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**Immigrant Earnings: Age at Immigration Matters**

Joseph Schaafsma and Arthur Sweetman

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Views expressed in this manuscript are those of the author(s) alone. For more information contact the Co-Directors of the Centre, Dr. Don DeVoretz, Department of Economics, SFU (e-mail: [devoretz@sfu.ca](mailto:devoretz@sfu.ca)) or Dr. David Ley, Department of Geography, UBC (e-mail: [davidley@unixg.ubc.ca](mailto:davidley@unixg.ubc.ca)).

# **Immigrant Earnings: Age at Immigration Matters**

by

Joseph Schaafsma  
Department of Economics  
University of Victoria  
e-mail: [schaafsm@uvic.ca](mailto:schaafsm@uvic.ca)

and

Arthur Sweetman  
Department of Economics  
University of Victoria  
e-mail: [sweetman@uvic.ca](mailto:sweetman@uvic.ca)

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**Abstract:** A correlation between age at immigration and earnings is observed in Canadian census data even after controlling for cohort effects and a range of demographics. Evidence of at least three mechanisms underlying this correlation are found. First, work experience in the source country yields virtually no return in the host country. Second, the return to education is observed to vary systematically across immigrants by age at immigration. Those who arrive as young children have a return to education very similar to that of natives, but the return declines as age at immigration increases until it is quite low for those who arrive as older adults. However, if this parameter heterogeneity is ignored, and education is partitioned according to where it was obtained, then immigrants' return to education appears to be slightly below that of the native born, but the same whether the education was obtained in Canada or elsewhere. Finally, we find evidence which suggests that, at least for visible minorities, age at arrival has an economic impact that may be interpreted as "acculturation." Additionally, we find some evidence that educational attainment may vary systematically across age at immigration with those arriving around age 15 to 18 obtaining fewer years of education than those who land when they are older or younger. Adjusting to a new environment near the transition out of high school may have a permanent effect.

## Introduction

A small number of studies exploring the labour market impact of age at immigration have been conducted in the United States (e.g. Friedberg 1993, Smith 1992), and the issue has sometimes been addressed tangentially in studies looking at the rate of immigrant economic “assimilation” or integration (e.g. Borjas 1995, Funkhouser and Trejo 1995).<sup>1</sup> But the topic itself does not appear to have been given much attention, and it seems to have received almost no attention in the Canadian context.<sup>2</sup> This is particularly striking since the economic implications may be sizable and, unlike the large negative coefficients observed for recent entry cohorts in “assimilation” studies such as Baker and Benjamin (1994), and Borjas (1985, 1995), age-at-immigration effects do not attenuate with time in the host country, but leave permanent legacies. Further, in contrast to the United States, Canada has, since 1967, employed a “points system” to determine the eligibility of applicants to immigrate, and one of the variables for which points are awarded is age, which makes age at immigration an important variable to understand.<sup>3</sup> Using Canadian census data, this study looks at the impact of age at immigration on men’s employment earnings and finds large effects.

There are a variety of reasons why one would expect that age at immigration might matter, either directly or indirectly, for labour market outcomes. For example, schooling obtained in the source country may not be (recognized as) equivalent to schooling in the host country, and thus yields a lower return. The same may be true for labour market experience. Older immigrants may also be less able to adjust to the linguistic and cultural challenges associated with entering a new country, and this may make it difficult for them to generate earnings commensurate with their formal educational and occupational skills. Each of these factors suggests that age at immigration may be an important determinant of an immigrant’s

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<sup>1</sup> The latter is important because the normal procedure for constructing a sample for analysis from (repeated) cross-sectional data induces a correlation between the year of immigration (immigration cohort) and age at immigration. To be of working age and, therefore, in the sample, the earliest cohorts must have immigrated as children, and the most recent cohorts must have arrived as adults.

<sup>2</sup> See Borjas 1994 for a survey of the economics of immigration.

earnings. Further, the examples above suggest that immigrant earnings, relative to an equivalent native-born person, will decline as age at immigration increases.

The seminal work of Chiswick (1978) and Borjas (1985) on the economic assimilation of immigrants does not include any specific consideration of the impact of age at immigration on earnings profiles; however, a number of subsequent American studies do. Kossoudji (1989) allows the returns to experience and schooling to vary by whether the experience and schooling were obtained abroad or in the United States. Her results indicate near-zero returns to labour market experience acquired abroad and very little difference in the returns to pre- and post-immigration schooling. Friedberg (1993) extends the analysis of Chiswick (1978) and Borjas (1985) by adding an age at immigration variable to the economic assimilation model. Using 1970 and 1980 United States census data, she finds that age at immigration exerts a statistically significant negative effect on male immigrant earnings after controlling for education, experience, ethnicity, and years since immigration. Borjas (1995) using 1970, 1980, and 1990 census data obtains similar results. Neither paper seeks to determine why age at immigration matters. Schoeni (1998) uses the same data to examine the labour force participation of immigrant women. His results show that female immigrants who attended schools in the United States (i.e. women who immigrated at an early age), had higher labour force participation rates. Thus, if labour force participation is a measure of economic integration, the degree of integration varies inversely with age at immigration.

Kee's (1995) study of male immigrants living in the Netherlands also focuses on the returns to pre- and post- immigration labour market experience and schooling for a number of ethnic groups. His results indicate that the return to pre-immigration measures is higher for immigrants from school systems — and implicitly the cultural contexts — more similar to that of the Dutch. Using Australian data, Chiswick and Miller (1985) find that schooling obtained abroad yields a lower return than schooling obtained by natives, and that this difference is larger if the schooling was received in a non-English-speaking country. Their results also show

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<sup>3</sup> The points system applies only to the “skilled” class of immigrants and not to refugees. Immigrants arriving as part of a family reunification have been subject to the points system only in certain policy regimes. An immigrant's entry category cannot be identified in the available data.

that foreign labour market experience yields a much lower return than Australian labour market experience.

