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Incidence and Returns to Apprenticeship Training in Canada: the Role of Family Background and Immigrant Status

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Incidence and Returns to Apprenticeship Training in Canada:
The Role of Family Background and Immigrant Status*

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ABSTRACT

Immigrant men and women in Canada from recent arrival cohorts have especially low rates of having an apprenticeship credential when compared to either their counterparts from earlier arrival cohorts or the Canadian born. Among the native born, a second generation man is more likely to have completed an apprenticeship if his father's generation of immigrant men in Canada (from the same source country) have a high probability of apprenticeship completion. The same effect is present for first generation men who arrived in Canada as children. However, this effect is not found for either first generation or second generation women. An analysis of earnings indicates a strong wage return from the completion of an apprenticeship in Canada is found for men. However, women who have completed an apprenticeship in Canada actually have lower weekly earnings than women with only a high school diploma. The empirical results suggest that the increased emphasis on university education in the selection of economic immigrants is creating an imbalance between the supply of both first and second generation immigrants with an apprenticeship, and the demand for workers with these credentials.

JEL Code: J1 and I2

Keywords: Apprenticeships, Education, Immigration, and Second Generation

Executive Summary

Historically, Canada has relied upon skilled tradespersons entering as immigrants to provide an adequate supply of labour services in the Canadian labour market. However, changes in immigration policy over the past number of decades have had implications for the extent to which immigration can meet labour shortages in the skilled trades. For immigrants, one relevant issue is the extent of intergenerational connections in occupational attainment among immigrants. It may be the case that the Canadian-born adult children of the immigrants from earlier arrival cohorts (many of whom came to Canada in search of employment as skilled tradespersons) may be more likely to complete apprenticeships and work in the trades. This could be due to different attitudes about this type of education and work determined in part by the attitudes of their parents and possibly by other members of their ethnic communities. Alternatively, this could be due to a greater knowledge of the returns to this type of training in the labour market. Another possibility is that employers interested in taking on apprentices may look first to members of their own family or community networks.

In this paper, we investigate the importance of immigrant status and country of origin in determining three important dimensions of apprenticeship training: 1) incidence of completion of an apprenticeship, 2) earnings of individuals holding an apprenticeship obtained in Canada compared to other forms of post-secondary education, and 3) the incidence of employment of individuals with apprenticeships obtained in Canada compared to those individuals with other types of education. As part of our analysis, we explore these issues separately for men and women to investigate whether differences in immigrant status vary by gender.

We are able to undertake an analysis of these issues because, unlike what was the case for earlier Censuses of Canada, the 2006 Census specifically asks respondents whether they have completed an apprenticeship. Using the detailed parental immigrant status information in the confidential 2006 Census file, we investigate whether there is an inter-generational 'echo effect' on attitudes towards apprenticeship programs between the adult children of immigrants when compared to the incidence of apprenticeship completion of immigrants of their parent's generation and source country. We do this by first analyzing the relationship between immigrant status and the completion of an apprenticeship for individuals who would have completed their educational training in the 1950s, 1960s and 1970s. The idea is to identify immigrant groups by source country and arrival cohort who were more likely to have completed an apprenticeship (likely in their home countries) and then work in Canada. Next, we analyze the probability of completion of an apprenticeship program for younger individuals in the 2006 Census allowing us to see which groups of immigrants and the Canadian born are more likely to follow this educational path. We carry out simple logit and

multinomial logit estimation models of the decision to complete an apprenticeship.

Immigrant men and women from more recent arrival cohorts have especially low rates of having an apprenticeship credential when compared to either their counterparts from earlier arrival cohorts or the Canadian born. The shift in the distribution of immigrants coming to Canada away from traditional source countries such as the UK and countries in Western Europe towards new source countries such as those in Asia have been associated with a decline in the supply of immigrants who report their highest educational credential as being an apprenticeship.

A second generation man is more likely to have completed an apprenticeship if his father's generation of immigrant men in Canada (from the same source country) have a high probability of apprenticeship completion. The same effect is present for first generation men who arrived in Canada as children. However, this effect is not found for either first generation or second generation women.

A strong wage return from the completion of an apprenticeship in Canada is found for men. However, women who have completed an apprenticeship in Canada actually have lower weekly earnings than women with only a high school diploma. For both men and women, the returns to an apprenticeship are not found to vary significantly between the first generation (arriving as children), the second generation or the third (and higher) generation.

For both men and women, individuals with apprenticeship credentials obtained in Canada are more likely to be employed than are their counterparts with no more than a high school diploma. The magnitude of this effect does not vary between the first, second and third generation groups within each gender.

Taken together, these findings raise concerns for the supply of individuals with apprenticeship training in the Canadian labour market. The shift away from traditional source countries in Canada's immigrant intake means that, in the coming decades, Canada will receive fewer immigrants with apprenticeship training than was the case in past decades. The evidence for men of an inter-generational echo effect indicates that this shift in source country composition may lead to both a lower share of immigrants having apprenticeship training and a lower proportion of their Canadian-born children choosing to undertake apprenticeship training in the future. Given the strong labour market returns to apprenticeship training, at least for men, this raises the question as to whether enough emphasis is currently being placed on apprenticeships and other vocational training in the selection of immigrants.

1. Background and Motivation

The apprenticeship system is one of the most important gateways through which individuals become licensed to work in a range of skilled trades and occupations. Apprenticeships are a form of employer-based worker training in which the costs of the training are shared between employers and employees, and Federal and Provincial Governments subsidize these costs through various means. Compared to individuals with other types of post-secondary education, individuals holding apprenticeships constitute only a small percentage of the Canadian working population: according to data from the 2006 Census, 7% of men aged 28-65 and 2% of women aged 28-65 identify an apprenticeship as their highest educational credential. Furthermore, only a small percentage of Canadians in post-secondary education are enrolled in an apprenticeship: as noted by Sharp and Gibson (2005), around 2% of the labour force between the ages 15-40 are registered in an apprenticeship program. Despite this, Van Walraven (2005) notes that government spending on apprenticeship training is significant. The Federal government alone spends \$1295 per enrolled apprentice, an amount per apprentice that is 6 times higher than what is spent by the US Federal government.

Historically, Canada has relied upon skilled tradespersons entering as immigrants to provide an adequate supply of these labour services in the Canadian labour market. The availability of skilled tradespersons, primarily from European countries, likely has limited the development of a sufficient number of domestic educational programs and places necessary to supply the number of individuals needed to work in the trades. However, changes in immigration policy over the past number of decades have had implications for the extent to which immigration can meet labour shortages in the skilled trades. With the deterioration of the earnings of the immigrant entry cohorts after the early 1970s (see Green and Worswick, 2010, McDonald and Worswick, 1998, and Baker and Benjamin, 1994), Canadian immigration policy placed a greater emphasis on high levels of education in terms of the selection of individuals under the Skilled Worker and Professionals program. For example, in the mid 1990s, the point system employed to select immigrants under this category was revamped so as to place a much higher weight on university education and a relatively lower weight on both secondary education and non-university types of post-secondary education. The result has been a significant increase in the average educational levels of immigrants entering Canada (see Beach, Green and Worswick, 2007). However, it has raised concerns that too much emphasis was placed on university-level education at the expense of college or other vocational training, particularly given that the demand for skilled tradespeople is not being met fully by domestically educated individuals. Related to this, the marked changes over time in the composition of immigrants by source country have also had implications for the educational composition and occupational preferences of immigrants. More recently, the federal selection policy has been revamped somewhat to make it easier for individuals with these types of training to be admitted under the points system. However, concern remains that Canadian immigration policy is not sufficiently welcoming to individuals who have graduated from skilled trades programs.

The ongoing shortage of workers in particular skilled trades and occupations in Canada coupled with changes in immigrant composition in favour of tertiary education has led to a renewed interest on the part of researchers in the Canadian apprenticeship system and the extent to which it can help Canada meet current and future demand for skilled tradespersons. Of key importance to the debate is the possible existence of barriers to the completion of apprenticeships for key groups of Canadians, in particular women and immigrants (Gunderson, 2009, p16). Despite marked changes in industrial composition, income support for working mothers, and societal attitudes to gender and work over the past number of decades, Sharp and Gibson (2005) note that female apprenticeship registrations are increasingly concentrated in traditional areas such as food and services.

