0.067***	-0.051***	-0.066***	-0.064***	-0.066***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Foreign exper.		0.001	0.002***		-0.006***	-0.005***
		(0.001)	(0.001)		(0.001)	(0.001)
For exper squared		-0.000	-0.003*		0.015***	0.017***
		(0.002)	(0.001)		(0.002)	(0.002)
Cdn-for experience interaction		-0.035***	-0.026***		-0.023***	-0.023***
		(0.002)	(0.002)		(0.003)	(0.002)
HS dropout	-0.159***	-0.115***	-0.152***	-0.132***	-0.089***	-0.122***
	(0.003)	(0.004)	(0.002)	(0.003)	(0.005)	(0.003)
Trade certif.	0.026***	0.003	0.021***	0.012***	0.035***	0.016***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.006)	(0.003)
Some Post-sec.	0.200***	0.137***	0.190***	0.185***	0.153***	0.180***
	(0.003)	(0.005)	(0.002)	(0.003)	(0.004)	(0.002)
Bachelors degree	0.467***	0.347***	0.447***	0.509***	0.359***	0.481***
	(0.004)	(0.006)	(0.003)	(0.003)	(0.005)	(0.003)
Post-graduate	0.626***	0.528***	0.605***	0.654***	0.511***	0.621***
	(0.006)	(0.008)	(0.005)	(0.004)	(0.006)	(0.004)
Single	-0.017***	-0.006	-0.015***	-0.045***	-0.026***	-0.044***
	(0.004)	(0.006)	(0.003)	(0.004)	(0.006)	(0.003)
Married	0.001	-0.010**	-0.001	0.010***	-0.008*	0.006**
	(0.003)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)
Bilingual	-0.004	0.041***	0.003	0.037***	0.084***	0.046***
	(0.003)	(0.006)	(0.003)	(0.003)	(0.006)	(0.003)
French only	-0.065***	-0.050***	-0.059***	-0.078***	-0.043***	-0.069***
	(0.005)	(0.010)	(0.004)	(0.005)	(0.012)	(0.004)
Neither fr nor eng		-0.048***	-0.043***		-0.078***	-0.048***
		(0.007)	(0.007)		(0.009)	(0.009)
Mother tongue neither fr or eng		-0.033***	-0.034***		-0.060***	-0.060***
		(0.006)	(0.006)		(0.006)	(0.006)
Mother tongue French		0.009	0.005		0.004	-0.007
		(0.012)	(0.011)		(0.012)	(0.011)

CMA	0.089***	0.078***	0.089***	0.133***	0.119***	0.134***
	(0.002)	(0.005)	(0.002)	(0.002)	(0.006)	(0.002)
N.F.L.	-0.070***	0.015	-0.072***	-0.227***	-0.086*	-0.231***
	(0.007)	(0.029)	(0.007)	(0.007)	(0.044)	(0.007)
P.E.I.	-0.129***	-0.089*	-0.131***	-0.148***	-0.176***	-0.154***
	(0.012)	(0.047)	(0.012)	(0.012)	(0.068)	(0.012)
Nova Scotia	-0.113***	-0.116***	-0.115***	-0.219***	-0.197***	-0.222***
	(0.005)	(0.016)	(0.005)	(0.006)	(0.020)	(0.005)
New Brunswick	-0.088***	-0.111***	-0.093***	-0.215***	-0.206***	-0.221***
	(0.006)	(0.021)	(0.006)	(0.006)	(0.024)	(0.006)
Quebec	0.054***	0.003	0.043***	-0.103***	-0.192***	-0.118***
	(0.004)	(0.005)	(0.003)	(0.004)	(0.007)	(0.003)
Manitoba	-0.034***	-0.062***	-0.039***	-0.168***	-0.200***	-0.175***
	(0.005)	(0.007)	(0.004)	(0.005)	(0.008)	(0.004)
Saskatchewan	0.038***	0.021	0.034***	-0.177***	-0.193***	-0.183***
	(0.005)	(0.014)	(0.005)	(0.005)	(0.018)	(0.005)
Alberta	0.085***	0.069***	0.081***	-0.093***	-0.132***	-0.102***
	(0.003)	(0.005)	(0.003)	(0.003)	(0.005)	(0.003)
BC	0.118***	0.097***	0.113***	0.000	-0.029***	-0.007**
	(0.004)	(0.005)	(0.003)	(0.003)	(0.004)	(0.003)
Other controls						
Country of birth[(a)] (Ref. = UK)	NO	YES	YES	NO	YES	YES
Observations	260,039	118,911	378,950	368,782	175,359	544,141
R-squared	0.20	0.19	0.20	0.24	0.19	0.23

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) 75 different countries and regions of origin (with the base group) are included.