The effect of age at immigration on subsequent earnings in Canada has been limited to sensitivity analyses as part of studies concerned with other issues and the results have been mixed. In their study of immigrant assimilation, Baker and Benjamin (1994) estimate a model for the subset of immigrants who were at least 16 years old at the time of immigration and find that their return to education is statistically insignificantly lower than that for all immigrants. Their return to labour market experience is about half of what it is for all immigrants, which is about two-thirds that of natives. Grant (1998) updates Baker and Benjamin (1994) using 1991 census data, and also splits the male immigrant sample on the basis of whether immigration occurred before age 16, or later. No regression results are shown, but it is reported that they do not differ from those for the full sample. In their analysis of the effect of macroeconomic conditions on male immigrant earnings, McDonald and Worswick (1998) specify separate models for all male immigrants, and for those who immigrated as adults, and conclude that there is very little difference in the parameter estimates.

The current paper investigates the impact of age at immigration and finds a sizable correlation with earnings even after controlling for cohort effects and a range of demographics. The different mechanisms that might underlie this correlation are also explored. Work experience in the source country is found to yield virtually no return in the host country, but ascertaining the relative value in the labour market of education received in Canada compared to elsewhere is more complicated. Immigrants who arrive as young children have a return to education similar to that of natives, but the return to education declines as age at immigration increases until those who arrive as older adults have quite low returns. However, if this parameter heterogeneity is ignored and education is assigned as either Canadian or foreign (we implement this two ways), then the return to education from foreign and Canadian schools can appear to be quite similar for immigrants and below the return to education for the native born. Further, we find evidence which suggests that, at least for visible minorities, age at arrival has an economic impact that may be thought of as “acculturation.” Finally, we observe some evidence that immigrants who arrive around age 15 to 18 complete fewer years of school than

those who arrive either earlier or later. It is possible that arriving near the transition out of high school may be associated with a permanent reduction in educational attainment.

We begin by outlining our empirical strategy and how we deal with the identification problem that arises from the identity that relates age, age at immigration, and year of immigration. We address this by extending the traditional use of the native born as a comparison group.<sup>4</sup> Intuitively, our empirical strategy is to assign each immigrant to the position we would expect him to have on the age-earnings profile were he native born. This projection onto the native born age-earnings profile allows us to identify both cohort and age-at-immigration effects independently. Next we present the data and provide descriptive statistics of the characteristics of native and immigrant males, and of the labour market outcomes for these two groups. Regression results are presented in the following section. The paper ends with a brief summary and conclusion.

## Methods

Our analysis of the impact of age at immigration on subsequent earnings is conducted in the context of the log earnings model typically used in analyses of the economic assimilation of immigrants. Thus, we express the natural log of the earnings (EARNINGS) of a native-born person as a function of the usual human capital variables: years of schooling (SCHOOL) and labour market experience (EXP) or age (AGE); marital status (MARRIED), visible minority status (VISMIN), weeks worked (WEEKS), and weekly hours worked (HOURS), i.e.:

$$\ln(\text{EARNINGS})_n = F(\text{SCHOOL}, \text{EXP}, \text{MARRIED}, \text{VISMIN}, \text{WEEKS}, \text{HOURS}, \varepsilon) \quad (1)$$

where  $\varepsilon$  is a random error term, and the subscript  $n$  indicates the earnings are for natives. The model is not identified if age, schooling, and experience enter as a set because :

$$\text{SCHOOL} + \text{EXP} = \text{AGE} - 5 \quad (2)$$

For immigrants the functional relationship is usually augmented with years since migration (YSM), and year of migration (IMMCOHORT). The YSM variable picks up the return to

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<sup>4</sup> Baker and Benjamin (1994) explore the implications of using different comparison groups in a fairly standard specification. They find that the choice does not substantially alter their results.



assimilation, and IMMCOHORT allows for cohort fixed effects due to unobserved differences across immigrants who arrived at different points in time. The separate effects of YSM and IMMCOHORT cannot be identified if the data are cross-sectional for one year only since, given the year the data are observed, e.g. 1990:

$$\text{YSM} = 1990 - \text{IMMCOHORT} \quad (3)$$

This problem does not exist if cross-section data for more than one year are pooled and it is assumed that the assimilation pattern is stable over time.

In the existing literature the empirical analysis generally proceeds by either estimating separate log earnings functions for natives and immigrants, or pooling the data and estimating a single function. Our analysis is an extension of the first technique where the role of the native born as a comparison group is used to obtain identification. We first estimate the earnings of male natives as a function of age (and in some versions other demographics as well) and use it to predict the log of earnings for male immigrants. The difference between the log of the observed earnings of male immigrants and the log of the predicted earnings is the dependent variable in our regression analysis of the relative earnings of male immigrants. This is equivalent to constraining the immigrant earnings equation to have the coefficients of the native one. This dependent variable is computed for a number of specifications of the earnings function for natives and, for each specification, is then regressed on a variety of immigrant characteristics; i.e.

$$\ln(\text{EARNINGS}) - \ln(\text{EARNINGS}^p) = G(X, \mu) \quad (4)$$

where  $\text{EARNINGS}^p$  are the predicted earnings,  $X$  is a vector of immigrant characteristics and  $\mu$  is a random error term. Depending on the specification of the model, the vector  $X$  will include one or more of the following:  $\text{YSM}$ ,  $\text{IAGE}$ ,  $\text{SCHOOL}^f$ ,  $\text{SCHOOL}^d$ ,  $\text{EXPER}^f$ ,  $\text{EXPER}^d$ ,  $\text{MARRIED}$ ,  $\text{VISMIN}$ ,  $\text{WEEKS}$ , and  $\text{HOURS}$ ; where  $\text{IAGE}$  is age at immigration,  $\text{SCHOOL}^f$  and  $\text{SCHOOL}^d$  are pre- and post-immigration schooling, respectively,  $\text{EXPER}^f$  and  $\text{EXPER}^d$  are pre- and post-immigration labour market experience, respectively, and the other variables are defined as before. All continuous variables are deviated from the characteristics of the mean person in the relevant group. We chose this technique since it poses most clearly the

question we wish to address: do immigrants and equivalent natives have the same earnings and, if not, what factors explain the difference?