One important issue is the extent of intergenerational connections in occupational attainment among immigrants. It may be the case that the Canadian-born adult children of the immigrants from earlier arrival cohorts (many of whom came to Canada in search of employment as skilled tradespersons) may be more likely to complete apprenticeships and work in the trades. This could be due to different attitudes about this type of education and work determined in part by the attitudes of their parents and possibly by other members of their ethnic communities. Alternatively, this could be due to a greater knowledge of the returns to this type of training in the labour market. Another possibility is that employers interested in taking on apprentices may look first to members of their own family or community networks. By comparing the patterns of apprenticeship completion across both age groups, immigrant groups and second generation immigrant groups, it is possible to test for this type of inter-generational echo effect in terms of attitudes towards apprenticeships and employment in the trades. Similar work on immigrant earnings was undertaken by Aydemir, Chen and Corak (2009) who used the 2001 Census to investigate whether earnings are correlated across generations in immigrant families in Canada.

Although there is little current research specifically on immigrants and apprenticeships, there has been recent work on the incidence of and return to more general forms of training. Yoshida and Smith (2005) study the training incidence and earnings of foreign-born males in Canada using the Workplace and Employee Survey. They find that visible minority groups are disadvantaged in both access to training and in earnings, but that education reduces this disadvantage. They also find that for on-the-job training in particular, there is less access for both visible minority and white immigrants compared to Canadian-born whites. Hum and Simpson (2003) examine the take-up of training by immigrants to Canada and find that training is reduced by one year for each year that migration is delayed, for both men and women. Immigrants arriving as adults train significantly less than do both immigrants who arrived as children and the Canadian born.

There is a larger international literature on immigrants, training and earnings. Colding (2006) finds that family background variables do not explain the gap in dropout rates from vocational education between the native born and the children of immigrants in Denmark. He also finds that girls have lower dropout rates than boys in immigrant families. Cohen-Goldner and Eckstein (2008) study males from the former Soviet Union who immigrated to Israel. They find that the estimated returns to white collar training are

very high for a majority of immigrant men. However returns are lower for blue collar training and accrue to a smaller proportion of immigrant men. Knowledge of Hebrew improves the returns to training in both occupational groups while knowledge of English only improves returns for white collar training. Cohen-Goldner and Eckstein (2004) study female immigrants to Israel and find that training in blue collar occupations has no significant effect on the mean offered wage for this group while training in white collar occupations increases the mean offered wage by 19%.

In addition, there is a small but growing literature on both the educational outcomes and economic performance of the second generation. Sweetman and Dicks (1999) find a positive correlation in the educational outcomes across immigrant generations in Canada. Worswick (2004) analyzes test score data from the National Survey of Children and Youth of Statistics Canada and finds that the children in Canadian schools with an immigrant parent have poor performance in the early years in school but their performance catches up to that of children with native-born parents on average by around age 14. Hum and Simpson (2007) find that the children of immigrants in Canada are more educated than their native born counterparts in the third generation. Overall, the findings of this literature for Canada indicate relatively strong performance on the part of the second generation in Canada and that educational outcomes are correlated with those of the parents. These findings suggest that the increased emphasis on university education within the Canadian immigration system (beginning in the 1990s) is likely to have resulted in an increased tendency towards university education and a decreased tendency towards apprenticeship training among subsequent school entering cohorts of the second generation in Canada.

As well, Abada, Hou and Ram (2008) find some evidence of intergenerational transfer in university education for Canadian immigrants. They study the 2002 Ethnic Diversity Survey and find that the children of immigrant parents from most source regions achieve higher university completion rates than the children of Canadian-born parents, and this is partly due to the higher education levels of immigrant parents.

In this paper, we investigate the importance of immigrant status and country of origin in determining three important dimensions of apprenticeship training: 1) incidence of completion of an apprenticeship, including the role of educational attainment of first generation immigrants to affect the education choices of their Canadian-born children, 2) earnings of individuals holding an apprenticeship obtained in Canada compared to other forms of post-secondary education, and 3) the incidence of employment of individuals with apprenticeships obtained in Canada compared to those individuals with other types of post-secondary training and education. As part of our analysis, we explore these issues separately for men and women to investigate whether differences in immigrant status vary by gender.

We are able to undertake an analysis of these issues because, unlike what was the case for earlier Censuses of Canada, the 2006 Census specifically asks respondents whether they have completed an apprenticeship. The 2006 Census also asks specifically in what country the highest level of education credential was obtained. Further, access to the

confidential 20% file through the Research Data Centre at UNB yields a sample size large enough to allow a relatively disaggregated analysis by immigrant period of arrival and region of origin, and father's region of origin for second generation immigrants, separately for men and women. Using the detailed parental immigrant status information in the 2006 Census, we investigate whether there is an inter-generational 'echo effect' on attitudes towards apprenticeship programs between the second generation (or adult Canadian-born children of immigrants) when compared to the incidence of apprenticeship completion of immigrants of their parent's generation and source country. We do this by first analyzing the relationship between immigrant status and the completion of an apprenticeship for individuals who would have completed their educational training in the 1950s, 1960s and 1970s. The idea is to identify immigrant groups by source country and arrival cohort who were more likely to have completed an apprenticeship (likely in their home countries) and then work in Canada. Next, we analyze the probability of completion of an apprenticeship program for younger individuals in the 2006 Census allowing us to see which groups of immigrants and the Canadian born are more likely to follow this educational path.

2. Data and Preliminary Statistical Analysis

Data from the confidential master file of the 2006 Canadian Census are employed in this analysis. We exploit the detailed educational information in the Census – both in terms of type of education and major field of study – to examine the determinants of undertaking an apprenticeship and the returns to apprenticeship training both in terms of labour market earnings and in terms of employment outcomes.¹ Our apprenticeship indicator variable is based on one of the possible categories of the 'highest education completed' variable. Consequently, we cannot identify individuals who completed an apprenticeship then went on to complete a higher degree (such as a university bachelor degree). Given the relatively low proportion of people in apprenticeship programs that complete the program (38.8% in 2002, according to Sharp and Gibson, 2005) we would also like to analyze the determinants of applying for an apprenticeship program and the acceptance into an apprenticeship program. However, using the 2006 Census data it is not possible to identify these outcomes.

As well, the fact that second generation Canadians can be identified in the 2006 Canadian Census files means that it is possible to see whether the children of immigrant parents are more or less likely to complete an apprenticeship program relative to other Canadian born as well as to first generation immigrants. The 2006 Census contains the source country of the respondents' parents so it will be possible to see whether there is an inter-generational transmission of preference or openness to apprenticeship programs. Unfortunately, the Census data do not contain additional relevant information such as the educational attainment of the respondent's parents. Consequently, it is not possible to directly relate the apprenticeship status of the respondent to the apprenticeship status of his/her father or mother. However, as described below, it will be possible to generate a probability of having an apprenticeship credential for the respondent's father based on

¹ The 2006 Census is the first Census year that contains data on country of education. Consequently, we are not able to incorporate data from the earlier Census years into the analysis.

analyzing the immigrant sample of the 2006 Census with the respondent's father's country of origin for an age range that is consistent with the father's generation given the respondent's age.

For region of birth outside of Canada, we group individuals according to the following categories: USA, UK/Ireland/Australia/New Zealand, Western Europe, Eastern Europe, Western Asia (which includes the Middle East), South Asia, developed Asia (which includes Japan, South Korea, Singapore, Taiwan and Hong Kong), the rest of East and Southeast Asia, Africa excluding South Africa, Caribbean, Central and South America including Mexico, and the Pacific Islands. We define the same set of regions of father's birth for second generation immigrants who were born in Canada. For period of arrival of first generation immigrants, we define arrival period cohorts beginning with 2002-06 and moving back in time at five-year intervals.

We first present descriptive statistics on the incidence and labour market outcomes from apprenticeship training. It should be noted that among first generation immigrants, those who arrived as children are overwhelmingly likely to have obtained their education credentials in Canada. For immigrants who arrived as adults, the statistics reflect the incidence of both Canadian and international credentials. For much of the regression analysis, we restrict our attention of earnings and labour market outcomes to individuals with credentials obtained in Canada.²

In Table 1, sample means are presented separately by gender for the different education categories by first generation (immigrants), second generation (Canadian-born children of immigrants) and third generation or higher (Canadian-born children of Canadian-born parents). Second generation immigrants are identified based on the place of birth of the father only. We are interested in tracking the effect of the probability of apprenticeship in the parents' generation on the incidence of apprenticeship for their adult children. Since men of the older generation in our data were much more likely to have an apprenticeship than the women of the same generation were, we feel it makes more sense to define second generation status based on the father's immigrant status.