Table 3a: Decomposition of the Mean Wage Gap between Immigrant and Canadian-born Full-time Males

	1980	2000	Change
Raw (unadjusted) gap	0.067	-0.016	-0.083
Unexplained (adjusted) gap	0.061	0.089	0.028
Gap explained by:			
Canadian experience	0.008	-0.045	-0.053
Foreign experience	0.071	0.001	-0.07
Cnd*foreign experience	-0.074	-0.026	0.048
Education	0.028	0.053	0.025
Marital status	0.025	0.021	-0.004
Language	-0.018	-0.035	-0.017
Place of birth	-0.069	-0.132	-0.063
Location[a]	0.033	0.059	0.026
Total explained	0.006	-0.105	-0.111

Notes: Decomposition based on the regression models in columns 3 and 6 of Table 2a. (a) Includes CMA and province.

Table 3b: Decomposition of the Mean Wage Gap between Immigrant and Canadian-born Full-time Females

	1980	2000	Change
Raw (unadjusted) gap	-0.001	-0.017	-0.016
Unexplained (adjusted) gap	0.020	0.056	0.036
Gap explained by:			
Canadian experience	0.014	-0.034	-0.048
Foreign experience	0.008	-0.013	-0.021
Cnd*foreign experience	-0.025	-0.016	0.009
Education	-0.008	0.016	0.024
Marital status	0.002	0.003	0.001
Language	-0.013	-0.039	-0.026
Place of birth	-0.023	-0.071	-0.048
Location[(a)]	0.024	0.082	0.058
Total explained	-0.021	-0.073	-0.052

Note: Decomposition based on the regression models in columns 3 and 6 of Table 2b. (a) Includes CMA and province.

Table 4a: Unconditional quantile regressions, log weekly wage for full-time males

	1980			2000		
	10th	50th	90th	10th	50th	90th
	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant	-0.002	0.078***	0.096***	0.014*	0.077***	0.190***
	(0.006)	(0.003)	(0.006)	(0.008)	(0.004)	(0.009)
Cdn experience	0.045***	0.032***	0.035***	0.068***	0.033***	0.024***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Cdn exper squared	-0.079***	-0.056***	-0.058***	-0.124***	-0.055***	-0.033***
	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)
Foreign exper.	0.021***	0.013***	0.020***	0.021***	-0.005***	-0.004***
	(0.001)	(0.000)	(0.001)	(0.002)	(0.001)	(0.001)
For exper squared	-0.069***	-0.029***	-0.026***	-0.075***	0.009***	0.026***
	(0.004)	(0.001)	(0.002)	(0.006)	(0.002)	(0.003)
Cdn-for experience	-0.045***	-0.065***	-0.096***	-0.084***	-0.021***	-0.021***
interaction	(0.004)	(0.001)	(0.002)	(0.006)	(0.002)	(0.003)
HS dropout	-0.176***	-0.098***	-0.086***	-0.104***	-0.078***	-0.051***
	(0.005)	(0.002)	(0.003)	(0.007)	(0.002)	(0.003)
Trade certif.	0.039***	0.047***	-0.038***	0.176***	0.088***	-0.004
	(0.005)	(0.002)	(0.004)	(0.006)	(0.003)	(0.004)
Some Post-sec.	0.131***	0.116***	0.081***	0.233***	0.163***	0.098***
	(0.006)	(0.002)	(0.004)	(0.006)	(0.003)	(0.004)
Bachelors degree	0.218***	0.256***	0.427***	0.380***	0.365***	0.461***
	(0.006)	(0.003)	(0.006)	(0.006)	(0.003)	(0.006)
Post-graduate	0.167***	0.341***	0.884***	0.352***	0.459***	0.769***
	(0.007)	(0.003)	(0.009)	(0.007)	(0.003)	(0.008)
Single	-0.370***	-0.085***	0.021***	-0.264***	-0.117***	-0.016***
	(0.009)	(0.003)	(0.006)	(0.009)	(0.004)	(0.006)
Married	0.183***	0.094***	0.056***	0.111***	0.082***	0.100***
	(0.007)	(0.003)	(0.006)	(0.007)	(0.003)	(0.005)
Bilingual	0.019***	0.014***	0.035***	0.027***	0.017***	0.020***
	(0.006)	(0.002)	(0.004)	(0.007)	(0.003)	(0.005)
French only	0.006	-0.065***	-0.057***	0.031***	-0.068***	-0.080***
	(0.009)	(0.003)	(0.006)	(0.011)	(0.004)	(0.007)
Neither fr nor eng	-0.089***	-0.032***	0.010	-0.328***	-0.068***	0.059***
	(0.021)	(0.007)	(0.009)	(0.032)	(0.009)	(0.011)
Mother tongue	-0.046***	-0.009**	-0.078***	-0.077***	-0.046***	-0.048***
not fr or eng	(0.011)	(0.004)	(0.008)	(0.012)	(0.005)	(0.009)