The parameters of the various specifications of equation (4) were estimated with data from the Public Use Microdata Files of the 1991 and 1986 Canadian censuses. We limited our analysis to these two censuses since they are the only two with observations on whether or not the respondent is a member of a visible minority. We do not exploit the two censuses to perform any pseudo-panel analysis, but rather use the two cross-sections to increase our confidence in the robustness of our results.<sup>5</sup> To facilitate comparability, our sample selection rules are those used by Baker and Benjamin (1994). All available records for immigrants are used, and a one-sixth random sample of other native-born is selected. Our analysis is limited to male members of the labour force who were 16–64 years old on the relevant survey date and who worked more than 40 weeks in the year before the census was taken.

## **Empirical Results**

### **Summary Descriptive Statistics**

Comparative descriptive statistics for the 16–64 year old native and immigrant males are summarized in Table 1 for the 1991 and 1986 samples. A comparison of these sample statistics shows that immigrants on average are 5 years older, and have 4.7 more years of labour market experience and 0.3 more years of formal schooling than the native born. Immigrant earnings on average also exceed the earnings of the native born by some \$1500. The proportion married is higher for immigrants than for native born. One of the more notable differences between the native born and immigrant samples, shown in Table 1, is that an immigrant is seven times more likely to belong to a visible minority. It is also interesting to note that for both natives and immigrants there is a substantial percentage increase from 1986 to 1991 in the proportion that belongs to a visible minority.

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<sup>5</sup> We performed an analysis to see if the addition of age-at-immigration variables affected the cross-census assimilation profiles, similar to those estimated by Baker and Benjamin (1994), and Grant (1998). We find that while their addition had a large effect on the cross-sectional profiles in each year, the effect is similar in

A cross-classification of immigrants by age at immigration and year of immigration is shown in Table 2 for the pooled 1986 and 1991 census data.. As expected, the average age at immigration rises the more recent the year of immigration. Thus, if age at immigration affects assimilation, not including it in empirical models of assimilation will result in omitted variables bias in the estimated assimilation pattern. Table 2 also shows the proportion of the immigrants in each cell that belongs to a visible minority. It should be stressed that since our sample is limited to 16–64 year old male immigrants who worked more than forty weeks in the census year, these proportions are only indicative of how the ethnic composition of immigrant cohorts has changed. From 1945 to 1960 visible minority immigrants represented about 5 percent of newly arriving immigrants. As of 1960, this proportion rose steadily over the next three decades to 69 percent. If ignored, this systematic change in cohort composition is a second potential source of omitted variables bias in empirical analyses of assimilation.

Given the large age differences between immigrants and the native born, age-adjusted (ln) earnings and schooling levels are presented in Table 3. Columns 1 and 2 , for 1991 and 1986 respectively, indicate that, controlling for age, non-visible minority immigrants have the highest earnings, followed closely by non-visible minority non-immigrants, and then non-immigrant visible minorities. Visible minority immigrants, however, have substantially lower earnings than the previous three. To provide some context for interpreting these results, columns 3 and 4 of Table 3 present the age-adjusted years of schooling of each group. Visible minority natives have the highest education with an average of 0.26 more years than visible minority immigrants, 0.96 more years than non-visible immigrants, and 1.27 more years than non-visible natives. Three conclusions emerge from these results. First, although the visible minority group is better educated than the non-visible group, its members earn less. Second, within the visible minority group, natives are better educated than immigrants and also earn more. Third, within the non-visible group, the immigrants are better educated than natives and earn more.

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both years and the effect across censuses is negligible. Funkhouser and Trejo (1995) report a similar negligible effect on the assimilation profile.

## Regression Results

Our first set of regressions, in Table 4, focus on the relative earnings of immigrants unadjusted for any human capital and behavioural differences between immigrants and natives. As discussed above, the dependent variable is adjusted so that immigrants are implicitly given the native age-earnings profile, and it is regressed on the immigrant's age at immigration and year of immigration. These two measures enter as dummy variables defined over age intervals and immigrant cohorts, respectively. The omitted categories for age at immigration and immigrant cohort are 0 to 4 years old, and 1946–55, respectively. The parameter estimates are shown in columns 1 and 4, Table 4, for the 1991 and 1986 Census data respectively.

The 1991 and 1986 coefficient estimates for the base case model broadly conform to expectations. The immigrant's age-earnings profile generally declines as the age at immigration rises and shows that those who immigrated at 45–64 years of age earn 16 to 18 percent less than those who immigrated before age 5. However, this relationship is not monotonic. In both sets of results, those who immigrated before age 5 have lower age-adjusted earnings than those who immigrated when they 5 to 9 years old, and those who immigrated at ages 15–19 have a lower age-earnings profile than those who immigrated at the ages of 20–34.

With two exceptions, the coefficients for the immigrant cohort dummies also display the expected pattern, i.e. the more recently the immigrant arrived the lower the age-earnings profile. The two exceptions are the negative coefficient for those who arrived before 1946 and the coefficient for the 1966–70 immigrant cohort, which is smaller in absolute terms than the coefficients for the immediately preceding and following cohorts. For both data sets, the results show that the age-adjusted earnings of those who arrived in the last five years before the census was taken were 36 percent less than those who arrived in 1946–55.

In our second set of regressions, controls are added for a number of observable differences across natives and immigrants that may account for differences in age-adjusted earnings across the two groups and within each group. The dependent variable is now the

difference between the log of the immigrant's observed earnings and the log of earnings predicted with an expanded earnings function estimated for natives. The explanatory variables in the expanded earnings function allow for shifts in the age-earnings function on the basis of years of schooling, hours worked, weeks worked, marital status, and whether the person belongs to a visible minority, but the coefficients are constrained to be those of the native born. These variables will capture the effect on earnings of key socioeconomic characteristics that may be correlated with either age at immigration and/or immigration cohort. The regression results for the 1991 and 1986 data are shown as columns 2 and 5, Table 4, respectively.