The rates of apprenticeship completion are similar across the different groups of men, with five percent of the sample having an apprenticeship credential for the first generation and seven percent for the two Canadian-born groups. The rates are lower for women, with two percent of each of the three groups having completed an apprenticeship. Greater variation across the three groups is seen for other educational qualifications. For example, first generation immigrants are more likely to have less than high school education than are either the second generation or the third generation groups and this is true for both men and women. Also, immigrant men are more likely (11 percent) to have a higher university degree than are either second generation (six percent)

² The recognition of international credentials is an important topic that warrants its own analysis. We are also not modeling the re-education decision of adult immigrants who go back to school when their credentials are not recognized.

or third generation (four percent) men. A similar pattern is true for women, with the magnitude of these differences being smaller.

In Table 2, the proportion of individuals who have completed an apprenticeship is presented by gender and region of: 1) own birth for the case of the first generation and 2) father's birth for the case of the second generation. For men, the proportions tend to move together for the first generation and the second generation. For example, first generation men born in the UK/Ireland/Australia/New Zealand group have relatively high rates of apprenticeship credentials for both the first and second generation, at 9 percent and 7 percent, respectively. For the Other East Asia group and the South Asia group, the rates are very low at two percent for both the first generation and the second generation men. For women, the pattern is less clear. Overall rates of apprenticeship completion are smaller and there are a number of examples where the apprenticeship rate for first generation women is high while the apprenticeship rate of second generation women from the same source region is low (e.g. Eastern Europe and Caribbean).

Sample means for weekly earnings are presented in Table 3 by gender and generation group. For each education level, the mean is highest for the second generation group, for both women and men. The relevant mean is considerably lower for first generation men and considerably lower for third generation women. For the apprenticeship educational category, second generation women have higher weekly earnings (\$618.62) than first generation women (\$609.78) and much higher earnings than third generation women (\$575.08). The pattern is somewhat different for men, in that the first generation men have the highest weekly earnings (\$1,183.76) but the next highest is the third generation men (\$1,136.19) and the lowest is the first generation men (\$1,050.00). Glancing down each column, there is preliminary evidence that apprenticeship education is associated with especially high earnings for each group of men (comparable to a postgraduate diploma and much higher than high school only) but this is not the case for women where the average earnings for each group of women with an apprenticeship credential are lower than the high school only group and the postgraduate diploma group. This is due in large measure to the concentration of female apprentices in relatively low paid occupations in the food and services sector, particularly hairdressing, as noted earlier.

In Table 4, the incidence of employment is presented by gender for the case of all adults aged 28-65 and then for the case of adults with an apprenticeship only level of education. For men, the probability of working ranges from 88 percent to 91 percent with the second generation men having the highest probability of employment. This is also the case among men with a completed apprenticeship, with the third generation men having an especially low probability of working among this educational category at 81 percent. Similar overall patterns are found for women but with lower probabilities of employment ranging from a low of 74 percent for first generation women to a high of 84 percent for second generation women. Once we restrict the attention to women with a completed apprenticeship, we see a somewhat higher employment probability of 84 percent (compared to 79 percent) for third generation women.

3. Econometric Specification and Empirical Findings

For the first phase of the analysis on the determinants of completing an apprenticeship, we use Logit estimation to analyze the determinants of the incidence of having an apprenticeship as his or her highest educational qualification, and zero otherwise. Initially, we use simple binary Logit models grouping all other educational categories into the default category of the model. In addition, we employ multinomial Logit estimation in which apprenticeship is one of the possible educational outcomes with the other options being a university degree, a college diploma, or no more than a high school level of education. For the second phase of the analysis, we analyze the labour market implications of having an apprenticeship (as opposed to other levels of education) through the estimation of both OLS wage regressions as well as a Logit model of employment to see whether apprenticeship credentials have a differential impact on employment probabilities relative to other types of education.

At each stage of the analysis, we differentiate between immigrants, the second generation and the third generation. In all regressions, unless otherwise noted, we restrict the sample to individuals aged 28-65 who are not currently enrolled as either full time or part time students. In most regressions, we also restrict the immigrant sample to those who arrived as children (aged 15 or less) and who obtained their educational credentials in Canada in order to abstract from issues of credential recognition and the decision by immigrants to return to education when international credentials are not recognized.

3.1 Determinants of Incidence of Apprenticeship Completion

The following provides the basic structure of the index function employed in the apprenticeship completion simple Logit estimation:

$$(1) \quad I_i \equiv X_i\alpha + \beta_1 Age_i + \beta_2 Age_i^2 + \sum_j \delta_j C_{ji} + \gamma SG_i + \varepsilon_{i0}$$

X_i is a vector of personal characteristics that include province of residence and urban/rural status as well as detailed controls for the age at which an individual entered the labour market and mother tongue of the respondent (English, French or other). The error term, ε_{i0} , captures the random component of the decision to complete an apprenticeship program as opposed to having some other type of education. The age controls are included to capture differences across birth cohorts in the propensity to complete an apprenticeship program. The immigrant arrival cohort indicator variables, C_{ji} , identify all J arrival cohorts that are observed in the 2006 Census data and allow for differences in the probability of completing an apprenticeship program between immigrants and the Canadian born.³ As noted above, Canadian immigration policy has varied considerably over the past 40 years in terms of the ease with which a skilled tradesperson can gain landed immigrant status. This specification of the index allows for these differences in immigrant selection regime to be captured at least in part by the coefficients on the immigrant arrival cohort indicator variables. The second generation

³ All of the immigrant cohort and region of birth variables are defined to equal zero for the Canadian born.

status indicator variable, SG_i , identifies the Canadian born respondents whose father was an immigrant. In addition, equation (1) is extended to include a set of region of birth variables for first generation immigrants and a set of region of father's birth variables for second generation immigrants.

3.2 The Role of Intergenerational Effects in the Incidence of Apprenticeship Training

An individual's decision to complete an apprenticeship program will be affected by both his/her knowledge of the wage returns and type of employment opportunities that are likely to result from the training, but also by the value placed on this type of education within his/her family and community. We argue that these types of effects are most likely to be present in cases where the older generation (say that of the respondent's parents) has a high rate of apprenticeship completion. This type of intergenerational transmission is likely to be strongest in the case where the respondent has a parent who has completed apprenticeship training. As noted above, we focus on the case of the father since apprenticeship completion rates are much lower for mothers among mid to late career respondents in the Census. Ideally, we would like to have information on the respondent's father's education.⁴ However, that information is not available in the Census. Instead, we exploit the information on the country of origin of the respondent's father and combine this with information on older immigrant respondents in the Canadian Census in terms of their rates of apprenticeship completion by country of origin. In effect, the rate of apprenticeship completion among immigrant men in Canada from the same source country as the respondent's father is used as an additional explanatory variable in our analysis of apprenticeship completion rates.

Before presenting the expanded index function for the binary choice model, it is important to list the possible intergenerational transmission mechanisms that could be captured by this variable. First, it may be that this variable is proxying the direct 'father/adult child' transmission where the father's completion of an apprenticeship both informs the respondent of the good wage returns and employment prospects associated with the completion of an apprenticeship credential making this choice more likely on the part of the respondent. Second, it may be that other males of the father's generation and country of birth are in fact the ones who have completed an apprenticeship (rather than the father) and the respondent's knowledge of their experience makes the respondent more likely to choose this educational pathway. Unfortunately, we cannot distinguish this possibility from the first in the absence of information on the education of the respondent's parents. A final point is that there may also be connections operating through the labour demand side. If immigrant apprenticeship holders who are now employers in the skilled trades, they may be more inclined to take on apprentices who are from their own family or community. It may be that relatives or friends from the same ethnic community of the respondent's father may be more likely to accept the respondent as an apprentice either as a favour to the family or as part of an extended system of

⁴ Finnie and Mueller (2009) are able to control for parental education in their analysis of educational outcomes of first and second generation immigrants since the YITS data that they employed contains this information. However, the YITS data does not have information on apprenticeship training, so they were unable to analyze the determinants of this form of training.

mutual support. In the absence of this family/ethnic network, it may be much harder for the respondent to access an apprenticeship opportunity. Our approach cannot distinguish between these possible transmission mechanisms. One should interpret our empirical strategy as providing a reduced form measure of the relationship between the respondent's apprenticeship decision and the average apprenticeship training rates within the respondent's father's generation and source country community in Canada.

