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Will they ever converge? Earnings of immigrant and Canadian-born workers over the last two decades

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This paper represents the views of the author and does not necessarily reflect the opinions of Statistics Canada.



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Abstract

Using Census data covering the 1980-2000 period, we examine what outcomes would be necessary for today's recent immigrant cohorts to achieve earnings parity with Canadian-born workers. Our results show that today's recent immigrants would have to experience a drastic steepening of their relative age-earnings profile in the near future for their earnings to converge with their Canadian-born counterparts. The reason is simple: the greater relative earnings growth experienced by recent immigrant cohorts has only partially offset the drastic deterioration in their relative earnings at entry.

Keywords: immigration, earnings assimilation, cohort effects

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I. Introduction

Since it has important implications for issues such as earnings inequality, poverty dynamics and social cohesion, analyzing the convergence of earnings of immigrants towards those of Canadian-born workers has been a popular research objective over the last decade. Using Canadian census data, Baker and Benjamin (1994) and Bloom, Grenier and Gunderson (1995) first showed that between 1970 and 1985, recent cohorts of immigrants witnessed a deterioration of their earnings at entry relative to those of Canadian-born individuals. The implication was clear: unless they experienced “abnormally” high earnings growth in the future, recent immigrant cohorts would, from now on, need more time than earlier ones before they would assimilate into the Canadian labour market, i.e. before their earnings would converge to those of Canadian-born individuals.

Subsequently, Grant (1999) used Census data for the 1980-1990 period and reported more optimistic news: between 1985 and 1990, relative entry earnings of immigrants stopped deteriorating. Furthermore, recent immigrants experienced much faster relative earnings growth during the 1985-1990 period than their counterparts did between 1980 and 1985.

Given these two sets of results, whether today’s recent immigrants will likely achieve earnings parity with Canadian-born workers less rapidly than earlier cohorts remains an open question. The goal of this study is to examine what outcomes are necessary for recent cohorts to achieve earnings convergence with Canadian-born workers in the coming years.

To do so, we combine data from the Canadian censuses of 1981, 1986, 1991, 1996 and 2001. In Section II, we discuss the methods used to analyze the convergence of earnings of immigrant and Canadian-born workers. Next, we present the data and concepts used in the study (Section III). A statistical profile of recent immigrants over the last two decades is shown in Section IV. The empirical results are presented in Section V, and are followed by a conclusion (Section VI).

II. Methods

Given the absence of longitudinal earnings data covering an extended period of time on *both* immigrant and Canadian-born workers, we use the quasi-panel approach of Baker and Benjamin (1994) and Grant (1999) to examine the convergence of earnings of these two groups. In this framework, the log of earnings of immigrants in year t , Y_t , are given by the following equation:

$$Y_t = X'_t \beta_t + \sum_i \partial_{it} + \varepsilon_t \quad (1)$$

while the log of earnings of the Canadian-born in year t , Y_{nt} , are written as follows :

$$Y_{nt} = X'_{nt} \lambda_t + \partial_{nt} + \varepsilon_{nt} \quad (2)$$

where X'_t and X'_{nt} are vectors of observable characteristics of immigrant and Canadian-born workers, respectively. The parameters ∂_{it} denote intercepts for cohorts of immigrants who arrived in period i , while ∂_{nt} is an intercept term for Canadian-born individuals.

The approach used in this paper is to combine (1) and (2) into a single earnings equation that contains the parameters ∂_{it} , ∂_{nt} and a full set of interaction terms between a binary indicator of immigration status and workers' observable characteristics. This set of interaction terms allows the returns to observable characteristics to differ between immigrant and Canadian-born workers, as is implied by (1) and (2). The resulting earnings equation is estimated separately for each year and for each sex.¹

If predicted log earnings of “recent” cohorts of immigrants (i.e. those who arrived in year $i+k$) in year t are denoted by $y_{i+k,t}$ and predicted log earnings of “non-recent” cohorts (i.e. those who arrived in year i) are denoted by $y_{i,t}$, then the difference between the log earnings of the two cohorts in a single cross-section of data, $y_{i,t} - y_{i+k,t}$, can be written as the sum of the following two components:

$$y_{i,t} - y_{i+k,t} = (y_{i,t} - y_{i,t-k}) + (y_{i,t-k} - y_{i+k,t}) \quad (3)$$

The first component on the right-hand side of (3) measures the growth of earnings of non-recent cohorts between year $t-k$ and year t . The second component simply compares the entry earnings of the two cohorts.

Equation (3) indicates that the difference between the log earnings of the two cohorts in a single cross-section of data will be an unbiased measure of the log earnings growth of non-recent cohorts, $(y_{i,t} - y_{i,t-k})$, only if entry earnings of the two cohorts are constant over time, i.e. only if $(y_{i,t-k} - y_{i+k,t}) = 0$. Entry earnings will remain constant only if the quality of the two immigrant cohorts, the level of economic activity faced by immigrants at entry, and the wage structure remain constant over time, three conditions which are rarely satisfied². For these reasons, recent studies have used quasi-panel methods to estimate the earnings growth of immigrants.

Defining predicted log earnings of Canadian-born workers in year t as $y_{n,t}$, the difference between the log earnings of the two cohorts in a single cross-section of data can also be expressed as follows:

$$y_{i,t} - y_{i+k,t} = [(y_{i,t} - y_{i,t-k}) - (y_{n,t} - y_{n,t-k})] + [(y_{i,t-k} - y_{n,t-k}) - (y_{i+k,t} - y_{n,t})] \quad (4)$$

The first term on the right-hand side of (4) is the assimilation effect, while the second term is the cohort (or entry) effect. Equation (4) shows that the difference between the log earnings of the two cohorts in a single cross-section of data is positive when: a) the earnings of non-recent cohorts grow faster than those of native-born between year $t-k$ and year t [first component of (4)] and, b) their *relative* earnings at entry are greater than those of recent cohorts [second component of (4)].³

¹ In the parametric family of immigrant earnings models (Bloom, Grenier, and Gunderson, 1995), pooled regressions are estimated (i.e. several cross-sections are used in a single regression), which allows one to explicitly model earnings as a function of the immigrant cohort, and years-since-migration. A limitation of this approach is that the model parameters are forcibly equal for all years.

² For a detailed exposition of the conditions under which the returns to assimilation can be estimated in a single cross-section of data or with quasi-panel methods, see Baker and Benjamin (1994: 378-81).

³ Following Grant (1999: 939), one can rewrite (4) as follows :

Using repeated cross-sections of data and assuming that the earnings growth of native-born between year t-k and year t was not “abnormally” high (low), the first component of (4) can be used along with the estimates of relative earnings at entry of non-recent cohorts, $(y_{i,t-k} - y_{n,t-k})$, to measure the degree to which earnings of immigrants “normally” converge to those of native-born over time.

III. Data and concepts

The Census is the only available data source that combines information on immigrants and Canadian-born individuals for a long period of time. We thus use Census data for the income reference years 1980, 1985, 1990, 1995, and 2000. Although some of the information refers to the census reference week (in 1981, 1986, 1991, 1996, or 2001), for simplicity, we will still refer to the income reference year.

Following Grant (1999), we focus on individuals between 16 and 64 years old who worked at least 40 weeks in the reference year, and were mainly full-time workers in that year, i.e. they worked at least 30 hours of work per week on average. The key variable of interest is annual earnings, which includes wages and salaries, net income from self-employment, and other employment income (tips, gratuities, etc.)⁴. Only individuals with positive earnings are selected. To reduce data processing time, we have taken a 20% random sample of the Canadian-born in the regressions (except when we focus on new Canadian-born entrants).

Immigrant entry cohorts are identified by groups of five years. Given the 40 weeks work restriction, immigrants who arrived during the reference year are almost certainly selected out of the sample, but the few that remain would cause some problems. For example, immigrants who arrived in early 1995 and worked the entire year would enter the sample for the 1995 cross-section. In 2000, the 1991-95 cohort would most likely include these early 1995 entrants, but immigrants who arrived later in the year would also be included. Thus, the 1991-95 cohort may be markedly different in 1995 and 2000. To avoid this problem, we simply drop all immigrants who entered the country in the reference year. The cohorts we look at are thus: 1995-99, 1990-94, 1985-89, 1980-84, 1975-79, 1970-74, 1965-69, 1960-64, and pre-1960.