Adding the control variables has a major impact on the coefficients for the age-at-immigration dummy variables. In contrast to the previous regression, starting at age 5 relative earnings now decline monotonically as age at immigration rises. Further, for those older than 24 years at the time of immigration, adding controls results in even lower earnings relative to natives than indicated in the base case. This suggests that the earnings of these individuals are not commensurate with their human capital as valued by the native-born regression coefficients. Also, the sizable, statistically significant negative coefficient in the base case for those who immigrated at the ages of 15–19 is now virtually zero, and not statistically significant. An explanation for this is that the formal education of those who immigrated at ages 15–19 ended prematurely since, as seen in Table 5, for the entire post-war period individuals who immigrated at the ages 15–19 have less schooling than those who immigrated as 20–24 year olds and, for the period 1945 to 1980, they also have less schooling than those who immigrated as 10–14 year olds.<sup>6</sup>

The coefficients for the immigrant cohort variables are also sensitive to the inclusion of the control variables. These coefficients generally become smaller and the gradient across them is flatter. This suggests that the relatively low immigrant earnings observed in the base case regressions are partly due to differences across immigrant cohorts in the values of the control variables. Since the largest changes in the immigrant cohort coefficients are for those who immigrated after 1970, it appears that there has been a fundamental shift in the observable

characteristics of immigrants over the last three decades. We compared the basic descriptive statistics for immigrants who arrived before and after 1970 for the 1991 Census data and found that those who arrived after 1970 are on average somewhat better educated by 0.76 of a year, and much more likely to belong to a visible minority (58.2 % versus 13.7 % for those who arrived before 1970).

Next, we allow the return to the observed characteristics to vary between the native born and immigrants by adding the control variables to the immigrant regression equation. The dependent variable is the same as in the preceding model. The results are shown in columns 3 and 6, Table 4, for the 1991 and 1986 census years, respectively. Note that in these columns the estimated coefficients for the control variables are deviations from the coefficients shown for these variables in columns 2 and 5.

The parameter estimates in columns 3 and 6, Table 4, indicate that the return to a year of schooling is 0.7 to 0.9 of a percentage point less for immigrants than for natives, and that visible minority immigrants earn 10 percent less than otherwise equivalent visible minority natives. The estimated coefficients for the labour market activity variables and marital status are not consistent across the two census years in terms of statistical significance. However, in terms of the signs of the estimated coefficients, married immigrants appear to earn less than married natives, and immigrants who worked 40 to 48 weeks a year earned less than natives who worked the same number of weeks.

Allowing the returns to the human capital and labour market activity variables to be different for immigrants and natives has no consistent impact on the estimated coefficients for the age-at-immigration variables for the two census years, but does result in a further flattening of the gradient across the coefficients for the immigrant cohort dummy variables. This effect is most pronounced for the post-1970 immigrant cohorts and may be the result of the large earnings deficit for visible minority immigrants shown in Table 4, and the growing proportion of immigrants who are members of a visible minority. We tested this hypothesis by re-

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<sup>6</sup> Note that, to be in our sample, the individuals in the upper right-hand portion of Table 5 must have terminated their education at a fairly young age. Care must, therefore, be taken in making inferences regarding them since they are a heavily selected sample.

estimating our earnings deviations model with the restriction that the coefficients of all the controls — except membership in a visible minority — are the same for immigrants and natives. The estimated immigrant cohort coefficients for this specification are very similar to those reported in columns 3 and 6, Table 4, and thus support the hypothesis that part of the gradient across the immigrant cohort coefficients since 1970 observed in columns 1 and 4, Table 4, is due to the growing proportion of immigrants who are members of a visible minority and whose earnings are about 10 percent less than equivalent minority natives, who themselves earn about 5–8 percent less than equivalent non-minority natives.

Our analysis thus far has established that age at immigration matters for subsequent earnings, even after controlling for human capital and labour market activity variables and for differences across natives and immigrants in the returns to these variables. The annual earnings of someone who immigrated between the ages of 44 and 65 is about 80 percent of the annual earnings of an otherwise equivalent immigrant who immigrated before the age of 5. We now turn to why age at immigration matters for subsequent earnings. Earlier we noted three possible reasons: schooling received in the source country may yield a lower return than schooling obtained in Canada, labour market experience acquired abroad may yield a lower return than Canadian labour market experience, and the younger the age at immigration the more easily the person acculturates. We examine the relative importance of the first two factors by estimating earnings functions for immigrants only. The effect of age at immigration on acculturation cannot be separated from immigrant cohort fixed effects in these regressions. The problem is that, for a given census year, the sum of the years since immigration and age at immigration equals the sum of the years of schooling, years of experience, and a constant (5 years).<sup>7</sup> Thus, there is an identification problem if schooling, experience, age at immigration, and years since immigration are all included in a model to be estimated with a single cross section of census data.

Our first method for determining whether schooling and experience obtained abroad and in Canada yield the same returns consists of splitting experience and schooling into foreign and Canadian components. The years of experience are split into years acquired abroad

( $\text{expfor} = \text{age at immigration measured at the midpoint of the interval} - \text{years of schooling} - 5$ ) and years of experience in Canada ( $\text{expcdn} = \text{experience} - \text{experience acquired abroad}$ ). We used two different methods to distinguish between foreign and Canadian schooling. In the first, it is assumed that what matters is where the education was completed, i.e. does the immigrant's final diploma or degree bear the imprint of a Canadian or a foreign institution? Since this information is not directly available from the Census we approximated it as follows: schooling was completed in Canada if the years of schooling plus 5 exceeds the upper end-point of the immigrant's age-at-immigration cohort; schooling was completed abroad if years of schooling plus 5 is less than the lower end-point of the immigrant's age-at-immigration cohort; for the remaining cases we cannot be reasonably certain where schooling was completed. The returns to these types of schooling are captured by the coefficients of the schooling variables  $\text{schoolcdn}$ ,  $\text{schoolfor}$ , and  $\text{schoolunk}$  respectively. The regression results are shown in columns 1 and 4, Table 6, for 1991 and 1986, respectively. For comparison purposes, the regression results for the native log earnings function are shown in columns 2 and 5 of the same table.