We extend equation (1) by adding our intergenerational measure, the rate of having an apprenticeship among older immigrants with the same country of birth as the respondent's immigrant father.⁵ We do this by calculating rates of incidence of having an apprenticeship credential, m_l , by gender and by detailed source country over the older immigrant sub-sample (those men aged 45-65) where l reflects the source country of the immigrant.

$$(2) \quad I_i \equiv Z_i\eta + \lambda m_l + \varepsilon_{i1}$$

where Z_i contains all of the right hand side variables from (1). Note that m_l is a generated regressor and this is taken into account when carrying out statistical inference. Since the confidential version of the 2006 Census file reports exact country of birth, we use this information to construct our variable m_l . This variable is identified in the presence of controls for region of birth and father's region of birth because of variation within these broadly defined groups of countries. The coefficient λ reflects the influence of the probability of having an apprenticeship among the father's generation of immigrant men in Canada from his source country on his adult child's probability of having an apprenticeship credential. In order to facilitate the interpretation of λ , we multiply the rate variable, m_l , by 10 so that a one unit increase in the variable can be thought of as a ten percent increase in the proportion of men of the father's immigrant generation who have an apprenticeship.⁶

3.3 Empirical Results from Incidence Analysis

In Table 5a and Table 5b, odds ratio estimates are presented from Logit estimation on the incidence of completing an apprenticeship of men and women, respectively. In column (1) of Table 5a, results are presented based on the sample of men aged 28 to 65. The odds ratio estimate of 1.092 associated with the first generation variable indicates that immigrant men who arrived in the default arrival cohort (1982-86) are more likely to have completed an apprenticeship than are the third generation Canadian-born men (the default group of the equation).⁷ The first generation immigrants from earlier arrival cohorts are more likely to have an apprenticeship credential and this difference is especially large for the 1962-66 cohort and the 1967-71 cohort. For more recent arrival

⁵ This variable is set equal to zero for both first generation and third generation respondents.

⁶ If we did not use this transformation of the variable then the coefficient would be interpreted as the effect of a 100 percent increase in the rate variable.

⁷ Specifically, this relates to the default category of the source country region controls – first generation men born in the UK/Australia/New Zealand group of countries.

cohorts, they are much less likely to have an apprenticeship credential, with a small difference for immigrants from the early 1990s and large differences (relative to the 1982-86 cohort) for the immigrants who arrived in the late 1990s and early 2000s. This is consistent with the re-design of the points system which greatly rewarded university education relative to other types of education leading to a large increase in the proportion of immigrants entering Canada since the mid 1990s with a university degree. The coefficients on the source country variables for the first generation are generally strongly significant indicating considerable variation by source country in terms of the probability of having an apprenticeship credential. US immigrant men are much less likely than the immigrant men in the default group (UK, Ireland, Australia and New Zealand) to have completed an apprenticeship. Immigrants from Western Europe and Eastern Europe are more likely to have an apprenticeship but the coefficient on virtually every other source country group implies a lower probability of having an apprenticeship credential than immigrants from the UK, Ireland, Australia and New Zealand.

The coefficient on the second generation dummy variable indicates that the Canadian-born children of immigrant fathers from the UK, Ireland, Australia or New Zealand, are less likely to have completed an apprenticeship than are the third generation Canadian-born men, *ceteris paribus*. Considerable variation exists in the probability of having completed an apprenticeship across the different groups of second generation men. Second generation men with fathers born in Western Europe, are more likely to have completed an apprenticeship and those whose fathers were born in each of the regions of Asia, the Caribbean and Africa (except South Africa) are significantly less likely to have completed an apprenticeship than are men whose fathers were born in the UK, Ireland, Australia or New Zealand. It is striking how similar the patterns are in the coefficients on the source country controls for first generation men and for second generation men. There are a few exceptions (such as the US, and the Caribbean) where the coefficient sign and significance is not the same across the two sets of controls variables; however, in general, if the first generation men from a particular source country are less (more) likely to have completed an apprenticeship than those from the default source country region then the second generation men whose fathers were born in the same source country region are also less (more) likely to have completed an apprenticeship than the second generation men whose fathers were born in the UK/Ireland/Australia/New Zealand).

In terms of the age controls, more recent birth cohorts are less likely to have completed an apprenticeship than were earlier birth cohorts, indicating an overall trend away from apprenticeship completion over time. We also find significant variation by province. Men residing in Quebec are less likely to have completed an apprenticeship than men residing in Ontario while men in all other provinces have higher rates of completing an apprenticeship than have men residing in Ontario. The largest differences are found for those men living in Alberta and British Columbia.⁸ Aboriginal men are less likely to have completed an apprenticeship.

⁸ It would also be of interest to investigate the importance of province of birth on the subsequent likelihood of an individual completing an apprenticeship. While province of birth is available in the 2006 Census, Census documentations cautions that there are problems with the reporting of this variable and recommends that it not be used in analysis.

In column (2) of Table 5a, the specification employed in column (1) is re-estimated over the same sample after excluding immigrant men who arrived in Canada as adults. Our goal here is to focus on the decision to undergo apprenticeship training for young men in Canada and so we restrict the sample of first generation immigrants to those individuals who arrived in Canada aged 15 or younger. The odds ratio for the first generation indicator variable declines from 1.092 to 0.811 indicating that immigrants who arrive as children are much less likely to have completed an apprenticeship than are the immigrants who arrived in Canada as adults. The remaining estimates are generally very similar to those found in column (1).

The odds ratios in column (3) of Table 5a are estimated over the narrower sample of men aged 28 to 44 so that we can include an additional variable that measures the proportion of men with an apprenticeship who are aged 46-65 and from the same country of birth as the individual's father. We allow for the effects of this variable on the incidence of apprenticeships to vary between first and second generation individuals. For individuals whose father was born in Canada, this variable is set to zero. As in column (2), immigrant men who arrived in Canada as adults are excluded from the analysis in order to focus on the decision to undergo apprenticeship training in Canada. For these younger men, we see that the odds ratio for the first generation variable is now smaller indicating a lower probability of having an apprenticeship credential relative to the default category of third generation men. The coefficients on the cohort variables for the first generation are similar to those of column (1) except for the fact that, for the earlier arrival cohorts, these men are not more likely to have completed an apprenticeship relative to the default cohort where in column (1) the opposite was true.

The odds ratios for the source country variables for first generation immigrants are similar to what was found in column (1); however, the magnitudes of the odds ratio terms are generally closer to one indicating that the source country effects may be smaller when we focus on younger individuals. The odds ratio associated with the second generation indicator variable is smaller in magnitude than the one from column (2). The pattern of odds ratios for the source country region for the second generation men is similar to what was found in column (2).

Our variable reflecting intergenerational effects appears in two forms: 1) for the first generation respondents who arrived as children and 2) for the second generation. We make this distinction since both groups are of interest and in the former case there may be a greater influence on the attitudes towards apprenticeship training based on the incidence and the returns to apprenticeship in the source country. In each case, the coefficient is strongly significant with an odds ratio larger than one, indicating that first and second generation males are more likely to have completed an apprenticeship if their fathers were born in a source country for which the immigrants in Canada from that source country have a high probability of having completed an apprenticeship. The magnitude of this effect is somewhat larger (1.034 compared to 1.022) for the case of the first

generation men relative to the second generation men.⁹ However, in both cases, this is strong evidence of an intergenerational echo effect. Note that this effect does not necessarily mean that it is a father-son transmission although this is certainly possible. It may be that other adult men in the family or in the ethnic community having an apprenticeship plant the idea in the younger generation and make them more likely to complete an apprenticeship or, in some other way, facilitate access to apprenticeship training.¹⁰

In Table 5b, odds ratios are presented based on estimates from Logit estimation of the outcome of having an apprenticeship credential using the same specifications as in Table 5a but estimated over the sample of women in the 2006 Census. In general, the column (1) estimates are similar to what was found in column (1) for men. The odds ratio estimate for the first generation indicator variable indicates that immigrant women who arrived in the 1982 through 1986 period have higher probabilities of holding an apprenticeship than otherwise similar third generation Canadian-born women. The odds ratios associated with the arrival cohort variables indicate that the recent arrival cohorts were less likely to hold an apprenticeship (as was found for men); however, the earlier arrival cohorts were also generally less likely to have an apprenticeship credential (in contrast to the results for men). The odds ratios for the source country variables for immigrants follow similar patterns to what was found for men. However, immigrant women from South and Central America, the Caribbean, and Africa (but not South Africa) are found to be more likely to have completed an apprenticeship than immigrant women from the UK, Ireland, Australia and New Zealand.

The remaining odds ratios are generally similar to what was found for men in column (1) of Table 5a. Two notable exceptions are the odds ratios on the mother tongue variables and on the aboriginal indicator variable. Women with French as a mother tongue are more likely than those with English as a mother tongue to have completed an apprenticeship program and this is also true for women with a mother tongue that is neither English nor French. For men, the French/English difference in the odds ratio was much smaller and men with a mother tongue that is neither English nor French were in fact less likely to have an apprenticeship credential than are the men with English as a mother tongue. Aboriginal women do not have a significantly different rate of having an apprenticeship credential relative to other Canadian-born women which is in contrast to the finding of a much lower incidence of having completed an apprenticeship program for aboriginal men relative to Canadian-born men.