Earlier immigrant earnings studies generally focused on men, since they have the greatest attachment to the labour force. Since women have increased their presence in the labour market over the last couple of decades, we include them in the analysis, albeit in a separate set of results.

IV. A profile of recent immigrants over the last two decades

We begin by describing the characteristics of recent immigrants (i.e. those arriving in the previous five years) over the study period, relative to their Canadian-born counterparts. The sample means of the primary variables of interest appear below, in Table 1:

$y_{i,t} - y_{i+k,t} = [(y_{i,t} - y_{i,t-k}) - (y_{n,t} - y_{n,t-k})] + [(y_{i,t-k} - y_{i+k,t}) - (y_{n,t-k} - y_{n,t})]$. The first component on the right-hand side measures relative log earnings growth within cohort i while the second component captures relative log earnings growth as measured across cohorts of immigrants.

⁴ Other employment income can not be separated from wages and salaries in the Census.

Table 1: Sample means, Canadian-born and recent immigrants workers****

	1980		1985		1990		1995		2000	
	Canadian-born	Recent imm.	Canadian-born	Recent imm.	Canadian-born	Recent imm.	Canadian-born	Recent imm.	Canadian-born	Recent imm.
Men										
No high school	0.367	0.238	0.320	0.286	0.259	0.242	0.217	0.202	0.195	0.139
High school	0.172	0.138	0.177	0.149	0.193	0.177	0.245	0.208	0.255	0.181
College	0.336	0.405	0.354	0.339	0.387	0.328	0.354	0.303	0.365	0.241
Bachelor's	0.085	0.127	0.102	0.117	0.111	0.145	0.128	0.160	0.131	0.232
Master's	0.035	0.074	0.041	0.083	0.045	0.086	0.050	0.098	0.049	0.168
Doctorate	0.005	0.019	0.006	0.025	0.006	0.022	0.006	0.030	0.006	0.039
Potential work experience (in years)	19.1	14.6	19.3	15.2	19.4	15.7	20.3	16.5	20.9	16.7
Weeks worked	50.4	50.0	50.7	50.3	50.7	50.2	50.6	50.0	50.5	50.0
Married	0.758	0.781	0.755	0.745	0.644	0.712	0.616	0.710	0.712	0.788
Visible minority	0.006	0.497	0.009	0.569	0.012	0.680	0.012	0.687	0.018	0.693
Atlantic provinces	0.085	0.021	0.082	0.018	0.081	0.013	0.077	0.010	0.075	0.008
Montreal	0.122	0.126	0.122	0.122	0.118	0.114	0.115	0.115	0.116	0.104
Other parts of Quebec	0.161	0.018	0.156	0.016	0.157	0.013	0.151	0.011	0.150	0.013
Toronto	0.094	0.343	0.112	0.386	0.107	0.481	0.103	0.451	0.106	0.466
Other parts of Ontario	0.236	0.141	0.241	0.142	0.241	0.138	0.241	0.123	0.242	0.125
Manitoba	0.044	0.039	0.044	0.044	0.041	0.030	0.042	0.025	0.040	0.019
Saskatchewan	0.044	0.016	0.043	0.016	0.038	0.007	0.039	0.007	0.036	0.007
Alberta	0.106	0.146	0.101	0.134	0.103	0.075	0.108	0.077	0.118	0.077
Vancouver	0.046	0.108	0.045	0.090	0.052	0.108	0.054	0.154	0.052	0.159
Other parts of British Columbia	0.060	0.041	0.052	0.029	0.060	0.020	0.066	0.026	0.062	0.022
N	812,588	22,553	798,609	17,579	881,675	23,474	857,654	30,057	937,303	30,658
Women										
No high school	0.295	0.315	0.256	0.339	0.203	0.252	0.158	0.200	0.137	0.156
High school	0.238	0.175	0.220	0.182	0.232	0.196	0.247	0.207	0.269	0.207
College	0.364	0.356	0.393	0.322	0.412	0.361	0.401	0.339	0.378	0.262
Bachelor's	0.076	0.107	0.097	0.098	0.111	0.128	0.140	0.169	0.156	0.231
Master's	0.025	0.042	0.032	0.050	0.040	0.055	0.051	0.075	0.057	0.127
Doctorate	0.001	0.005	0.002	0.008	0.002	0.008	0.003	0.010	0.004	0.017
Potential work experience (in years)	16.3	13.8	17.0	14.6	18.0	15.2	19.5	16.1	20.2	16.0
Weeks worked	50.3	49.6	50.6	50.0	50.7	50.1	50.6	49.8	50.4	49.8
Married	0.597	0.706	0.623	0.668	0.545	0.653	0.540	0.627	0.664	0.728
Visible minority	0.008	0.592	0.011	0.631	0.014	0.708	0.014	0.720	0.020	0.711
Atlantic provinces	0.080	0.014	0.079	0.012	0.080	0.008	0.081	0.007	0.081	0.007
Montreal	0.138	0.124	0.133	0.113	0.130	0.096	0.128	0.104	0.127	0.098
Other parts of Quebec	0.148	0.011	0.141	0.008	0.144	0.007	0.141	0.009	0.142	0.011
Toronto	0.123	0.408	0.140	0.433	0.125	0.528	0.118	0.464	0.116	0.479
Other parts of Ontario	0.225	0.106	0.229	0.113	0.236	0.124	0.234	0.108	0.236	0.111
Manitoba	0.043	0.042	0.042	0.048	0.041	0.024	0.041	0.025	0.040	0.019
Saskatchewan	0.037	0.013	0.038	0.013	0.037	0.007	0.038	0.008	0.036	0.006
Alberta	0.102	0.128	0.102	0.131	0.100	0.077	0.101	0.084	0.108	0.078
Vancouver	0.053	0.123	0.051	0.102	0.054	0.111	0.056	0.164	0.053	0.167
Other parts of British Columbia	0.048	0.029	0.043	0.026	0.051	0.017	0.060	0.026	0.057	0.023
N	402,272	12,975	443,576	10,936	568,482	16,591	577,944	20,452	673,330	20,424

* Recent immigrants arrived in Canada in the previous five years.

** In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings.

Compared to Canadian-born individuals, recent immigrants are generally more educated. In recent years, the education gap has been widening. For example, 16% of Canadian-born men in our sample had a university degree in 1990 (reference year); by 2000, this had risen to 19%. In contrast, 25% of recent immigrants had a university degree in 1990; by 2000, this shot up to 44%. Likewise, the proportion of individuals with a university degree rose much more among recent female immigrants than among their Canadian-born counterparts between 1990 and 2000.

Not surprisingly, recent immigrants have fewer potential years of work experience than the Canadian-born⁵. This is because recent immigrants are younger and have spent more time in school than their Canadian-born counterparts⁶.

⁵ Potential work experience = age – years of schooling – 6. Years of schooling is only available in the 1985, 1990, and 1995 Census (reference years). As a result, we regressed years of schooling on the highest level of schooling

Marital rates are generally higher among recent immigrants than Canadian-born individuals. Most recent immigrants are members of visible minorities, and this has become increasingly so over the period of study. In 2000, almost three-quarters of recent immigrants in our sample were members of visible minorities. Only a very small fraction of Canadian-born men and women are members of visible minorities, although this has also been on the rise in recent years.

Recent immigrants tend to be clustered in larger urban areas. In 2000, almost half were in Toronto, while about three-quarters were in Toronto, Montreal, or Vancouver. The proportions settling in Toronto and Vancouver have increased over the study period, while the proportion settling in Montreal has remained quite stable.