The 1991 and 1986 immigrant regression results in Table 6 are very similar. First, foreign experience has a negligible impact on earnings. The return to Canadian experience, on the other hand, is positive, statistically significant, and comparable to the return for natives. Second, the minor differences in the coefficients for the three schooling variables appears to suggest that it does not matter much where schooling was completed, but we will explore this issue in more detail in what follows. To the extent that it does matter, the return to education completed in Canada is marginally the highest but this return is only 75 percent of the return to schooling for natives. Third, the statistically significant negative coefficient for the visible minority dummy variable is substantially larger in the immigrant equation than in the native equation. This result is consistent with those reported earlier.

Allowing for different returns to Canadian and foreign labour market experience has a substantial impact on the coefficients for the immigrant cohort dummy variables. To highlight this effect, the regression results for the immigrant earnings equation without allowing for

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<sup>7</sup> Each of these sums equals the immigrant's age in the census year.



different returns are shown in columns 3 and 6, Table 6. In these results, the coefficients for the three most recent immigrant cohorts are negative and increase in absolute size the more recent the period of immigration. In the results with variable returns, the coefficients for the three most recent immigrant cohorts are positive and also increase in size the more recent the period of immigration. It is not surprising that splitting experience into foreign and Canadian experience alters the pattern of the immigrant cohort coefficients. There is a substantial correlation between years since migration, captured by the cohort variables for a given cross-section of census data, and Canadian labour market experience.

Our second method for distinguishing between education acquired abroad and in Canada focuses on where the years of education were received. Again, this information is not directly available from the Census and must be approximated. We compute the years of schooling obtained in Canada and abroad by comparing the years of schooling plus 5 with the two end-points of the immigrant's age-at-immigration cohort. If this sum is less than the lower end-point, all education was acquired abroad. If this sum falls between the two end-points, the years up to the lower end-point are years of schooling obtained abroad and the years between the end-points cannot be assigned. If this sum is larger than the upper end-point, the difference between this sum and the upper end-point is the number of years of schooling received in Canada. Using this definition of foreign and Canadian schooling, instead of where schooling was completed, has results that are very similar to those shown in columns 1 and 4, Table 6, and we therefore do not report them.

Our second method for checking whether the returns to Canadian and foreign schooling and experience are different consists of fitting earnings equations separately for three groups of immigrants defined by age at immigration: less than 10 years old, 20–29 years old, and 35–64 years old. Those who arrived before the age of 10 clearly received most, or all, of their schooling, and all of their labour market experience, in Canada. This group will also be the most acculturated upon entry into the labour force and will continue to acculturate comparatively easily. Those who arrived after age 34 likely received all of their formal schooling abroad and upon landing will have a substantial amount of experience in a foreign labour market. They will have looked for their first job in Canada as the process of

acculturation began and will be the most challenged by this process. Those who arrived as 20–29-year-olds likely received all their schooling abroad but will have had only a minimal amount of foreign labour market experience. This group likely also looked for their first job as the process of acculturation began, but will have been less challenged by this process than the older immigrants. A comparison of the returns to schooling and experience across these three groups therefore provides very useful additional information about why age at immigration affects earnings.

The regression results for the earnings equations fitted for the three groups of immigrants are summarized in Table 7, and show patterns that are common to both census years. First, the return to Canadian schooling is higher than the return to schooling acquired in the source country, and by a much larger margin than shown in Table 6. For 1991, the three coefficients for schooling, ranked from the youngest to the oldest age-at-immigration group, are 0.092, 0.053, and 0.045; and for 1986 they are 0.077, 0.055, and 0.046. These coefficients also indicate that the middle group is able to earn a higher return with their foreign education than the oldest group. This is what one would expect if acculturation occurs more easily the younger the age at immigration. It is also interesting to note that the return to schooling for the youngest age group is higher than the return earned by natives, marginally in 1986 and substantially in 1991. This is consistent with the hypothesis that immigrant families are highly motivated to rebuild their lives and that this produces superior performance when acculturation barriers are minimal.

The results for the labour market experience variables also conform to expectations. For the youngest age group, the return to experience is by far the highest, and is even higher than for the native born. We again postulate that this is because this group is highly motivated and thus outperforms the average native-born person. The return to experience for the middle-age group is positive but only about 25 percent of the return to experience of the group arriving at a younger age. This is partly because the average member of this group will have some foreign labour market experience, which we earlier showed yields a negligible return. It may also be due to greater difficulty with acculturation and thus not acquiring Canadian specific human capital on the job as rapidly as the younger age group. For the oldest age

group, the return to labour market experience appears to be either nonexistent (1991), or negative (1986). However, when fitting the model to data stratified by age-at-immigration, it is difficult to separate the labour market experience effect from the years since immigration effect since these two variables are highly correlated. When we re-estimated the model without the immigrant cohort dummy variables, the coefficients for experience and experience squared were positive and negative, respectively, in all six equations. However, for those who immigrated when they were more than 34 years old the return to experience is negligible, and for those who immigrated between the ages of 19 and 30 the return to experience is about two-thirds of the return for those who immigrated before age 10.

The results for the visible minority dummy variable show an extremely interesting pattern and provide strong evidence of acculturation. Members of a visible minority who immigrated before age 10 do not have a statistically significant reduction in their earnings relative to other immigrants. Those who immigrated between the ages of 19 and 30, and 34 and 64, experience a statistically significant reduction of about 15 and 18 percent respectively. This pattern suggests that the earnings deficit for visible minority immigrants may be less the result of discrimination based on visible attributes, and more the result of difficulty in acculturating. Poor acculturation may lead to a lower than normal return to human capital and, possibly, to discrimination based on cultural differences and language skills.

## **Conclusions**

Our analysis is the first detailed study of the effect of age at immigration on earnings using Canadian census data. Our results support the conclusion reached by others — using non-Canadian data — that age at immigration matters. Our results also support the general consensus that it matters partly because foreign labour market experience yields a very low return in the destination country. With respect to whether age at immigration also matters because it determines where schooling is obtained, our results show that it does, but this finding can be difficult to observe. Unlike other studies, we present some evidence that age at immigration also matters because the young acculturate more easily. Visible minority

immigrants who landed before age 10 do not have an earnings deficit relative to otherwise equivalent immigrants, while visible minority immigrants who landed at an older age do experience an earnings deficit relative to otherwise equivalent immigrants and this deficit grows with age at migration.