As with the results for men, we re-estimate the model after excluding the first generation who arrived as adults, and the results are presented in column (2) of Table 5b. The odds ratio estimates are generally very similar to those presented in column (1). However, some important differences are found. The odds ratio on the USA first generation

⁹ It is worth noting that with a baseline probability of having an apprenticeship of 5%, an odds ratio of 1.034 implies an increase in the probability of 0.2% (to 5.2%) from a 10 percentage point increase in the percentage of that individual's father's cohort having an apprenticeship.

¹⁰ In results not reported here, we also investigated intergenerational effects based on mother's country of birth. This variable was insignificant and poorly determined in all regressions for both men and women.

indicator is now much larger at .985 compared to .598 in column (1). A similar change is also found for the Rest of East Asia group indicating that first generation women from these countries who arrived in Canada as adults are much less likely to have an apprenticeship credential than are first generation women from the same countries who arrived as children and went through the Canadian school system.

In column (3) of Table 5b, the model is re-estimated with the sample restricted to women age 28 to 44 and with the first generation who arrived as adults excluded from the sample. In addition, the intergenerational controls are also included. The magnitude of the odds ratio effect of the first generation variable is larger than it was in either column (1) or column (2) indicating that there is an even higher probability for first generation women from the 1962-66 arrival cohort in terms of having an apprenticeship relative to the third generation default group. The odds ratio effects of each of the source country variables follow the same pattern as was seen in columns (1) and (2). For the second generation, the odds ratio estimate is .749 indicating that the second generation women are less likely to have an apprenticeship than the third generation Canadian-born women (at least for those in the default group of their fathers having been born in the UK, Ireland, Australia or New Zealand). The changes in the odds ratio according to the source country of the second generation women's fathers follow the same overall pattern as in column (1). The coefficient on the 'apprenticeships in the father's generation' variable for first generation women is .977 and is not statistically significant from one. The coefficient on the equivalent variable for second generation women is .881 and is significantly different from one at the five percent level. These estimates indicate that if the female respondent's father is from a source country whose male immigrants to Canada (of that generation) had a high probability of completing an apprenticeship, then the female respondent will not have a relatively high probability of completing an apprenticeship, *ceteris paribus*, and for the case of the second generation women, the effect is in fact negative.. This is in stark contrast to what was found in column (3) of Table 5b for men where these intergenerational effect variables had a strong positive effect on the probability of completing an apprenticeship.

3.4 Multinomial Logit analysis of education choice for men

Next, our model of apprenticeship incidence is expanded to account for the fact that a number of educational choices are in principle possible. In the model underlying equations (1) and (2), the individual is choosing between having an apprenticeship and not having an apprenticeship. The latter category will include individuals with both lower education than an apprenticeship (the high school or less category) and individuals with education that is at a higher level than an apprenticeship (such as community college diplomas and university degrees). In order to explore whether this heterogeneity in the group of individuals without an apprenticeship has implications for the probability of completing an apprenticeship, we expand the model to allow for four educational outcomes: high school or less, apprenticeship, other post-secondary, and university degree. We treat these as unordered choices and we estimate using the multinomial Logit

estimator. The general form of the indirect utility that the respondent would receive from each educational choice is assumed to take the following form:

$$(3) \quad V_{ie} \equiv Z_i \eta_e + \lambda_e m_{ie} + \varepsilon_{i2}$$

where the e variable indexes the four educational categories. The m_{ie} variable is defined as the rate at which immigrant men of the respondent's father's generation have the same educational level as e . As was the case in the Logit analysis above, this variable is set equal to zero for third generation respondents. The coefficients, λ_e , capture the sensitivity of the respondent's preference for that education level for a first generation (child arrival) or second generation respondent if this particular education level was relatively more common among the respondent's father's generation of immigrants (by source country) in Canada.

In Tables 6a through 6d, marginal probabilities are presented which are generated from the multinomial Logit model estimated over the sample for men.¹¹ Rather than present the large number of coefficient estimates generated from the model, we instead present the marginal probabilities of key variables. In Table 6a, the focus is on the father's generation variables. Each column of the table relates to the four educational outcomes of the respondents with marginal probabilities presented first followed by p-values. Each row of the table relates to the rate of each educational level of the father's generation presented first for the first generation immigrants and then for the case of the second generation respondents. Of particular interest is the second column where the marginal probabilities related to apprenticeships are presented. For first generation (child arrivals), a 10 percent increase in the rate of apprenticeships in the respondent's father's generation and source country group leads to a 0.6 percentage point increase in the probability that the respondent chooses to complete an apprenticeship. Comparing this number to the overall probability of completing an apprenticeship among respondents in the sample (6.4 percent), this marginal increase can be thought of as roughly a 10 percent increase in the rate of apprenticeship completion. Looking across this row, we see that the increase in apprenticeships would come mainly at the expense of the high school or less category (-.003) and the other post-secondary category (-.002) with only a small transfer from the university degree category (-.001). For second generation respondents, the magnitude of these effects are roughly half of what was found for the first generation at 0.3 percentage point increase with the increase in apprenticeships being drawn equally from each of the other three educational categories.

In Table 6b, equivalent marginal probabilities are presented from the same multinomial Logit estimation but for the case of the immigrant indicator variable and the arrival cohort variables. Immigrant (child arrival) men from the default group of source countries (UK, Ireland, Australia and New Zealand) arriving in the default (1967-71) period are more likely to list a university degree as their highest educational qualification, relative to the third generation men, and less likely to be in the high school or less category and the apprenticeship category. However, more recent immigrant arrivals are actually increasingly less likely to have higher education, other things equal. It should be

¹¹ Given the relatively small fraction of women who choose apprenticeship training and the large number of parameter estimates generated from this model, we only report results of the estimation of this model for women.

reiterated that these immigrants are individuals who arrived as children and who obtained their highest level of education in Canada.¹²

In Table 6c, the marginal probabilities for the country of birth variables are presented for first generation respondents. Immigrants born in the UK, Ireland, New Zealand and Australia default group are more likely to complete an apprenticeship than are immigrants from Eastern Europe, the African countries group, South Africa, South Asia, and the Japan/Korea/Hong Kong group. The other marginal probabilities for the apprenticeship category by country grouping are not statistically significant.

In Table 6d, the marginal probabilities for the respondent's father's country of birth variables are presented for second generation respondents. The second generation respondents in the UK, Ireland, New Zealand and Australia default group are much more likely to have a university degree (10.3 percent) than the third generation default group and less likely to be in the high school or less category (-4.1 percent), the apprenticeship category (-2.6 percent), or the other post-secondary category (-3.5 percent). Among the second generation, we see lower probabilities of completing an apprenticeship among those with fathers born in South Asia (-1.9 percent), East Asia (-2.1 percent) and the Caribbean (-2.8 percent). However, in each case the patterns of educational level vary considerably by source region of the father. For example, while the Caribbean background second generation men are relatively less likely to complete an apprenticeship, this is due to a relatively high rate of being in the other post-secondary group while for East Asian and South Asian background second generation men the low rate of completing an apprenticeship coincides with a very high rate of completion of a university degree.

3.5 Rates of Return to Apprenticeship programs

In this section, we estimate human capital regression models that include controls for detailed educational information so as to generate earnings differentials between individuals whose highest level of education is an apprenticeship credential and individuals with different types of highest educational credential. First generation respondents who arrived in Canada as adults are excluded from the analysis in order to restrict the focus onto individuals who have completed their education in Canada and to abstract from differential returns to education credentials obtained later in an immigrant adult's working life. We also impose the additional restriction that the person's highest reported educational credential was obtained in Canada.

We estimate equations of the following form:

$$(3) \quad W_i \equiv M_i \theta + \mu_A A_i + E_i \mu + \varepsilon_i^w$$

¹² Estimating the same model after including adult arrivals educated elsewhere yields the opposite pattern in the arrival cohort terms, namely that more recent cohorts are increasingly more likely to have a university degree. The apparently anomalous result for Canadian educated child arrivals warrants further investigation.

Where W_i is the log weekly earnings of individual i in the 2006 Census sample, M_i is a vector of personal characteristics such as age (and age-squared), marital status controls, province of residence, aboriginal status and mother tongue. A_i is an indicator variable for whether or not person i has completed an apprenticeship program (as his/her highest degree) or not, E_i is a vector of indicator variables for all other relevant groupings of types of highest educational outcomes (with the exception of the default grouping of high school completion only), and ε_i^w is a mean zero error term. We also include interactions of the A_i with the first generation and second generation indicator variables to allow for differential returns to apprenticeship training in Canada across the first generation, second generation and third generation groups.