V. Results

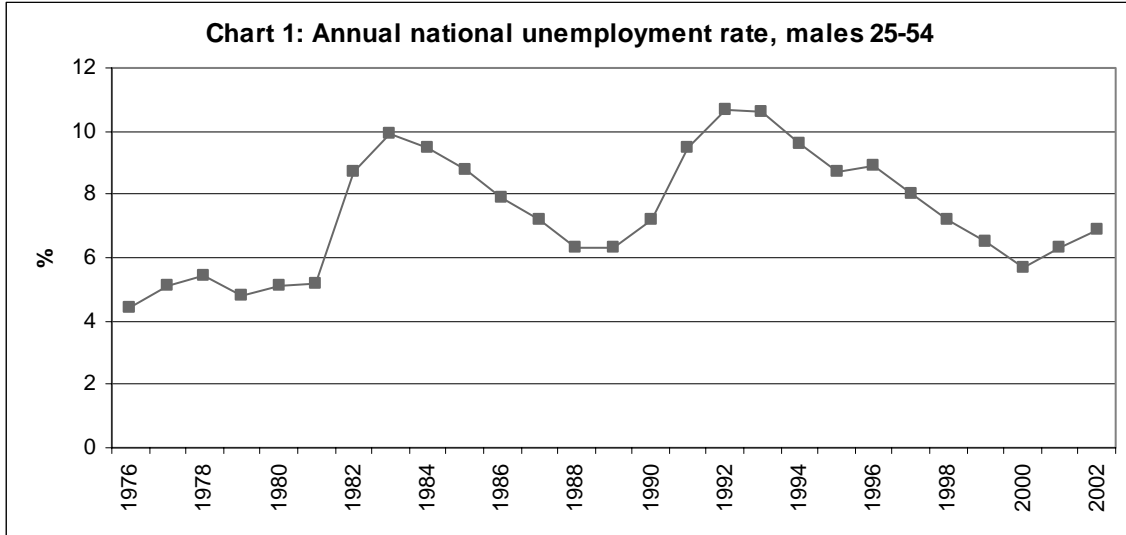
Examining the relative earnings of immigrants (especially recent ones) over a long period of time, can be a tricky proposition. Although they may have considerable foreign work experience, they are still new entrants to the *Canadian* labour market, and as such, they may be particularly vulnerable to business cycle fluctuations⁷. As the economy contracts, fewer new jobs are created, and this affects potential new entrants the most, whether it means experiencing unemployment spells, or being forced to accept lower paying jobs than anticipated. Of course, when the economy picks up steam, and new jobs are being created, firms must draw upon available workers to fill vacant positions, and this means that immigrants may regain lost ground (relative to older workers, or those with more Canadian experience).

Throughout the paper, the entry earnings of immigrants should be placed within the context of the business cycle. Over the period of study, the Canadian economy saw two full business cycles, as witnessed by the movements in the unemployment rate shown below, for males aged 25 to 54 years old.

attained in those three years, and applied the parameter estimates to predict years of schooling in all census years. The parameter estimates were quite stable regardless of the census year used. The results of these models are available from the authors upon request.

⁶ In our sample, recent immigrants in 1990 were 34.9 years old on average, compared to 37.9 for Canadian-born individuals. In 2000, recent immigrants were 37.0 years old on average, compared to 40.0 for Canadian-born workers.

⁷ See McDonald and Worswick (1998) for more detailed work in this area.



In 1980, the unemployment rate was at a low of 5.1%. The rate had almost doubled by 1983 (to 9.9%), but declined steadily afterwards to a low of 6.3% in 1988-89. The rate peaked again at 10.7% in 1992, only to fall (very slowly this time) to 5.7% by 2000. The 1980 and 2000 census data are clearly peak years, while 1990 is a near peak year (unemployment rate of 7.2%). The 1985 and 1995 census data can perhaps best be described as recovery years, with the unemployment rate near 9% and headed downwards.

V.1 Descriptive evidence

The left panel of Table 2 compares average log earnings of immigrants with those of Canadian-born workers over the last two decades. Relative earnings at entry—i.e. within the first five years after arrival in Canada—are shown for five cohorts: IM7579 (immigrants arrived between 1975 and 1979), IM8084, IM8589, IM9094 and IM9599. The underlying mean earnings are shown in Appendix 1.

Table 2: Log earnings differences between immigrant and Canadian-born workers, 1980-2000***

	Unadjusted differences						OLS adjusted differences***				
	1980	1985	1990	1995	2000		1980	1985	1990	1995	2000
Men						Men					
IMpre60	0.122	0.149	0.177	0.180	0.195	IMpre60	-0.015	-0.008	0.008	-0.002	0.016
IM6064	0.041	0.072	0.131	0.121	0.151	IM6064	-0.064	-0.052	-0.024	-0.028	0.011
IM6569	0.073	0.079	0.136	0.151	0.183	IM6569	-0.064	-0.066	-0.034	-0.015	0.025
IM7074	-0.031	0.011	0.038	0.059	0.123	IM7074	-0.113	-0.099	-0.089	-0.056	0.000
IM7579	-0.127	-0.076	-0.017	-0.022	0.064	IM7579	-0.165	-0.139	-0.103	-0.092	-0.028
IM8084		-0.306	-0.149	-0.122	-0.082	IM8084		-0.293	-0.193	-0.159	-0.141
IM8589			-0.318	-0.243	-0.165	IM8589			-0.332	-0.271	-0.216
IM9094				-0.450	-0.265	IM9094				-0.446	-0.310
IM9599					-0.283	IM9599					-0.399
Women						Women					
IMpre60	0.044	0.073	0.094	0.133	0.158	IMpre60	0.003	0.003	0.012	0.010	0.033
IM6064	-0.024	0.013	0.050	0.063	0.114	IM6064	-0.053	-0.047	-0.027	-0.015	0.016
IM6569	0.007	0.027	0.096	0.126	0.126	IM6569	-0.056	-0.062	-0.022	-0.005	-0.003
IM7074	-0.075	-0.028	0.038	0.064	0.103	IM7074	-0.131	-0.119	-0.076	-0.059	-0.028
IM7579	-0.196	-0.114	-0.026	-0.014	0.061	IM7579	-0.228	-0.181	-0.117	-0.117	-0.060
IM8084		-0.317	-0.157	-0.108	-0.060	IM8084		-0.331	-0.217	-0.180	-0.155
IM8589			-0.253	-0.187	-0.124	IM8589			-0.317	-0.271	-0.231
IM9094				-0.397	-0.240	IM9094				-0.456	-0.345
IM9599					-0.306	IM9599					-0.445

* Log earnings differences are approximately equal to percentage differences. For example, the left panel of the table reads as follows: the average earnings of immigrant men who arrived between 1975 and 1979 were about 12.7% lower than those of Canadian-born men in 1980.
 ** In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings. To reduce processing time, a 20% random sample of Canadian-born workers is used in the regressions.
 *** Differences that are statistically significant at 5% are shaded. Note that no significance tests were performed on the unadjusted results.

The data show a substantial deterioration of relative entry earnings of both male and female immigrants during the period. In 1980, male immigrants who had arrived recently in Canada (IM7579) had 13% lower earnings than Canadian-born men. In 1985, the earnings gap at entry reached much higher levels, amounting to about 31%. As Grant (1999) noted, relative entry earnings stopped falling between 1985 and 1990. However, the deterioration resumed in 1995, with recent immigrant cohorts experiencing 45% lower earnings than their Canadian-born counterparts. Between 1995 and 2000, relative entry earnings improved: they moved back to their mid-1980s value in 2000. Overall, the earnings gap between recent male immigrants and Canadian-born men more than doubled between 1980 and 2000.

Similar trends are observed for women between 1980 and 1995. Relative entry earnings of female immigrants fell from 20% to 32% lower than Canadian-born women between 1980 and 1985, rose slightly between 1985 and 1990, and deteriorated further between 1990 and 1995, then improved between 1995 and 2000. As for men, the earnings gap between recent immigrant women and their Canadian-born counterparts rose substantially over the last two decades⁸.