Mother tongue	-0.028	0.009	-0.007	-0.068**	-0.011	0.002
French	(0.024)	(0.009)	(0.016)	(0.028)	(0.010)	(0.017)
CMA	0.092***	0.036***	0.037***	0.084***	0.047***	0.081***
	(0.004)	(0.001)	(0.002)	(0.005)	(0.002)	(0.003)
N.F.L.	-0.203***	-0.094***	-0.027***	-0.243***	-0.164***	-0.079***
	(0.014)	(0.005)	(0.007)	(0.017)	(0.007)	(0.011)
P.E.I.	-0.336***	-0.225***	-0.103***	-0.309***	-0.310***	-0.163***
	(0.034)	(0.009)	(0.013)	(0.036)	(0.012)	(0.016)
Nova Scotia	-0.155***	-0.140***	-0.084***	-0.266***	-0.195***	-0.170***
	(0.011)	(0.004)	(0.006)	(0.013)	(0.005)	(0.008)
New Brunswick	-0.112***	-0.125***	-0.078***	-0.215***	-0.194***	-0.150***
	(0.012)	(0.004)	(0.006)	(0.015)	(0.006)	(0.008)
Quebec	-0.044***	-0.036***	-0.002	-0.135***	-0.127***	-0.139***
	(0.007)	(0.003)	(0.005)	(0.008)	(0.003)	(0.006)
Manitoba	-0.086***	-0.080***	-0.059***	-0.216***	-0.185***	-0.190***
	(0.009)	(0.003)	(0.005)	(0.011)	(0.004)	(0.006)
Saskatchewan	-0.052***	-0.021***	0.017***	-0.296***	-0.141***	-0.136***
	(0.011)	(0.004)	(0.006)	(0.014)	(0.005)	(0.007)
Alberta	0.137***	0.094***	0.199***	-0.075***	-0.017***	0.060***
	(0.006)	(0.002)	(0.005)	(0.006)	(0.003)	(0.005)
BC	0.121***	0.138***	0.153***	-0.060***	0.004*	-0.038***
	(0.005)	(0.002)	(0.004)	(0.006)	(0.003)	(0.005)
Other controls						
Country of birth[(a)] (Ref. = UK)	YES	YES	YES	YES	YES	YES
Observations	674,997	674,997	674,997	733,625	733,625	733,625

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) 75 different countries and regions of origin (with the base group) are included.

Table 4b: Unconditional quantile regressions, log weekly wage for full-time females