We define weekly earnings to be the sum of wages and salaries plus self-employment income with the total divided by the number of weeks worked in the reference year. It is common to exclude the self-employed in wage regression analyses. However, they are included in our analysis since many individuals with apprenticeships may have their own businesses (working as contractors) and so excluding self-employment income could both introduce an important sample selection issue and lead to an under-estimate of the returns to apprenticeship if some of the individuals whose highest education is an apprenticeship program have both wage earnings and at least some self-employment earnings. The sample is restricted to individuals aged 28 to 65 who have positive earnings and who are not currently students.

Ideally, we would like to treat A_i and the other educational controls as endogenous and identify instruments so that Instrumental Variable methods can be used to estimate the causal effects of apprenticeship completion on weekly earnings. Unfortunately, we have not been able to identify suitable instruments. Therefore, these estimates presented should be interpreted keeping in mind the potential bias due to the endogeneity of the decision to enter and complete an apprenticeship program.

In Tables 7a and 7b, log earnings regression results are presented separately for men and women. Considering first the estimates in column (1) of Table 6a, we see a strong return to the completion of an apprenticeship for men in Canada. Relative to the base group of men with only a high school credential, men whose highest credential is an apprenticeship have roughly 13 percent higher earnings. This is higher than the return for men with some other form of trades-based educational qualification and almost as high as the return to having a college diploma. The apprenticeship variable also appears as interactions with the first generation and the second generation variables. In each case, the coefficient is near zero and not statistically significant from zero indicating that there are not differential returns to apprenticeship training for first generation and second generation men relative to the third generation men.

First generation men do not have significantly different weekly earnings than the third generation default group and we do not see much variation in the earnings across year of arrival (with the exception of the 1992-96 cohort of men whose weekly earnings are roughly 18 percent lower). However, it should be kept in mind that these first generation

men all arrived in Canada as children or youth and so they are likely to have similar educational opportunities and language fluency to Canadian-born men. Thus, these general patterns are not surprising. Similarly, the differences in log earnings across the source country groupings are generally small and often not statistically significant.

The coefficient on the second generation variable is near zero and not statistically significant. As was found for first generation men, the source country variation does not appear to be important with the exception of the Caribbean group for which both the first generation and the second generation men have roughly 11 percent lower weekly earnings.

In column (2) of Table 7b, the equivalent specification to column (1) is re-estimated over a sample that is restricted to men whose highest educational credential is an apprenticeship. This analysis highlights factors associated with differential returns to an apprenticeship by observable characteristics such as period of arrival and region of birth; that is, it allows a greater degree of flexibility than what is allowed in the specification estimated in column 1. The coefficients on the variables related to first generation status are generally near zero and statistically insignificant indicating that first generation men with an apprenticeship as their highest educational credential have weekly earnings that are generally very similar on average to third generation men with the same level of education. However, immigrant men (who arrived as children) in the 1960s are found to have higher earnings than third generation men with the difference in the 16 to 17 percent range. In addition, some variation by source country is found with immigrant men born in the US, Western Asia, Japan/Hong Kong/Korea, Rest of East Asia, and the Caribbean having significantly lower earnings than other men with apprenticeships in the UK/Ireland/Australia/New Zealand default group. The coefficients on the variables related to second generation status are also typically not statistically significant. Second generation men whose fathers were born in the Caribbean have approximately 28 percent lower earnings than do other second generation men; however, the coefficients on all of the source country variables are not individually significant.

In Table 7b equivalent estimates are presented to those in Table 7a but where the models are estimated over the sample of women. In column (1), the variation in log earnings across the different categories of education is in fact larger than what was found in column (1) for men with the coefficient on the less than high school dummy being $-.260$ and the coefficient on the higher degree coefficient being $.857$. However, the coefficient on the Apprentice indicator variable is $-.121$ in contrast to the positive coefficient of $.127$ found for men. This indicates a much lower return to the completion of an apprenticeship credential for women than is the case for men in the sense that there is not the strong positive increase in returns relative to the high school only group that was found for men and there is in fact a negative difference instead. As was the case for men, the interactions of the apprenticeship indicator with each of the first and second generation indicators are not individually significant indicating that the returns to an apprenticeship do not differ significantly between women in the first, second and third generation groups.

Comparing the coefficients across columns (1) and (2) in Table 7b, we generally see similar patterns in the results for men and women related to first generation status and its interaction with immigrant arrival cohort. However, there are some important differences. We do not see the large negative effect for the Caribbean control with it instead equal to -.012 and not statistically significant in column (1) of Table 7b and not statistically significant in column (2). For second generation women, the results are generally similar to what was found for men with the exception being the second generation women from South Asia having relatively better earnings than their male counterparts in column (1).

3.6 Analysis of Employment Probabilities

The final stage of the analysis involves the estimation of binary choice models over the employment/non-employment outcome using Logit estimation where the basic structure of the right hand side of the index function is the same as the right hand side of equation (3).¹³ Since our analysis of earnings is restricted to those individuals with positive weeks of work during the reference year, it is useful to examine whether there are any systematic differences in the incidence of working positive weeks by observable characteristics. In Table 8a and Table 8b, the odds ratios are presented based on the analysis over the samples of men and women, respectively. A strong positive relationship between education and probability of working is apparent - respondents with an apprenticeship having a higher probability of employment than respondents with high school only. The odds ratios for the interactions of the apprenticeship variable with both the first generation and second generation variables are near one and statistically insignificant, indicating that the impact of an apprenticeship on the employment probability (relative to the high school only education level) does not differ across the three groups.

The odds ratios associated with the first generation variable and the arrival cohort variables are typically not individually significant for either men or women in either the analysis of all individuals (in the first columns of the two tables) or in the analysis of apprenticeship holders (in the second columns). While some variation exists across source country – with high probabilities of working for men from Western Europe and low probabilities of working for men from South Asia - most of the odds ratios are not statistically significant. For women, there is evidence of higher probabilities of working for first generation women from Western Europe but lower probabilities of working for women in the USA, Western Asia, South Asia, Rest of East Asia, Americas and Caribbean groups relative to the UK/Ireland/Australia/New Zealand default group of first generation women. However, once the sample is restricted to apprenticeship holders, these differences are no longer statistically significant.

For second generation men and women, a similar pattern emerges of either no differences in employment probabilities or small differences relative to the employment probabilities of the default group, the third generation. Second generation men from the Japan/Hong Kong/Korea grouping and the Rest of East Asia grouping are found to have higher

¹³ The sample includes all individuals whether or not they are in the labour force.

employment probabilities in column (1) of Table 8a; however, these differences are not statistically significant in column (2). A similar pattern is found for women.

In summary, the likelihood of an individual being out of paid employment during the entire reference year does not seem to vary much by observable immigrant characteristics such as generation, region of birth of self or father, or period of arrival of first generation immigrants.

4 Conclusions:

In this paper, we have analyzed the incidence and returns to apprenticeship credentials for men and women in Canada using the 2006 Canadian Census confidential file. A main focus of our analysis has been on differences in the propensity to complete an apprenticeship and the returns to those credentials according to the individual's immigrant status: first generation (immigrant), second generation (Canadian-born children of immigrants) and third or higher generation (Canadian-born children of Canadian-born parents).

We use Logit estimation of a binary choice model to test for differences in the incidence of having an apprenticeship by immigrant characteristics, after controlling for a range of demographic and other factors. Other things equal, first generation men from earlier arrival cohorts are more likely to have an apprenticeship credential and this difference is especially large for the 1962-66 cohort and the 1967-71 cohort. For more recent arrival cohorts, immigrants are much less likely to have an apprenticeship credential. This is consistent with the re-design in the mid 1990s of the immigration points system used to select principal applicants under the Skilled Worker and Professionals category of admission which greatly rewarded university education relative to other types of education. Immigrant men from Western Europe and Eastern Europe are more likely to have an apprenticeship than are immigrant men born in the default group of countries, the UK, Ireland, Australia and New Zealand. However, immigrant men from virtually every other source country group have a lower probability of having an apprenticeship credential than those born in the default group.

Immigrant women who arrived in the 1982 through 1986 period have higher probabilities of holding an apprenticeship than otherwise similar third generation women. Recent arrival cohorts are less likely to hold an apprenticeship; however, the earlier arrival cohorts are also generally less likely to have an apprenticeship credential (in contrast to the results for men). The source country effects follow similar patterns to what was found for men. However, immigrant women from Western Asia, South and Central America, the Caribbean, and Africa (but not South Africa) are more likely to have completed an apprenticeship than immigrant women from the UK, Ireland, Australia and New Zealand.