The substantial deterioration of relative entry earnings of recent immigrant cohorts would have been inconsequential for long-term earnings convergence if recent immigrant cohorts had done much better than previous cohorts at catching up. Table 2 suggests that this is not the case, at least for the first 15 years after arrival. For instance, relative earnings of male IM7579 grew by 11 percentage

⁸ Of course, comparing relative earnings of immigrant women and men masks the fact that women earn less than men on average (see Appendix 1 for more details).

points between 1980 and 1990 (hereafter, simply 5 and 15 years after arrival—the upper bound for IM7579). While those of male IM8084 and male IM8589 grew more—by 18 and 15 percentage points, respectively—between 5 and 15 years following arrival, the extra growth in earnings was not sufficient to completely offset the deterioration of entry earnings. Hence, while earnings of male IM7579 almost converged to those of Canadian-born men 15 years after arrival, those of male IM8084 and male IM8589 were still at least 12 percentage points below those of Canadian-born men after this period of time⁹.

Complete catch-up was not observed for recent female immigrant cohorts either. Fifteen years after arrival, earnings of female IM7579 had approached those of Canadian-born women (only 2% difference). In contrast, earnings of female IM8084 and of female IM8589 were 11% and 12% (respectively) lower than those of their Canadian-born counterparts after this same period of time.

Hence, contrary to immigrants who came to Canada in the second half of the 1970s, immigrants who came to Canada in the 1980s still had, 15 years after arrival, substantially lower earnings than Canadian-born workers. Compared to that of immigrants who arrived in the *first* half of the 1970s, the earnings performance of the 1980s immigrants is even worse: male immigrants who came to Canada between 1970 and 1974 saw their earnings converge with those of Canadian-born males within less than 15 years following arrival, whereas females almost saw full convergence within the same time period.

Taken together, these findings suggest that the deterioration of relative entry earnings of recent immigrant cohorts over the last two decades has had long-term consequences for earnings convergence. In the next section, we examine whether this statement holds true in regression analysis.

V.2 Evidence from regression analysis

As noted above, separate models are run for each census and each sex, but immigrants and Canadian-born workers are pooled in each model. Recall that immigrant effects are identified through a series of cohort dummy variables, as well as through interactions between a simple immigrant status variable and all covariates in the model. The dependent variable is the natural logarithm of annual earnings¹⁰. Our set of controls consists of the following covariates: education (highest level attained: no high school—omitted, high school, college, bachelor's, master's, and doctorate), potential work experience in years (and its square), weeks worked, marital status (a dummy variable), visible minority status (a dummy variable), and region (Atlantic provinces, Montreal, other parts of Quebec, Toronto—omitted, other parts of Ontario, Manitoba, Saskatchewan, Alberta, Vancouver, and other parts of British Columbia).

V.2.1 Ordinary least squares (OLS) results

⁹ Furthermore, 20 years after arrival, earnings of male IM7579 were closer to those of Canadian-born men (2% less) compared to male IM8084 (8% less).

¹⁰ Annual earnings are converted into 2000 constant dollars using the Consumer Price Index – All items.

The right panel of Table 2 presents adjusted earnings differences between immigrant and Canadian-born workers¹¹. We construct our adjusted earnings differences so as to provide an average “treatment effect” (e.g. Mellor, 1998), i.e. provide the answer to the following question. Given the actual observable characteristics of all workers - both immigrant and Canadian-born workers - by how much would, on average, predicted earnings of *all* workers differ under the two following scenarios : 1) all workers are paid according to the OLS earnings equation of immigrant cohort i and, 2) all workers are paid according to the OLS earnings equation of Canadian-born workers.

The adjusted results and the unadjusted results generally differ in magnitude, highlighting the importance of accounting for differences in education, work experience, and other characteristics.

The adjusted results confirm that for both male and female immigrants, relative entry earnings fell in the 1980s and dropped even further in the 1990s. All else equal, recent immigrant men received 17% lower earnings than Canadian-born men in 1980. Twenty-years later, the gap more than doubled, as it reached a stunning 40%¹². The gap doubled for recent immigrant women, as they received 23% lower earnings than their Canadian-born counterparts in 1980 and 44% lower earnings in 2000.

As the raw data suggested, this deterioration in relative entry earnings has had long-term consequences for earnings convergence. Fifteen years after arrival, adjusted earnings of male IM7579 were 10% lower than those of Canadian-born men. However, the corresponding earnings gaps for male IM8084 and male IM8589 were larger, amounting to 16% and 22%, respectively. Similarly, while female IM7579 were paid 12% less than Canadian-born women 15 years after arrival, female IM8084 and female IM8589 fared worse, their adjusted earnings being 18% and 23%, respectively, lower than those of their Canadian-born counterparts after 15 years spent in Canada.¹³

In Table 3, the cross-sectional growth in OLS predicted log earnings is decomposed into the assimilation effect and the cohort effect, as described in equation (4). Note however that the sign of the cohort effect has been changed to provide more intuitively clear results: the cohort effect reported below refers to the growth in relative log entry earnings by moving forward in time; the decomposition technique displayed in (4) shows the growth by moving backward in time.

¹¹ Detailed regression results are available in Appendices 2 and 3.

¹² Recall that the raw data suggested a substantial improvement in relative earnings between 1995 and 2000. This result was perhaps not surprising, given the improvement in the economy at the time, as well as the large rise in the proportion of recent immigrants with a university degree (see Table 1). After controlling for this rise in educational attainment of recent immigrants, relative entry earnings improved only slightly between 1995 and 2000.

¹³ Twenty years after arrival, earnings of male and female IM7579 were closer to those of Canadian-born workers (9% and 12% lower, respectively), compared to male and female IM8084 (14% and 16% lower, respectively).

Table 3: OLS decompositions of cross-sectional growth in predicted relative immigrant log earnings*

Men				
Cohort	Census years	Assimilation effect	Cohort effect	
IM9094	1995/2000	0.136	0.048	
IM8589	1990/1995	0.061	-0.114	
IM8084	1985/1990	0.101	-0.039	
IM7579	1980/1985	0.026	-0.128	
IM8589	1990/2000	0.116	-0.067	
IM8084	1985/1995	0.134	-0.153	
IM7579	1980/1990	0.062	-0.166	
IM8084	1985/2000	0.152	-0.106	
IM7579	1980/1995	0.073	-0.281	
Women				
Cohort	Census years	Assimilation effect	Cohort effect	
IM9094	1995/2000	0.111	0.011	
IM8589	1990/1995	0.046	-0.139	
IM8084	1985/1990	0.114	0.014	
IM7579	1980/1985	0.076	-0.102	
IM8589	1990/2000	0.085	-0.128	
IM8084	1985/1995	0.151	-0.125	
IM7579	1980/1990	0.111	-0.088	
IM8084	1985/2000	0.176	-0.114	
IM7579	1980/1995	0.111	-0.227	

* In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings. To reduce processing time, a 20% random sample of Canadian-born workers is used in the regressions.

** This is the difference in predicted log earnings in the most recent census year between a given cohort and the entry cohort. Note that in equation (4) of the text, the cohort effect is expressed as the difference in relative log entry earnings of immigrants in the less recent year and the most recent year. For the sake of clarity, we have reversed the order of this difference for this table.

As already noted (and shown in Table 3 in a different way than before), the relative entry earnings of immigrants have declined steadily over the last two decades. For example, relative entry earnings declined by 15 percentage points between 1985 and 1995 for men, and by 12 percentage points for women over the same period (see row IM8084, cohort effect column). Relative entry earnings continued to decline between 1990 and 2000.

Unless the assimilation rate of the recent cohorts is abnormally high, it will take longer for their earnings to fully converge with those of their Canadian-born counterparts. Table 3 suggests that to date, this has not been the case for male immigrants who arrived in the first half of the 1990s (IM9094), who managed to reduce the earnings gap with the Canadian-born men by 14 percentage

points between 1995 and 2000. This assimilation rate was only moderately above that of the male IM8084 group, who closed the earnings gap with Canadian-born men by 10 percentage points between 1985 and 1990. Clearly, the earnings of male IM9094 did not catch-up abnormally fast, despite the strong improvement in economic conditions between 1995 and 2000. In essence, the difference in the assimilation rate was not large enough to make up for the decline in relative earnings. The story is similar for women: both IM9094 and IM8084 closed the gap with Canadian-born women by 11 percentage points between 5 and 10 years following entry.