	1980			2000		
	10th	50th	90th	10th	50th	90th
	(1)	(2)	(3)	(4)	(5)	(6)
Immigrant	0.012*	0.027***	0.010	0.018**	0.058***	0.051***
	(0.007)	(0.004)	(0.006)	(0.009)	(0.005)	(0.008)
Cdn experience	0.025***	0.026***	0.035***	0.047***	0.032***	0.030***
	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Cdn exper squared	-0.043***	-0.048***	-0.064***	-0.083***	-0.057***	-0.053***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Foreign exper.	0.005***	-0.001**	0.006***	0.007***	-0.010***	-0.001
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
For exper squared	-0.018***	0.003*	0.002	-0.034***	0.028***	0.022***
	(0.004)	(0.001)	(0.002)	(0.006)	(0.002)	(0.002)
Cdn-for experience	-0.002	-0.023***	-0.059***	-0.008	-0.013***	-0.051***
interaction	(0.005)	(0.002)	(0.003)	(0.006)	(0.002)	(0.003)
HS dropout	-0.264***	-0.146***	-0.062***	-0.221***	-0.110***	-0.031***
	(0.005)	(0.002)	(0.003)	(0.008)	(0.003)	(0.003)
Trade certif.	-0.004	0.027***	0.010*	0.066***	0.003	-0.005
	(0.007)	(0.004)	(0.005)	(0.008)	(0.004)	(0.004)
Some Post-sec.	0.129***	0.192***	0.202***	0.248***	0.169***	0.081***
	(0.005)	(0.003)	(0.005)	(0.005)	(0.002)	(0.003)
Bachelors degree	0.211***	0.367***	0.870***	0.421***	0.444***	0.442***
	(0.006)	(0.003)	(0.009)	(0.006)	(0.003)	(0.005)
Post-graduate	0.203***	0.417***	1.384***	0.401***	0.516***	0.822***
	(0.007)	(0.004)	(0.015)	(0.006)	(0.003)	(0.008)
Single	-0.078***	-0.017***	0.070***	-0.107***	-0.037***	0.002
	(0.006)	(0.003)	(0.006)	(0.007)	(0.003)	(0.005)
Married	0.004	-0.006**	-0.004	0.007	0.003	0.002
	(0.005)	(0.003)	(0.005)	(0.005)	(0.003)	(0.004)
Bilingual	-0.039***	0.013***	0.023***	0.026***	0.039***	0.068***
	(0.006)	(0.003)	(0.005)	(0.007)	(0.003)	(0.005)
French only	-0.104***	-0.052***	0.010	-0.073***	-0.079***	-0.010
	(0.009)	(0.004)	(0.007)	(0.010)	(0.004)	(0.006)
Neither fr nor eng	-0.031*	-0.066***	0.028***	-0.117***	-0.044***	0.050***
	(0.018)	(0.007)	(0.008)	(0.027)	(0.008)	(0.009)
Mother tongue	-0.019*	-0.038***	-0.034***	-0.074***	-0.067***	-0.013
not fr or eng	(0.011)	(0.006)	(0.010)	(0.012)	(0.006)	(0.008)

Mother tongue French	-0.015	-0.010	0.034*	-0.016	-0.005	0.017
	(0.025)	(0.011)	(0.020)	(0.025)	(0.011)	(0.017)
CMA	0.154***	0.091***	0.008***	0.193***	0.122***	0.071***
	(0.004)	(0.002)	(0.003)	(0.005)	(0.002)	(0.003)
N.F.L.	-0.086***	-0.090***	-0.036***	-0.467***	-0.194***	-0.161***
	(0.017)	(0.007)	(0.010)	(0.021)	(0.007)	(0.008)
P.E.I.	-0.131***	-0.132***	-0.110***	-0.090***	-0.169***	-0.156***
	(0.034)	(0.012)	(0.016)	(0.032)	(0.012)	(0.014)
Nova Scotia	-0.129***	-0.131***	-0.085***	-0.276***	-0.199***	-0.174***
	(0.013)	(0.005)	(0.008)	(0.014)	(0.005)	(0.007)
New Brunswick	-0.074***	-0.105***	-0.090***	-0.280***	-0.198***	-0.201***
	(0.015)	(0.006)	(0.008)	(0.017)	(0.006)	(0.007)
Quebec	0.085***	0.023***	0.045***	-0.069***	-0.116***	-0.154***
	(0.007)	(0.003)	(0.006)	(0.008)	(0.003)	(0.006)
Manitoba	0.017*	-0.060***	-0.048***	-0.156***	-0.175***	-0.159***
	(0.010)	(0.004)	(0.006)	(0.011)	(0.005)	(0.006)
Saskatchewan	0.078***	0.037***	0.008	-0.239***	-0.173***	-0.153***
	(0.011)	(0.005)	(0.008)	(0.014)	(0.005)	(0.006)
Alberta	0.105***	0.076***	0.060***	-0.153***	-0.094***	-0.081***
	(0.006)	(0.003)	(0.005)	(0.007)	(0.003)	(0.004)
BC	0.096***	0.123***	0.103***	-0.015**	0.022***	-0.057***
	(0.006)	(0.003)	(0.005)	(0.006)	(0.003)	(0.004)
Other controls						
Country of birth[(a)] (Ref. = UK)	YES	YES	YES	YES	YES	YES
Observations	378,950	378,950	378,950	544,141	544,141	544,141

Robust standard errors in parentheses
* significant at 10%; ** significant at 5%; *** significant at 1%
(a) 75 different countries and regions of origin (with the base group) are included.