Second generation men whose fathers were born in the UK, Ireland, Australia or New Zealand are less likely to have completed an apprenticeship than are the third generation

Canadian-born men. Second generation men with fathers born in Western Europe are more likely to have completed an apprenticeship and those whose fathers were born in each of the regions of Asia, the Caribbean and Africa (except South Africa) are significantly less likely to have completed an apprenticeship. The second generation results for women generally follow the same pattern as those for second generation men.

We also investigated the extent to which there is an intergenerational relationship between the take-up of apprenticeships by young adults based on the rates of apprenticeships among immigrant men in Canada of their father's age and country of birth. A second generation man is more likely to have completed an apprenticeship if his father's generation of immigrant men in Canada from the same source country have a relatively high probability of apprenticeship completion. The magnitude of this effect is even larger for the case of first generation men who arrived as children. However, this does not necessarily imply that it is a father-son transmission. Other adult men in the family or in the ethnic community may act as role models making it more likely that second generation members of the community go on to complete an apprenticeship. Another possibility is that intergenerational networks within an ethnic community in some way facilitate the access of apprenticeship opportunities making it more likely that the respondent completes an apprenticeship. For second generation women, these relationships are either not statistically significant (first generation women) or have the opposite sign (second generation women) indicating that the greater the share of immigrant men in the father's generation from the father's source country, the lower is the probability that the female respondent will list an apprenticeship as her highest educational credential. Given the high concentration of apprenticeships among women who are employed in the relatively lower paid food and services industries, this may be an indication of encouragement from first generation parents for their daughters to progress beyond these types of occupations. This has not been tested of course, and a more formal analysis of reasons for the negative correlation could be conducted in future work.

In addition, we estimated a multinomial Logit model of educational outcomes where the respondent is choosing among the four (mutually exclusive) types of highest educational level: 1) high school or less education, 2) an apprenticeship, 3) another post-secondary education (but below the university degree level) and 4) a university degree. We estimate this model for men incorporating a choice-specific variable that reflects the rate of having the same educational level among immigrant men in Canada of the same age and source country as the immigrant father. As was the case in the binary Logit analysis, the intergenerational effects are significant indicating that the move away from immigrant men with apprenticeship and towards immigrant men with university degrees is likely to also be associated with a reduction in the rate of apprenticeship completions in subsequent generations of both immigrant men who arrive as children and second generation men.

In the earnings regression analysis, we find a strong return to the completion of an apprenticeship for men in Canada, captured by earnings that are approximately 13 percent higher than the earnings of men with no more than a high school diploma.

However, we do not find evidence that women who have completed an apprenticeship have higher earnings than women with only a high school level education. In fact, their earnings are 12 percent lower than the earnings of women with only a high school diploma. For both men and women, the return to an apprenticeship does not differ significantly between the first generation, second generation and third generation groups. While there is some variation by region of birth and region of birth of one's father, the general pattern is that once we condition on individuals who were born in Canada or immigrated to Canada as children, earnings are broadly comparable across generation groups. More flexible models that allow for the return to an apprenticeship to vary by specific immigrant characteristics also do not show marked differences in earnings.

In the final part of our analysis, we employed Logit estimation of binary choice models of the incidence of having worked at all during the reference year. The structure of our estimating equations mirrored the earnings analysis. Our goal was to see whether apprenticeship training had important effects on access to employment and whether these effects differed across the immigrant generation groups. Respondents with an apprenticeship have a higher probability of employment than respondents with high school only. The odds ratios for the interactions of the apprenticeship variable with both the first generation and second generation variables are very close to one and statistically insignificant, indicating that the impact of an apprenticeship on the employment probability (relative to the high school only education level) does not differ across the three groups.

In terms of the relationships between apprenticeship training and: 1) weekly earnings, and 2) employment outcomes, it is important to remember that the decision to complete an apprenticeship program is potentially endogenous and may be correlated with expected earnings and employment outcomes. We were unable to identify suitable instruments in order to use IV methods to test for endogeneity and if necessary provide consistent estimates of the causal impact of apprenticeship training on the labour market outcomes of men and women in Canada. This is an important topic that is left for future work.

Despite this caveat, our findings taken together raise concerns for the supply of individuals with apprenticeship training in the Canadian labour market. The shift away from traditional source countries in Canada's immigrant intake means that, in the coming decades, Canada will receive fewer immigrants with apprenticeship training than was the case in past decades. The evidence for men of an inter-generational relationship in apprenticeship completion indicates that this shift in source country composition may lead to both a lower share of immigrants having apprenticeship training and a lower proportion of their Canadian-born children choosing to undertake apprenticeship training in the future. Given the strong labour market returns to apprenticeship training, at least for men, this raises the question as to whether enough emphasis is currently being placed on apprenticeships and other vocational training in the selection of immigrants.

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Table 1: Educational attainment by Generation of Immigrant Arrival in Canada

	1st gen	2nd gen	3rd+ gen
MEN			
Less than HS	0.14	0.12	0.19
HS Only	0.20	0.24	0.24
Apprenticeship	0.05	0.07	0.07
Other Trade Cert.	0.06	0.06	0.11
Diploma	0.22	0.25	0.21
University Degree	0.21	0.19	0.13
Higher Degree	0.11	0.06	0.04
WOMEN			
Less than HS	0.17	0.09	0.16
HS Only	0.24	0.25	0.27
Apprenticeship	0.02	0.02	0.02
Other Trade Cert.	0.05	0.05	0.08
Diploma	0.25	0.31	0.28
University Degree	0.20	0.23	0.15
Higher Degree	0.07	0.05	0.03

Source: 2006 Census of Canada. Sample restricted to adults aged 28-65

Table 2: Proportion of individuals who completed an apprenticeship, by region of birth

Region of Birth	MEN		WOMEN	
	1 st Gen: own region of birth	2 nd Gen: father's region of birth	1 st Gen: own region of birth	2 nd Gen: father's region of birth
USA	0.04	0.08	0.01	0.02
UK/Ireland/Aus/NZ	0.09	0.07	0.02	0.01
Western Europe	0.09	0.07	0.03	0.02
Eastern Europe	0.07	0.07	0.03	0.01
Western Asia	0.03	0.03	0.03	0.03
Japan/Korea//HK	0.02	0.03	0.01	0.00
Other East Asia	0.02	0.03	0.02	0.01
South Asia	0.02	0.02	0.01	0.01
Americas	0.05	0.04	0.03	0.02
Caribbean	0.07	0.03	0.04	0.01
Pacific	0.07	0.04	0.03	0.03
Africa excl. RSA	0.03	0.02	0.03	0.01
South Africa	0.05	0.05	0.01	****

Source: 2006 Census of Canada. Sample restricted to adults aged 28-65. **** denotes suppressed due to confidentiality restrictions

Table 3: Average Weekly Earnings (\$) by Generation of Immigrant Arrival in Canada and Level of Education

	1st gen	2nd gen	3rd+ gen
MEN			
Less than HS	818.12	965.50	864.97
HS Only	876.61	1024.57	995.22
Apprenticeship	1050.00	1183.76	1136.19
Other Trade Cert.	946.90	1036.25	962.30
Diploma	1058.81	1196.71	1174.19
University Degree	1340.88	1771.05	1739.98
Higher Degree	1855.06	2469.67	2415.21
WOMEN			
Less than HS	533.19	602.59	518.27
HS Only	631.01	721.38	645.21
Apprenticeship	609.61	618.62	575.08
Other Trade Cert.	609.78	622.71	560.98
Diploma	760.56	828.47	778.88
University Degree	915.77	1138.86	1087.14
Higher Degree	1211.87	1601.85	1478.94

Source: 2006 Census of Canada. Sample restricted to adults aged 28-65 with positive annual earnings from wages, salaries or self-employment and positive weeks of work during the reference year.

Table 4: Probability of Working by generation of immigration to Canada

	MEN			WOMEN		
	1st gen	2nd gen	3rd+ gen	1st gen	2nd gen	3rd+ gen
All adults	0.89	0.91	0.88	0.74	0.84	0.79
Adults with an apprenticeship only	0.88	0.92	0.81	0.76	0.82	0.84

Source: 2006 Census of Canada. Sample restricted to adults aged 28-65.