V.2.2 Quantile regression results

The inferences drawn in Section V.2.1 are based on averages and thus, may not accurately represent the outcomes experienced by immigrant and Canadian-born workers in different parts of the earnings distribution. To overcome this limitation, we use quantile regression techniques¹⁴ and characterize earnings convergence in the bottom, middle and top of the earnings distribution, i.e. at the 25th, 50th and 75th percentile, respectively. The results are reported in Table 4¹⁵.

¹⁴ See Koenker and Bassett (1978), Buchinsky (1998), or Eide and Showalter (1999) for a detailed exposition of quantile regression methods.

¹⁵ Detailed results are available from the authors upon request.

Table 4: Adjusted log earnings differences at various points of the earnings distribution***

	Men					Women					
	Adjusted differences at 25th percentile					Adjusted differences at 25th percentile					
	1980	1985	1990	1995	2000	1980	1985	1990	1995	2000	
IMpre60	-0.009	0.000	0.015	0.003	0.022	IMpre60	0.002	0.001	0.012	0.036	0.056
IM6064	-0.061	-0.051	-0.016	-0.020	0.010	IM6064	-0.062	-0.052	-0.024	0.001	0.030
IM6569	-0.055	-0.053	-0.020	-0.011	0.011	IM6569	-0.056	-0.068	-0.022	0.013	0.011
IM7074	-0.115	-0.105	-0.086	-0.072	-0.009	IM7074	-0.129	-0.128	-0.092	-0.062	-0.031
IM7579	-0.189	-0.161	-0.122	-0.117	-0.039	IM7579	-0.238	-0.211	-0.134	-0.127	-0.079
IM8084		-0.338	-0.213	-0.196	-0.144	IM8084		-0.384	-0.238	-0.191	-0.173
IM8589			-0.370	-0.309	-0.231	IM8589			-0.350	-0.290	-0.244
IM9094				-0.490	-0.315	IM9094				-0.498	-0.368
IM9599					-0.437	IM9599					-0.496
	Adjusted differences at 50th percentile					Adjusted differences at 50th percentile					
	1980	1985	1990	1995	2000		1980	1985	1990	1995	2000
IMpre60	-0.008	-0.012	0.008	0.000	0.032	IMpre60	-0.004	0.003	0.016	0.024	0.050
IM6064	-0.050	-0.054	-0.019	-0.012	0.021	IM6064	-0.057	-0.051	-0.015	0.002	0.023
IM6569	-0.045	-0.053	-0.024	-0.005	0.027	IM6569	-0.062	-0.067	-0.023	-0.010	0.015
IM7074	-0.092	-0.090	-0.068	-0.048	0.007	IM7074	-0.129	-0.123	-0.081	-0.053	-0.023
IM7579	-0.149	-0.126	-0.090	-0.075	-0.019	IM7579	-0.225	-0.188	-0.123	-0.102	-0.058
IM8084		-0.283	-0.164	-0.131	-0.102	IM8084		-0.356	-0.199	-0.160	-0.130
IM8589			-0.302	-0.246	-0.177	IM8589			-0.306	-0.253	-0.203
IM9094				-0.417	-0.260	IM9094				-0.448	-0.311
IM9599					-0.367	IM9599					-0.418
	Adjusted differences at 75th percentile					Adjusted differences at 75th percentile					
	1980	1985	1990	1995	2000		1980	1985	1990	1995	2000
IMpre60	-0.017	-0.015	0.006	-0.004	0.025	IMpre60	-0.005	0.002	0.012	0.015	0.035
IM6064	-0.053	-0.053	-0.023	-0.022	0.005	IM6064	-0.053	-0.049	-0.019	-0.011	-0.010
IM6569	-0.053	-0.052	-0.029	-0.016	0.024	IM6569	-0.003	-0.010	-0.011	-0.012	-0.014
IM7074	-0.081	-0.067	-0.059	-0.040	0.002	IM7074	-0.066	-0.049	-0.047	-0.039	-0.031
IM7579	-0.116	-0.091	-0.065	-0.055	-0.012	IM7579	-0.087	-0.059	-0.037	-0.032	-0.022
IM8084		-0.201	-0.126	-0.105	-0.083	IM8084		-0.122	-0.071	-0.056	-0.063
IM8589			-0.241	-0.207	-0.151	IM8589			-0.082	-0.072	-0.070
IM9094				-0.349	-0.235	IM9094				-0.163	-0.089
IM9599					-0.310	IM9599					-0.078

* In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings. To reduce processing time, a 20% random sample of Canadian-born workers is used in the regressions.

** Differences that are statistically significant at 5% are shaded.

Whatever part of the earnings distribution is considered, the results confirm previous OLS patterns. Successive cohorts have seen their entry earnings decline (with the exception of women at the 75th percentile). For both sexes, adjusted earnings differences of immigrants who arrived during the first half of the 1980s (IM8084) were, fifteen years after arrival, substantially larger as those of immigrants who arrived during the second half of the 1970s (IM7579). Immigrants who arrived in the late 1980s (IM8589) fared even worse, fifteen years after arrival.

Did IM8084's relative performance fare any worse than that of IM7579 twenty years after arrival? The answer is yes at all points we examine in the distribution, although the differences are only moderate.

V.2.3 Discussion

Two key messages emerge from the OLS and quantile regressions. The first is that, 15 years after arrival, male and female immigrants who arrived in Canada between 1985 and 1989 (IM8589) could generally expect to receive between 15% and 24% lower earnings than their Canadian-born counterparts—females at the 75th percentile are an exception with only a 7% gap. In contrast, male and female immigrants who came to Canada between 1975 and 1979 could, 15 years after arrival,

expect to receive no more than 13% lower earnings than Canadian-born workers. Clearly, unless they experience “abnormally” high earnings growth in the future, immigrants who arrived in Canada between 1985 and 1989 will need more time than their predecessors to achieve earnings parity with Canadian-born workers. The worse performance of IM8589—compared to IM7579—cannot be due to business cycle effects *at the end of the period* since, 15 years after arrival, IM8589 faced an aggregate unemployment rate of 6.8% (in 2000), much lower than the 8.1% rate faced in 1990 by IM7579. It may, however, be due to the prolonged recession faced by IM8589 in the early 1990s, and any possible scarring effects it may have inflicted.

The second message is that—again with the exception of females at the 75th percentile—relative entry earnings continued to fall in the 1990s (when looking at the decade as a whole). As a result, the earnings of immigrants who arrived in the 1990s will have to grow at an “abnormally” high rate (compared to previous cohorts) in order to converge with the earnings of Canadian-born workers. Even though male immigrants who arrived in the first half of the 1990s (IM9094) experienced somewhat higher relative earnings growth than their counterparts who arrived in the first half of the 1980s (IM8084), the data suggest that more time will be needed before the earnings of immigrants who arrived in the 1990s converge—if they ever do—to those of their Canadian-born counterparts¹⁶.

What assimilation rate will be required for immigrants who arrived in the second half of the 1990s (IM9599) to achieve convergence with their Canadian-born counterparts? The results of the right panel of Table 2 may provide some useful insight into this question. Of all cohorts of immigrants who arrived between 1975 and 1989, IM8084 experienced the fastest relative earnings growth during the period covering 5 to 15 years after arrival: their relative earnings grew 14 and 15 percentage points, for men and women respectively. Even with a doubling of these relative earnings growth rates, the earnings of male and female IM9599 would be, in 2010, fully 12 and 15 percentage points below those of their Canadian-born counterparts, respectively. For full convergence to occur, their relative earnings would have to grow by at least 40 percentage points between 5 and 15 years after arrival—almost triple the fastest growth rate observed by any cohort arriving in the last 25 years.

Likewise, of all cohorts of immigrants who arrived between 1975 and 1984, IM8084 experienced the fastest relative earnings growth during the period covering 5 to 20 years after arrival: their relative earnings grew 15 and 18 percentage points, for men and women respectively. Once again, even with a doubling of these relative earnings growth rates, the earnings of male and female IM9599 would still be, in 2015, 10 and 9 percentage points below those of their Canadian-born counterparts, respectively. For full convergence to occur, their relative earnings would have to grow more than double the rates registered by IM8084 between 5 and 20 years after arrival.