In terms of policy implications, we believe that our results can be used in conjunction with other criteria to assess the design of the point system currently used in Canada to determine the eligibility of “skilled” applicants for immigrant status. In this system, age, education, and work experience together account for 30 percent of the total points that can be earned. It is of interest to know whether the rate at which these points are earned is based on the expected net economic contribution of the applicant. Our results provide some of the information needed for such an assessment.

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Table 1. Descriptive Sample Statistics.

	1991 Census				1986 Census			
	natives		immigrants		natives		immigrants	
	mean	s.e.	mean	s.e.	mean	s.e.	mean	s.e.
earnings*	29015	109.0	30448	115.0	28375	123.1	30058	133.4
age†	37.6	0.062	42.7	0.061	37.3	0.079	42.6	0.078
exp†	19.5	0.067	24.2	0.067	19.8	0.086	24.6	0.087
yrschool†	13.1	0.018	13.4	0.022	12.6	0.022	12.9	0.028
married#	0.706	0.003	0.803	0.002	0.722	0.003	0.820	0.003
vismin#	0.051	0.001	0.361	0.003	0.037	0.001	0.260	0.003
N	32914		32407		21451		20679	

\* In 1991 dollars.

† In years.

# Proportion of the sample with this characteristic.

Table 2. Immigrants cross-classified by age at immigration and year of immigration, and the proportion of each cell total that belongs to a visible minority, pooled 1986 and 1991 Census data.

Age	cohort									Total
	pre-46	46-55	56-60	61-65	66-70	71-75	76-80	81-85	86-90	
0-4	523 0.02	1662 0.02	998 0.04	624 0.09	702 0.18	299 0.36	33 0.55			4841 0.08
5-9	162 0.02	1263 0.03	897 0.06	550 0.11	849 0.22	597 0.45	214 0.56	20 0.45		4552 0.16
10-14	63 0.00	924 0.06	683 0.07	428 0.15	725 0.24	718 0.47	455 0.57	164 0.60	40 0.70	4200 0.25
15-19	28 0.14	1249 0.11	935 0.06	595 0.11	1117 0.27	959 0.54	779 0.68	489 0.74	226 0.81	6377 0.34
20-24	1 1.00	1761 0.05	1579 0.05	1003 0.09	2181 0.26	1993 0.54	1285 0.61	848 0.73	525 0.72	11176 0.33
25-29		887 0.02	1241 0.05	896 0.15	1949 0.27	1920 0.51	1308 0.56	1025 0.59	880 0.70	10106 0.36
30-34		120 0.07	426 0.03	482 0.16	1161 0.31	1211 0.53	980 0.51	766 0.51	772 0.67	5918 0.42
35-44			75 0.03	247 0.15	877 0.31	1067 0.49	834 0.47	680 0.47	902 0.64	4682 0.45
45-64					28 0.39	143 0.41	304 0.61	382 0.58	377 0.70	1234 0.60
Total	777 0.02	7866 0.05	6834 0.05	4825 0.12	9589 0.26	8907 0.51	6192 0.57	4374 0.60	3722 0.69	53086 0.18

Table 3 - Age-Adjusted (ln) Earnings and Years of Schooling

(ln)Earnings

Schooling



	1991		1986	
Immig. & Vismin	10.057 (0.009)	10.075 (0.012)	14.548 (0.038)	14.309 (0.056)
Immig. & Non-Vismin	10.262 (0.007)	10.272 (0.008)	13.847 (0.032)	13.409 (0.040)
Non-Immig. & Vismin	10.219 (0.020)	10.229 (0.027)	14.806 (0.074)	14.276 (0.108)
Non-Immig. & Non-Vismin.	10.241 (0.006)	10.263 (0.007)	13.532 (0.025)	13.060 (0.035)

Notes. Standard errors in parentheses. Earnings and years of schooling are adjusted to account for the age difference in the sample by regressing each on a quartic in age and four dummy variables representing each of the four groups of interest.

Table 4 - The Impact of Age at Immigration

	1991			1986		
	Without Controls (1)	Native Returns (2)	Own Returns (3)	Without Controls (4)	Native Returns (5)	Own Returns (6)
ia59	0.032 (0.021)	0.023 (0.020)	0.030 (0.020)	0.025 (0.023)	0.029 (0.022)	0.027 (0.022)
ia1014	-0.011 (0.022)	0.010 (0.021)	0.014 (0.021)	-0.005 (0.025)	0.024 (0.024)	0.019 (0.024)
ia1519	-0.067* (0.020)	0.000 (0.020)	0.003 (0.020)	-0.059* (0.022)	0.007 (0.021)	0.001 (0.022)
ia2024	-0.018 (0.018)	-0.019 (0.017)	-0.006 (0.018)	-0.053* (0.019)	-0.043+ (0.019)	-0.048+ (0.019)
ia2529	-0.005 (0.019)	-0.054* (0.018)	-0.034~ (0.019)	-0.023 (0.020)	-0.043+ (0.019)	-0.048+ (0.020)
ia3034	-0.042~ (0.022)	-0.111* (0.021)	-0.090* (0.021)	-0.006 (0.023)	-0.057* (0.022)	-0.061* (0.022)
ia3544	-0.090* (0.024)	-0.175* (0.023)	-0.158* (0.024)	-0.050~ (0.027)	-0.123* (0.025)	-0.132* (0.026)
ia4564	-0.172* (0.037)	-0.236* (0.036)	-0.226* (0.037)	-0.201* (0.043)	-0.235* (0.040)	-0.249* (0.040)
im46p	-0.134~ (0.072)	-0.121~ (0.067)	-0.126~ (0.068)	-0.026 (0.042)	-0.031 (0.040)	-0.037 (0.040)
im5660	-0.028 (0.018)	-0.013 (0.018)	-0.013 (0.018)	-0.014 (0.016)	0.002 (0.016)	0.004 (0.016)
im6165	-0.065* (0.021)	-0.026 (0.020)	-0.020 (0.020)	-0.062* (0.020)	-0.020 (0.019)	-0.009 (0.019)
im6670	-0.027 (0.018)	-0.018 (0.017)	0.009 (0.017)	-0.044+ (0.017)	-0.031~ (0.016)	0.000 (0.017)
im7175	-0.113* (0.018)	-0.075* (0.018)	-0.025 (0.018)	-0.120* (0.018)	-0.074* (0.017)	-0.018 (0.019)
im7680	-0.139* (0.020)	-0.086* (0.019)	-0.031 (0.020)	-0.177* (0.021)	-0.112* (0.020)	-0.051+ (0.021)
im8185	-0.20* (0.022)	-0.131* (0.021)	-0.072* (0.022)	-0.364* (0.028)	-0.298* (0.027)	-0.235* (0.027)
im8690	-0.359* (0.023)	-0.255* (0.022)	-0.189* (0.023)			
yrschl		0.059*	-0.009* (0.001)		0.056*	-0.007* (0.001)
vismin		-0.055*	-0.105* (0.010)		-0.076*	-0.092* (0.013)