Table 5a: Decomposition of Quantile Wage Gap between Immigrant and Canadian-born Full-time Males

	1981	2001	Change
A. 10th quantile			
Raw (unadjusted) gap	0.105	-0.040	-0.145
Unexplained (adjusted) gap	-0.002	0.014	0.016
Gap explained by:			
Canadian experience	0.013	-0.063	-0.076
Foreign experience	0.068	0.056	-0.012
Cnd*foreign experience	-0.049	-0.065	-0.016
Education	0.022	0.037	0.015
Marital status	0.060	0.036	-0.024
Language	-0.033	-0.068	-0.035
Place of birth	-0.025	-0.060	-0.035
Location[(a)]	0.050	0.073	0.023
Total explained	0.107	-0.054	-0.161
B. 50th quantile			
Raw (unadjusted) gap	0.060	-0.027	-0.087
Unexplained (adjusted) gap	0.078	0.077	-0.001
Gap explained by:			
Canadian experience	0.010	-0.040	-0.05
Foreign experience	0.055	-0.020	-0.075
Cnd*foreign experience	-0.072	-0.017	0.055
Education	0.025	0.047	0.022
Marital status	0.019	0.019	0.000
Language	0.001	-0.027	-0.028
Place of birth	-0.087	-0.120	-0.033
Location[(a)]	0.031	0.054	0.023
Total explained	-0.018	-0.104	-0.086

C. 90th quantile			
Raw (unadjusted) gap	0.044	0.032	-0.012
Unexplained (adjusted) gap	0.096	0.190	0.094
Gap explained by:			
Canadian experience	0.003	-0.039	-0.042
Foreign experience	0.114	-0.000	-0.114
Cnd*foreign experience	-0.106	-0.016	0.09
Education	0.041	0.076	0.035
Marital status	0.004	0.011	0.007
Language	-0.041	-0.024	0.017
Place of birth	-0.087	-0.223	-0.136
Location[(a)]	0.021	0.057	0.036
Total explained	-0.052	-0.158	-0.106

Table 5b: Decomposition of Quantile Wage Gap between Immigrant and Canadian-born Full-time Females

	1981	2001	Change
A. 10th quantile			
Raw (unadjusted) gap	0.050	0.011	-0.039
Unexplained (adjusted) gap	0.012	0.018	0.006
Gap explained by:			
Canadian experience	0.011	-0.043	-0.054
Foreign experience	0.013	0.009	-0.004
Cnd*foreign experience	-0.002	-0.006	-0.004
Education	-0.022	0.000	0.022
Marital status	0.010	0.007	-0.003
Language	0.004	-0.048	-0.052
Place of birth	-0.007	-0.026	-0.019
Location[(a)]	0.032	0.099	0.067
Total explained	0.038	-0.007	-0.045
B. 50th quantile			
Raw (unadjusted) gap	-0.019	-0.030	-0.011
Unexplained (adjusted) gap	0.027	0.058	0.031
Gap explained by:			
Canadian experience	0.014	-0.029	-0.043
Foreign experience	-0.006	-0.030	-0.024
Cnd*foreign experience	-0.023	-0.009	0.014
Education	-0.010	0.013	0.023
Marital status	0.001	0.003	0.002
Language	-0.019	-0.041	-0.022
Place of birth	-0.032	-0.071	-0.039
Location[(a)]	0.029	0.077	0.048
Total explained	-0.046	-0.088	-0.042

C. 90th quantile			
Raw (unadjusted) gap	-0.012	0.001	0.013
Unexplained (adjusted) gap	0.010	0.051	0.041
Gap explained by:			
Canadian experience	0.018	-0.028	-0.046
Foreign experience	0.046	0.017	-0.029
Cnd*foreign experience	-0.058	-0.038	0.02
Education	0.009	0.030	0.021
Marital status	-0.009	-0.000	0.009
Language	-0.018	-0.013	0.005
Place of birth	-0.014	-0.082	-0.068
Location[(a)]	0.004	0.062	0.058
Total explained	-0.022	-0.05	-0.028

(a) Includes CMA and province.