¹⁶ The fastest relative earnings growth was observed among men in the 25th percentile of the earnings distribution: male IM9094 saw their relative earnings grow by 18 percentage points between 1995 and 2000. The corresponding number for the 1985-1990 period for male IM8084 was 13 percentage points.

V.2.4 Using new entrants as a benchmark

Rather than being unique to them, the poor performance of recent immigrant in the 1990s could reflect downward shifts in the age-earnings profile of all new entrants to the labour market, whether they are born in Canada or not. So far, we have accounted for this to some extent by controlling for potential years of work experience, but to get a clearer sense of the extent to which this is the case, we now focus our attention on two groups: 1) recent immigrants, and 2) Canadian-born workers aged 25 to 29.^{17,18}

Table 5: Adjusted log earnings of recent immigrants and Canadian-born youths^{*****}

	1980	1985	1990	1995	2000
Men					
Recent Immigrants	10.396	10.244	10.194	10.061	10.215
Canadian-Born Youths	10.464	10.383	10.353	10.230	10.339
Difference	-0.068	-0.139	-0.159	-0.170	-0.124
Women					
Recent Immigrants	9.970	9.871	9.877	9.804	9.915
Canadian-Born Youths	10.138	10.103	10.112	10.026	10.097
Difference	-0.169	-0.232	-0.235	-0.222	-0.182

* In any given year, the sample consists of individuals aged 16-64 (for recent immigrants) or 25-29 (for Canadian-born youth), who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings.

** Recent immigrants are those who arrived in the last five years.

*** Differences that are statistically significant at 5% are shaded.

Among male new entrants, the fall in earnings of recent immigrants is not a unique phenomenon (Table 5). While earnings of recent immigrant men have fallen by 18 percentage points over the study period (1980 to 2000), the earnings of Canadian-born male youths have also fallen over this same time period, albeit by only 12 percentage points. As a result, the adjusted earnings gap between recent immigrants and Canadian-born young males rose from 7% to 12% (an 82% rise) during the period. Given that the earnings gap between recent male immigrants and all Canadian-born male workers rose much more—from 17% to 40%, which is a 141% rise (see Table 2)—this pattern confirms the finding of Green and Worswick (2003) that a non negligible part of the decline in relative earnings of recent male immigrants reflects a problem common to all new labour market entrants, whether they are born outside of Canada or not. More specifically, the rise in the gap

¹⁷ See Green and Worswick (2003) for a much more detailed look at using new entrants as a benchmark.

¹⁸ We also compared recent immigrants aged 25 to 29 to Canadian-born workers aged 25 to 29 and obtained similar qualitative conclusions.

declines by 42% (141% vs 82%) when we switch the benchmark group to new Canadian-born entrants¹⁹.

The results are even more striking for women. When compared to all Canadian-born women, recent female immigrants saw their earnings gap increase from 23% to 44% (Table 2). When the comparison group consists of young Canadian-born women, the adjusted earnings gap of recent female immigrants rises marginally from 17% to 18%.²⁰

VI. Conclusion

Our primary goal in this study has been to examine what outcomes would be necessary for today's recent immigrants to achieve earnings parity with Canadian-born workers. Our results suggest that the greater relative earnings growth experienced by recent immigrant cohorts has only partially offset the drastic deterioration in their relative earnings at entry. As a result, their earnings will have to grow at an "abnormally" high rate in the coming years in order to converge with Canadian-born earnings.

The finding that relative earnings of recent immigrants did not improve between 1990 and 2000 is surprising in light of the fact that the supply of university graduates has grown much faster among recent immigrants than among Canadian-born workers over the last decade. This suggests that the extent to which holding a university degree allows access to high-paying jobs has changed markedly for recent immigrants during the 1990s.

Our results confirm the finding of Green and Worswick (2003) according to which the poorer performance of recent male immigrant cohorts is partly due to the declining labour outcomes of new labour market entrants. For women, the fact that the earnings of new Canadian-born labour market entrants did not rise (and in fact fell slightly) accounts for almost all of the declining relative fortunes of recent immigrants.²¹ These findings in turn highlight the importance of understanding why the earnings gap between young and older workers has risen between 1980 and 2000, an issue which has been widely documented but has remains unresolved so far.

Whatever the underlying causes of these earnings changes are, our findings have important implications for several aspects of the Canadian labour market. First, they help explain the substantial rise in low-income rates among recent immigrants, documented by Morissette (2002) and Picot and Hou (2003). Second, they signal a potential drop in immigrants' permanent income and, in the absence of offsetting changes in their savings rates, a potential decline in immigrants' wealth and precautionary savings. Taken together, both factors suggest that, compared to earlier

¹⁹ Due to data limitations, Green and Worswick (2003) allow all positive earners into their sample. Some of their effects may thus be the result of adjustments in hours or weeks of work during the year. As a result, our findings can not be directly compared to theirs.

²⁰ The results for women are also different than those for men in that young Canadian-born women did not see their earnings fall by very much—it is more the failure of their earnings to rise as quickly as all Canadian-born women workers that explains why recent immigrant women fell further behind new Canadian-born entrants (see Appendix 1 for example).

²¹ See Appendix 4 for information on mean earnings by age group, immigrant status, and educational attainment.

cohorts, recent immigrant cohorts will—at least in the near future—be more likely to have difficulty making ends meet and will also be more financially vulnerable to shocks such as job loss or unexpected expenditures.²²

Appendix

Appendix 1: Sample mean earnings (\$2000) of immigrant and Canadian-born workers, 1980-2000*

Men	1980	1985	1990	1995	2000
Canadian-born	45,625	45,087	46,039	45,710	48,623
Canadian-born, 25-29 year olds	39,788	37,042	36,135	33,429	35,705
IMpre60	50,883	51,947	55,796	55,437	60,972
IM6064	47,708	47,953	52,614	52,443	57,055
IM6569	48,660	49,040	52,666	52,936	58,046
IM7074	44,080	46,112	48,386	48,825	55,126
IM7579	40,649	42,745	45,643	46,035	51,987
IM8084		35,110	41,340	42,099	46,587
IM8589			34,985	36,695	42,242
IM9094				30,700	38,061
IM9599					37,909
Women	1980	1985	1990	1995	2000
Canadian-born	28,836	29,522	31,041	32,376	34,418
Canadian-born, 25-29 year olds	29,635	28,385	28,766	27,625	29,231
IMpre60	30,134	31,769	34,393	36,957	40,062
IM6064	28,422	29,844	33,084	34,941	38,816
IM6569	29,304	30,544	33,992	36,200	39,061
IM7074	26,991	28,991	32,317	34,426	37,674
IM7579	23,780	26,491	30,340	32,220	36,846
IM8084		21,864	27,340	29,639	33,449
IM8589			24,572	27,416	31,319
IM9094				22,622	28,161
IM9599					26,793

* In any given year, the sample consists of individuals aged 16-64 (unless otherwise noted), who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings.

²² Morissette (2002) combines wealth data with income data and shows that between 1984 and 1999, recent immigrants have become much more vulnerable to income losses and unexpected expenditures. In 1984, of all persons living in immigrant families arrived less than 10 years ago, 15.7% were living in low income *and* would have remained in low income even if they had liquidated all their financial assets and added the proceeds to their after-tax income. This fraction rose to 25.6% in 1999. The corresponding numbers for all individuals living in Canada were 9.8% and 9.5% in 1984 and 1999, respectively.