Table 4 - The Impact of Age at Immigration (concluded)

	1991			1986		
	Without Controls (1)	Native Returns (2)	Own Returns (3)	Without Controls (4)	Native Returns (5)	Own Returns (6)
mar		0.215*	-0.045* (0.012)		0.204*	-0.009 (0.015)
h0119		-0.534*	0.158* (0.037)		-0.432*	0.013 (0.045)
h2029		-0.389*	0.003 (0.032)		-0.340*	0.019 (0.046)
h3034		-0.249*	0.031 (0.032)		-0.133*	-0.136* (0.048)
h3539		0.037*	0.002 (0.013)		0.007	0.048* (0.013)
h4549		0.109*	-0.027~ (0.016)		0.060*	-0.004 (0.017)
h50p		0.006	0.050* (0.012)		-0.072*	0.043* (0.014)
w4048		-0.109*	-0.028+ (0.013)		-0.139*	-0.017 (0.015)
intcpt	0.090* (0.017)	0.049* (0.016)	0.073* (0.019)	0.074* (0.017)	0.027~ (0.016)	0.026 (0.020)
N	32407	32407	32407	20679	20679	20679

Notes: Standard errors in parentheses:  $p < 0.10 = \sim$ ,  $p < 0.05 = +$ ,  $p < 0.01 = *$ . The coefficients in columns 2 and 5 below the cohort dummies are those from the native regression and are constrained at those values in the immigrant regressions. The coefficients for the controls in columns 3 and 6 are deviations from the coefficients for the controls in columns 2 and 5.

Table 5. Average number of years of schooling for immigrants cross-classified by age at immigration and year of immigration, pooled 1986 and 1991 Census data.

Age	Cohort								Total	
	pre-46	46-55	56-60	61-65	66-70	71-75	76-80	81-85		86-90
0-4	12.19	14.19	14.09	13.89	13.64	12.47	11.42			13.71
5-9	11.54	13.74	14.23	14.03	14.03	13.43	12.57	11.40		13.74
10-14	10.60	12.48	13.30	13.31	13.80	13.83	13.17	12.35	11.07	13.18
15-19	12.46	10.73	11.63	11.66	12.70	13.47	12.96	12.43	11.82	12.15
20-24	16.00	11.42	11.81	12.45	13.85	14.11	13.35	13.17	12.75	12.94
25-29		11.29	11.70	12.21	14.04	14.30	14.21	14.75	14.16	13.50
30-34		11.70	11.46	11.99	13.58	13.79	14.50	14.74	14.49	13.72
35-44			11.09	11.78	13.14	12.73	13.86	14.67	14.61	13.58
45-64					11.21	12.64	12.18	12.31	12.66	12.40
Total	11.94	12.38	12.54	12.67	13.65	13.73	13.62	13.85	13.81	13.23

Table 6 - Controlling for Where Education and Experience Were Obtained

	1991			1986		
	Splitting (1)	Native (2)	Not Splitting (3)	Splitting (4)	Native (5)	Not Splitting (6)
exp		0.060* (0.001)	0.039* (0.002)		0.064* (0.002)	0.044* (0.002)
exp2		-0.009* (0.000)	-0.006* (0.000)		-0.010* (0.000)	-0.007* (0.000)
efor	0.003 (0.002)			0.004~ (0.002)		
efor2	0.000 (0.001)			-0.001 (0.001)		
cmkt	0.058* (0.003)			0.067* (0.003)		
cmkt2	-0.010* (0.001)			-0.013* (0.001)		
yrschl		0.082* (0.002)	0.056* (0.001)		0.077* (0.002)	0.054* (0.001)
fecan	0.061* (0.002)			0.059* (0.002)		
fefor	0.059* (0.001)			0.057* (0.002)		
feunk	0.057* (0.002)			0.055* (0.002)		
vismin	-0.156* (0.011)	-0.051+ (0.020)	-0.150* (0.011)	-0.159* (0.013)	-0.088* (0.027)	-0.155* (0.013)
mar	0.230* (0.013)	0.256* (0.011)	0.222* (0.013)	0.265* (0.015)	0.256* (0.013)	0.260* (0.015)
im46p	-0.037 (0.068)		-0.128~ (0.066)	0.203* (0.051)		-0.016 (0.040)
im5660	-0.038+ (0.019)		-0.015 (0.017)	-0.016 (0.018)		-0.002 (0.016)
im6165	-0.050+ (0.024)		-0.041+ (0.020)	-0.030 (0.026)		-0.054* (0.019)
im6670	-0.021 (0.025)		-0.043+ (0.017)	-0.008 (0.027)		-0.080* (0.016)
im7175	-0.034 (0.030)		-0.113* (0.018)	0.046 (0.033)		-0.118* (0.019)
im7680	0.013 (0.035)		-0.144* (0.019)	0.141* (0.041)		-0.159* (0.020)