Appendix 2: OLS regression results - men

	1980		1985		1990		1995		2000	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	8.937	334.240	8.395	268.460	8.721	270.400	8.433	229.100	8.672	236.670
IMpre60	-0.024	-0.660	0.138	3.240	0.188	4.230	0.265	5.340	0.232	4.700
IM6064	-0.073	-2.020	0.093	2.190	0.156	3.510	0.238	4.790	0.227	4.560
IM6569	-0.073	-2.020	0.080	1.880	0.145	3.290	0.251	5.090	0.241	4.900
IM7074	-0.122	-3.380	0.046	1.090	0.091	2.060	0.211	4.280	0.216	4.390
IM7579	-0.174	-4.830	0.007	0.160	0.077	1.740	0.174	3.540	0.188	3.830
IM8084			-0.147	-3.470	-0.013	-0.290	0.108	2.190	0.075	1.530
IM8589					-0.152	-3.460	-0.005	-0.100	0.000	0.010
IM9094							-0.180	-3.670	-0.094	-1.920
IM9599									-0.183	-3.750
High school	0.195	41.730	0.204	39.190	0.198	36.030	0.183	30.710	0.160	25.680
College	0.233	60.530	0.247	56.420	0.284	59.840	0.286	50.220	0.300	50.880
Bachelor's	0.600	98.450	0.651	101.470	0.669	100.150	0.676	91.860	0.709	93.750
Master's	0.653	74.870	0.688	75.530	0.698	76.350	0.732	73.420	0.766	73.820
Doctorate	0.804	36.290	0.861	38.220	0.819	34.360	0.871	34.900	0.848	31.380
Potential experience (in years)	0.042	83.470	0.048	83.250	0.049	80.230	0.055	77.150	0.049	68.690
Potential experience squared (in years)	-0.001	-70.080	-0.001	-68.190	-0.001	-66.080	-0.001	-61.740	-0.001	-53.430
Weeks worked	0.018	34.910	0.025	43.110	0.020	33.640	0.023	33.290	0.020	28.860
Married	0.217	55.100	0.228	53.020	0.197	48.160	0.191	42.850	0.213	44.410
Visible minority	-0.019	-1.010	-0.041	-2.350	-0.076	-4.610	-0.127	-6.880	-0.121	-7.700
Atlantic provinces	-0.209	-28.980	-0.224	-28.600	-0.300	-36.370	-0.294	-31.720	-0.362	-37.660
Montreal	-0.054	-8.180	-0.106	-15.190	-0.148	-19.920	-0.172	-20.600	-0.209	-24.620
Other parts of Quebec	-0.134	-21.460	-0.209	-31.340	-0.252	-35.860	-0.251	-31.740	-0.336	-41.520
Other parts of Ontario	-0.100	-17.000	-0.113	-18.500	-0.157	-24.130	-0.125	-17.230	-0.137	-18.510
Manitoba	-0.180	-20.340	-0.199	-20.670	-0.293	-28.420	-0.287	-24.750	-0.293	-24.270
Saskatchewan	-0.137	-15.480	-0.237	-24.640	-0.394	-37.330	-0.325	-27.480	-0.352	-28.380
Alberta	0.035	5.140	-0.056	-7.610	-0.189	-24.550	-0.163	-19.060	-0.116	-13.600
Vancouver	0.083	9.500	0.004	0.440	-0.084	-8.940	-0.032	-3.040	-0.058	-5.360
Other parts of British Columbia	0.058	7.230	-0.067	-7.380	-0.143	-15.760	-0.076	-7.740	-0.164	-15.990
IMHigh school	-0.045	-6.720	-0.051	-6.950	-0.069	-8.900	-0.050	-6.140	-0.038	-4.520
IMCollege	-0.019	-3.800	-0.016	-2.700	-0.044	-6.800	-0.030	-3.910	-0.015	-1.840
IMBachelor's	-0.022	-2.730	-0.019	-2.200	-0.075	-8.410	-0.069	-7.120	-0.092	-9.400
IMMaster's	-0.053	-4.840	-0.052	-4.540	-0.050	-4.350	-0.080	-6.370	-0.083	-6.510
IMDoctorate	-0.011	-0.450	-0.013	-0.510	0.038	1.450	0.041	1.480	0.061	2.060
IMPotential experience (in years)	-0.007	-9.790	-0.010	-12.270	-0.013	-14.490	-0.023	-22.690	-0.028	-28.210
IMPotential experience squared (in years)	0.000	6.800	0.000	8.690	0.000	10.630	0.000	17.850	0.000	20.050
IMWeeks worked	0.003	3.720	0.001	0.750	0.001	0.810	0.001	1.520	0.004	4.550
IMMarried	-0.061	-11.010	-0.064	-10.450	-0.052	-8.900	-0.074	-11.800	-0.061	-9.100
IMVisible minority	-0.127	-6.520	-0.123	-6.820	-0.090	-5.370	-0.065	-3.450	-0.078	-4.790
IMAtlantic provinces	0.147	11.770	0.152	11.000	0.198	13.100	0.147	8.640	0.169	9.200
IMMontreal	-0.031	-3.840	-0.029	-3.290	-0.069	-7.510	-0.045	-4.320	-0.034	-3.250
IMOther parts of Quebec	0.062	5.000	0.044	3.140	0.054	3.630	0.041	2.420	0.086	4.990
IMOther parts of Ontario	0.097	14.000	0.093	12.600	0.093	11.780	0.106	11.990	0.115	12.820
IMManitoba	0.100	8.440	0.081	6.200	0.046	3.270	0.089	5.880	0.080	4.900
IMSaskatchewan	0.116	7.830	0.155	9.200	0.179	9.320	0.173	7.870	0.124	5.260
IMAlberta	0.063	7.390	0.047	5.020	0.050	5.160	0.034	3.140	0.036	3.380
IMVancouver	0.019	1.870	-0.005	-0.480	0.017	1.530	-0.005	-0.380	-0.026	-2.150
IMOther parts of British Columbia	0.006	0.610	0.012	1.020	0.025	2.120	0.016	1.250	0.026	1.880
N	366,971		354,537		379,669		370,616		409,166	
Adj. R ²	0.172		0.184		0.169		0.166		0.151	

* In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings. To reduce processing time, a 20% random sample of Canadian-born workers is used in the regressions.

Appendix 3: OLS regression results - women

	1980		1985		1990		1995		2000	
	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat	Coefficient	t-stat
Constant	7.887	218.510	7.498	185.270	7.797	193.130	7.644	176.000	8.237	202.110
IMpre60	0.510	10.640	0.594	10.990	0.703	12.920	0.736	12.790	0.439	8.030
IM6064	0.454	9.470	0.544	10.060	0.663	12.170	0.711	12.320	0.422	7.670
IM6569	0.451	9.420	0.529	9.810	0.669	12.330	0.721	12.570	0.404	7.410
IM7074	0.376	7.860	0.472	8.760	0.614	11.330	0.667	11.650	0.379	6.960
IM7579	0.279	5.830	0.410	7.610	0.573	10.580	0.609	10.640	0.347	6.380
IM8084			0.260	4.840	0.474	8.750	0.546	9.550	0.251	4.620
IM8589					0.374	6.930	0.456	7.980	0.175	3.230
IM9094							0.270	4.760	0.061	1.130
IM9599									-0.039	-0.720
High school	0.222	36.380	0.264	39.200	0.255	37.040	0.245	31.690	0.234	29.160
College	0.325	59.330	0.365	61.130	0.394	62.790	0.412	56.110	0.410	52.700
Bachelor's	0.716	79.960	0.813	92.330	0.829	96.060	0.867	94.490	0.892	96.310
Master's	0.869	62.690	0.935	69.670	0.945	77.080	0.983	81.090	0.990	82.050
Doctorate	1.021	17.030	1.025	17.930	1.139	24.020	1.104	25.730	1.091	28.300
Potential experience (in years)	0.029	46.690	0.038	54.520	0.042	58.910	0.049	61.240	0.047	59.270
Potential experience squared (in years)	-0.001	-37.740	-0.001	-42.230	-0.001	-47.420	-0.001	-46.600	-0.001	-43.930
Weeks worked	0.034	50.600	0.039	51.430	0.034	45.510	0.034	42.360	0.024	31.840
Married	0.007	1.500	0.024	5.140	-0.008	-1.640	0.005	0.990	0.028	5.400
Visible minority	-0.001	-0.040	0.014	0.660	-0.031	-1.660	-0.027	-1.280	-0.016	-0.930
Atlantic provinces	-0.225	-23.720	-0.240	-24.330	-0.360	-36.440	-0.408	-38.940	-0.424	-39.820
Montreal	-0.010	-1.170	-0.091	-10.710	-0.199	-23.210	-0.219	-23.710	-0.227	-24.200
Other parts of Quebec	-0.088	-10.870	-0.194	-23.150	-0.318	-37.840	-0.327	-36.010	-0.372	-40.400
Other parts of Ontario	-0.117	-15.770	-0.153	-20.200	-0.203	-26.700	-0.190	-23.230	-0.216	-25.920
Manitoba	-0.128	-10.940	-0.181	-14.800	-0.326	-26.360	-0.311	-23.000	-0.305	-21.820
Saskatchewan	-0.102	-8.080	-0.161	-12.480	-0.410	-31.530	-0.398	-28.760	-0.390	-27.540
Alberta	-0.015	-1.700	-0.071	-7.770	-0.243	-26.370	-0.276	-27.850	-0.243	-24.640
Vancouver	0.060	5.550	-0.018	-1.580	-0.122	-10.820	-0.041	-3.420	-0.045	-3.680
Other parts of British Columbia	-0.025	-2.230	-0.143	-11.630	-0.272	-23.660	-0.200	-17.120	-0.254	-21.120
IMHigh school	-0.026	-3.110	-0.054	-5.890	-0.052	-5.630	-0.054	-5.330	-0.054	-5.220
IMCollege	-0.048	-6.650	-0.063	-8.070	-0.079	-9.560	-0.082	-8.710	-0.062	-6.250
IMBachelor's	-0.091	-7.660	-0.153	-13.010	-0.167	-14.580	-0.202	-16.960	-0.210	-17.680
IMMaster's	-0.148	-8.410	-0.138	-8.070	-0.152	-9.690	-0.186	-12.060	-0.200	-13.270
IMDoctorate	-0.043	-0.650	0.041	0.650	-0.073	-1.360	-0.031	-0.640	-0.051	-1.140
IMPotential experience (in years)	-0.009	-10.600	-0.015	-15.680	-0.017	-16.410	-0.022	-19.240	-0.026	-23.720
IMPotential experience squared (in years)	0.000	7.840	0.000	11.390	0.000	12.660	0.000	13.300	0.000	16.090
IMWeeks worked	-0.008	-8.420	-0.007	-7.150	-0.009	-8.630	-0.007	-6.890	0.000	0.050
IMMarried	-0.015	-2.410	-0.012	-1.910	-0.021	-3.240	-0.020	-3.090	-0.002	-0.280
IMVisible minority	-0.037	-1.470	-0.062	-2.820	-0.025	-1.290	-0.047	-2.230	-0.090	-5.150
IMAtlantic provinces	0.103	5.690	0.094	4.910	0.101	5.050	0.134	6.390	0.103	4.660
IMMontreal	-0.003	-0.260	-0.005	-0.460	-0.010	-0.940	-0.012	-1.050	0.007	0.600
IMOther parts of Quebec	0.082	4.250	0.116	5.440	0.098	4.640	0.105	4.860	0.131	6.160
IMOther parts of Ontario	0.053	5.900	0.058	6.170	0.053	5.640	0.079	7.820	0.103	9.990
IMManitoba	0.042	2.670	0.051	3.110	0.073	4.290	0.024	1.300	0.027	1.450
IMSaskatchewan	0.097	4.430	0.044	1.860	0.130	5.340	0.133	5.070	0.044	1.590
IMAlberta	0.069	6.070	0.069	5.880	0.051	4.300	0.057	4.550	0.076	6.110
IMVancouver	0.035	2.740	0.015	1.130	0.034	2.590	0.007	0.540	-0.001	-0.050
IMOther parts of British Columbia	0.041	2.740	0.012	0.750	0.048	3.080	0.033	2.120	0.036	2.190
N	180,239		196,500		245,097		249,143		292,289	
Adj. R ²	0.160		0.169		0.154		0.167		0.145	

* In any given year, the sample consists of individuals aged 16-64, who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings. To reduce processing time, a 20% random sample of Canadian-born workers is used in the regressions.

Appendix 4: Mean earnings (\$2000) of recent immigrant and Canadian-born workers*

	All education levels			High school or less			College			University		
	1980	2000	Growth	1980	2000	Growth	1980	2000	Growth	1980	2000	Growth
Men												
Canadian-Born												
16-64 yo	45,625	48,623	7%	40,329	38,909	-4%	45,402	46,689	3%	69,058	75,971	10%
25-29 yo	39,788	35,705	-10%	37,209	31,364	-16%	40,580	36,080	-11%	45,820	44,257	-3%
30-54 yo	51,266	52,556	3%	44,979	42,544	-5%	50,126	49,461	-1%	74,807	79,310	6%
Recent Immigrants**												
16-64 yo	40,649	37,909	-7%	31,826	26,369	-17%	40,905	34,354	-16%	55,281	48,309	-13%
25-29 yo	36,117	33,427	-7%	31,268	26,778	-14%	37,797	30,004	-21%	42,322	43,381	3%
30-54 yo	45,375	40,274	-11%	35,360	28,036	-21%	44,404	35,960	-19%	57,654	48,982	-15%
Women												
Canadian-Born												
16-64 yo	28,836	34,418	19%	24,827	27,647	11%	30,080	32,769	9%	45,191	49,971	11%
25-29 yo	29,635	29,231	-1%	25,926	23,719	-9%	30,031	26,977	-10%	38,001	36,429	-4%
30-54 yo	31,722	37,017	17%	26,531	29,627	12%	33,027	34,865	6%	51,363	54,211	6%
Recent Immigrants												
16-64 yo	23,780	26,793	13%	20,337	19,975	-2%	24,634	24,969	1%	32,723	34,678	6%
25-29 yo	24,345	25,196	3%	21,377	19,574	-8%	24,449	23,731	-3%	30,812	32,030	4%
30-54 yo	25,253	28,411	13%	21,013	21,149	1%	26,061	25,887	-1%	34,375	35,510	3%

* In any given year, the sample consists of individuals who worked at least 40 weeks (mainly full-time, or 30 hours or more per week), and with positive earnings.

** Recent immigrants are those who arrived in the last five years.

References

- Baker, M. and D. Benjamin (1994) "The performance of immigrants in the Canadian labour market", *Journal of Labor Economics*, 12 (3), pp. 369-405.
- Bloom, D.E., G. Grenier and M. Gunderson (1995) "The changing labour market position of Canadian immigrants", *Canadian Journal of Economics*, 28 (4), pp. 987-1005.
- Buchinsky, M. (1998) "Recent advances in quantile regression models: A practical guideline for empirical research", *Journal of Human Resources*, 33 (1), pp. 88-126.
- Eide, E.R. and M.H. Showalter (1999) "Factors affecting the transmission of earnings across generations: A quantile regression approach", *Journal of Human Resources*, 34 (2), pp. 253-67.
- Grant, M.L. (1999) "Evidence of new immigrant assimilation in Canada", *Canadian Journal of Economics*, 32 (4), pp. 930-55.
- Green, D.A. and C. Worswick (2003) "Earnings of immigrant men in Canada: the roles of labour market entry effects and returns to foreign experience", paper prepared for Citizenship and Immigration Canada.
- Koenker, R.W. and G. Bassett, Jr. (1978) "Regression quantiles", *Econometrica*, 46 (1), pp. 33-50.
- McDonald, J.T. and C. Worswick (1998) "The earnings of immigrant men in Canada: Job tenure, cohort and macroeconomic conditions", *Industrial and Labor Relations Review*, 51 (3), pp. 465-82.
- Mellor, J.M. (1998). "The effect of family planning programs on the fertility of welfare recipients: evidence from Medicaid claims", *Journal of Human Resources*, 33 (4), pp. 866-95.
- Morissette, R. (2002) "Families on the financial edge", *Perspectives on Labour and Income*, Catalogue No. 75-001XPE, 14 (3), pp. 9-20.
- Picot, G. and F. Hou (2003) *The rise in low-income among immigrants in Canada*, Analytical Studies Branch research paper series 11F0019MIE2003198, Analytical studies, Ottawa: Statistics Canada.