Table 6 - Controlling for Where Education and Experience Were Obtained (concl'd)

	1991			1986		
	Splitting (1)	Native (2)	Not Splitting (3)	Splitting (4)	Native (5)	Not Splitting (6)
im8185	0.075~ (0.041)		-0.195* (0.021)	0.106+ (0.051)		-0.357* (0.026)
im8690	0.111+ (0.050)		-0.346* (0.022)			
h0119	-0.474* (0.038)	-0.752* (0.031)	-0.484* (0.038)	-0.535* (0.047)	-0.636* (0.041)	-0.549* (0.048)
h2029	-0.446* (0.033)	-0.478* (0.031)	-0.447* (0.033)	-0.382* (0.047)	-0.428* (0.037)	-0.389* (0.046)
h3034	-0.232* (0.032)	-0.275* (0.031)	-0.235* (0.032)	-0.276* (0.048)	-0.155* (0.030)	-0.274* (0.048)
h3539	0.042* (0.013)	0.038* (0.011)	0.043* (0.013)	0.061* (0.013)	0.012 (0.012)	0.062* (0.013)
h4549	0.090* (0.016)	0.113* (0.015)	0.085* (0.016)	0.064* (0.017)	0.065* (0.015)	0.062* (0.017)
h50p	0.067* (0.012)	0.006 (0.012)	0.063* (0.012)	-0.018 (0.014)	-0.073* (0.014)	-0.024~ (0.014)
w4048	-0.137* (0.013)	-0.112* (0.012)	-0.137* (0.013)	-0.164* (0.015)	-0.150* (0.014)	-0.162* (0.015)
intcpt	9.757* (0.037)	10.070* (0.011)	10.132* (0.018)	9.745* (0.037)	10.148* (0.014)	10.131* (0.019)
N	32407	32914	32407	20679	21451	20679
R-sq	0.182	0.272	0.182	0.21	0.273	0.208

Notes: Standard errors in parentheses: p<0.10 = ~, p<0.05 = +, p<0.01 = \*

Table 7 - Stratifying on Age at Immigration

Immig. Age	1991			1986		
	<10 (1)	20-29 (2)	35-64 (3)	<10 (4)	20-29 (5)	35-64 (6)
exp	0.079* (0.007)	0.021* (0.004)	0.007 (0.010)	0.075* (0.006)	0.019* (0.005)	-0.032* (0.011)
exp2	-0.011* (0.001)	-0.003* (0.001)	-0.002 (0.001)	-0.011* (0.001)	-0.002* (0.001)	0.003~ (0.002)
yrschl	0.092* (0.005)	0.053* (0.003)	0.045* (0.005)	0.077* (0.005)	0.055* (0.003)	0.047* (0.005)
vismin	-0.010 (0.032)	-0.159* (0.016)	-0.204* (0.029)	-0.058 (0.052)	-0.169* (0.019)	-0.202* (0.035)
mar	0.216* (0.026)	0.165* (0.020)	0.173* (0.048)	0.223* (0.028)	0.166* (0.025)	0.163+ (0.066)
im46p	-0.248* (0.085)	--	--	-0.192+ (0.093)	0.241* (0.033)	--
im5660	0.069+ (0.032)	0.056 (0.036)	--	0.119* (0.034)	0.075+ (0.030)	--
im6165	0.170* (0.048)	0.097+ (0.048)	--	0.170* (0.051)	0.043 (0.043)	-0.037 (0.091)
im6670	0.311* (0.062)	0.153* (0.049)	-0.117 (0.120)	0.016 (0.068)	0.099+ (0.047)	0.041 (0.077)
im7175	0.221* (0.078)	0.126+ (0.057)	-0.128 (0.117)	-0.135 (0.098)	0.076 (0.057)	-0.064 (0.083)
im7680	0.084 (0.099)	0.079 (0.064)	-0.156 (0.117)	-0.40 (0.258)	-0.027 (0.066)	-0.163+ (0.082)
im8185	-0.196 (0.229)	0.014 (0.072)	-0.221~ (0.118)	--	-0.285* (0.079)	-0.429* (0.090)
im8690	--	-0.152~ (0.081)	-0.396* (0.122)			
h0119	-0.553* (0.077)	-0.367* (0.065)	-0.268* (0.10)	-0.743* (0.088)	-0.256* (0.071)	-0.437* (0.159)
h2029	-0.432* (0.061)	-0.447* (0.059)	-0.219+ (0.091)	-0.290* (0.076)	-0.417* (0.084)	-0.357* (0.118)
h3034	-0.256* (0.064)	-0.203* (0.045)	-0.061 (0.072)	-0.238* (0.081)	-0.278* (0.082)	-0.437* (0.153)
h3539	0.004 (0.029)	0.051* (0.019)	0.099* (0.036)	0.032 (0.028)	0.072* (0.019)	0.077~ (0.042)
h4549	0.145* (0.030)	0.085* (0.024)	-0.015 (0.066)	0.107* (0.036)	0.057+ (0.026)	0.136+ (0.059)
h50p	0.059+ (0.030)	0.064* (0.019)	0.103+ (0.042)	0.011 (0.034)	-0.042~ (0.022)	-0.022 (0.046)

Table 7 - Stratifying on Age at Immigration (concluded)

Immig. Age	1991			1986		
	<10 (1)	20-29 (2)	35-64 (3)	<10 (4)	20-29 (5)	35-64 (6)
w4048	-0.168* (0.030)	-0.134* (0.020)	-0.107* (0.038)	-0.178* (0.036)	-0.144* (0.023)	-0.224* (0.053)
intcpt	10.081* (0.030)	9.990* (0.060)	10.188* (0.131)	10.208* (0.034)	10.055* (0.052)	10.278* (0.114)
N	5524	12790	3801	3869	8492	2115
R-sq	0.316	0.146	0.108	0.364	0.155	0.187

Notes: Standard errors in parentheses:  $p < 0.10 = \sim$ ,  $p < 0.05 = +$ ,  $p < 0.01 = *$



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