Table 5a: Incidence of completing an apprenticeship for men – Logistic regression

	age 28-65		age 28-65, no FB who arrived as adults		age 28-44, no FB who arrived as adults	
	OR	p-value	OR	p-value	OR	p-value
First Generation	1.092	0.022	0.811	0.029	0.626	0.040
arr0206	0.443	0.000	n/a		n/a	
arr9701	0.569	0.000	n/a		n/a	
arr9296	0.793	0.000	0.744	0.344	0.782	0.390
arr8791	0.976	0.545	0.959	0.760	1.003	0.981
arr8286	1.000	--	1.000	--	1.000	--
arr7781	1.088	0.046	1.125	0.278	1.131	0.213
arr7276	1.111	0.008	1.091	0.392	1.080	0.415
arr6771	1.209	0.000	1.066	0.530	1.045	0.694
arr6266	1.208	0.000	1.118	0.282	1.049	0.653
arr61p	1.042	0.322	1.278	0.011	0.807	0.801
Own Region of Birth (1 st gen)						
UK/Ireland/Aus/NZ	1.000	--	1.000	--	1.000	--
USA	0.461	0.000	0.703	0.000	0.894	0.351
Western Europe	1.131	0.000	1.301	0.000	1.076	0.422
Eastern Europe	1.140	0.000	1.133	0.078	1.029	0.781
Western Asia	0.568	0.000	0.760	0.054	0.879	0.372
South Asia	0.351	0.000	0.455	0.000	0.511	0.000
Jap/Kor/HK	0.244	0.000	0.226	0.000	0.245	0.000
Rest of East Asia	0.353	0.000	0.528	0.000	0.644	0.003
Americas	0.792	0.000	0.845	0.051	0.860	0.170
Caribbean	0.957	0.275	0.866	0.120	0.894	0.381
Pacific	0.695	0.001	0.807	0.397	0.888	0.248
Africa except RSA	0.456	0.000	0.431	0.000	0.393	0.001
South Africa	0.632	0.000	0.737	0.140	0.565	0.001
Second Generation Father's region of birth (2 nd gen)	0.893	0.000	0.898	0.000	0.684	0.000
UK/Ireland/Aus/NZ	1.000	--	1.000	--	1.000	--
USA	1.016	0.720	1.015	0.736	0.869	0.015
Western Europe	1.256	0.000	1.260	0.000	1.287	0.000
Eastern Europe	0.993	0.843	0.999	0.968	1.147	0.007
Western Asia	0.581	0.003	0.585	0.004	0.748	0.074
South Asia	0.408	0.000	0.410	0.000	0.505	0.000
Jap/Kor/HK	0.565	0.001	0.570	0.001	0.483	0.009
Rest of East Asia	0.396	0.000	0.396	0.000	0.467	0.000
Americas	0.861	0.214	0.867	0.237	0.875	0.482
Caribbean	0.559	0.000	0.560	0.000	0.587	0.001
Pacific	0.397	0.079	0.395	0.078	0.521	0.000
Africa except RSA	0.385	0.000	0.385	0.000	0.415	0.001
South Africa	0.813	0.413	0.808	0.399	0.653	0.000
App'ships in father's gen-1 st gen (10 pt)	n/a		n/a		1.034	0.014
App'ships in father's	n/a		n/a		1.022	0.008

gen-2 nd gen (10 pt)						
born7478	0.744	0.000	0.736	0.000	0.738	0.000
born6973	0.831	0.000	0.816	0.000	0.819	0.000
born6468	1.000	--	1.000	--	1.000	--
born5963	1.117	0.000	1.122	0.000	1.096	0.000
born5458	1.103	0.000	1.102	0.000	n/a	
born4953	1.103	0.000	1.080	0.000	n/a	
born4448	1.163	0.000	1.132	0.000	n/a	
born4143	1.179	0.000	1.110	0.000	n/a	
ATL	1.130	0.000	1.150	0.000	1.164	0.000
PQ	0.893	0.000	0.889	0.000	1.108	0.000
ONT	1.000	--	1.000	--	1.000	--
PRAIRIES	1.137	0.000	1.145	0.000	1.242	0.000
AB	2.005	0.000	2.072	0.000	2.095	0.000
BC	1.599	0.000	1.640	0.000	1.665	0.000
Mother tongue						
English	1.000	--	1.000	--	1.000	--
French	1.045	0.003	1.071	0.000	1.004	0.792
Other	0.908	0.000	0.884	0.000	0.870	0.026
Aboriginal	0.869	0.000	0.866	0.000	0.835	0.000
Sample size	1,497,859		1,239,052		556,967	
Pseudo-Rsq	0.025		0.016		0.016	

Notes: p-values based on robust standard errors. Controls for father's region of birth are set to zero for all individuals other than 2nd generation Canadians.

Table 5b: Incidence of completing an apprenticeship for women – Logistic regression

	age 28-65		age 28-65, no FB who arrived as adults		age 28-44, no FB who arrived as adults	
	OR	p-value	OR	p-value	OR	p-value
First Generation	1.505	0.000	1.432	0.004	1.718	0.001
arr0206	0.564	0.000	n/a		n/a	
arr9701	0.664	0.000	n/a		n/a	
arr9296	0.899	0.049	1.041	0.913	1.088	0.820
arr8791	1.000	0.998	0.826	0.268	0.853	0.196
arr8286	1.000	--	1.000	--	1.000	--
arr7781	0.862	0.013	0.699	0.012	0.690	0.015
arr7276	0.795	0.000	0.580	0.000	0.586	0.000
arr6771	0.825	0.001	0.607	0.000	0.535	0.000
arr6266	0.921	0.205	0.795	0.100	0.640	0.006
arr61p	0.669	0.000	0.773	0.038	4.633	0.002
Own Region of Birth (1 st gen)						
UK/Ireland/Aus/NZ	1.000	--	1.000	--	1.000	--
USA	0.598	0.000	0.985	0.904	0.897	0.436
Western Europe	1.417	0.000	1.362	0.000	1.011	0.898
Eastern Europe	1.480	0.000	1.124	0.391	0.797	0.321
Western Asia	1.123	0.111	0.974	0.911	0.779	0.333
South Asia	0.394	0.000	0.709	0.082	0.503	0.005
Jap/Kor/HK	0.483	0.000	0.415	0.000	0.295	0.000
Rest of East Asia	0.599	0.000	1.058	0.693	0.911	0.527
Americas	1.222	0.001	1.241	0.124	1.102	0.589
Caribbean	2.167	0.000	2.115	0.000	1.915	0.000
Pacific	0.923	0.645	0.758	0.546	0.812	0.388
Africa except RSA	1.127	0.087	0.849	0.467	0.710	0.190
South Africa	0.469	0.001	0.574	0.283	0.618	0.148
Second Generation	0.747	0.000	0.763	0.000	0.749	0.000
Father's region of birth (2 nd gen)						
UK/Ireland/Aus/NZ	1.000	--	1.000	--	1.000	--
USA	1.224	0.035	1.219	0.039	0.909	0.037
Western Europe	1.379	0.000	1.403	0.000	1.688	0.000
Eastern Europe	1.009	0.903	1.039	0.618	1.264	0.071
Western Asia	1.524	0.056	1.538	0.050	1.761	0.000
South Asia	0.714	0.140	0.742	0.192	0.717	0.002
Jap/Kor/HK	0.373	0.012	0.392	0.017	0.476	0.164
Rest of East Asia	0.577	0.010	0.601	0.018	0.724	0.040
Americas	1.015	0.953	1.027	0.914	1.190	0.502
Caribbean	0.730	0.095	0.711	0.070	0.756	0.193
Pacific	0.929	0.918	0.987	0.985	1.346	0.000
Africa except RSA	0.476	0.023	0.468	0.020	0.478	0.022
App'ships in father's gen-1 st gen (10 pt)	n/a				0.977	0.858
App'ships in father's gen-2 nd gen (10 pt)	n/a				0.881	0.048

born7478	0.848	0.000	0.838	0.000	0.833	0.000
born6973	0.890	0.000	0.876	0.000	0.873	0.000
born6468	1.000	--	1.000	--	1.000	--
born5963	0.933	0.003	0.913	0.000	0.991	0.690
born5458	0.817	0.000	0.770	0.000	n/a	
born4953	0.878	0.000	0.851	0.000	n/a	
born4448	1.010	0.691	0.947	0.049	n/a	
born4143	0.953	0.108	0.859	0.000	n/a	
ATL	1.434	0.000	1.489	0.000	1.461	0.000
PQ	1.196	0.000	1.290	0.000	1.560	0.000
ONT	1.000	--	1.000	--	1.000	--
PRAIRIES	1.373	0.000	1.439	0.000	1.717	0.000
AB	1.438	0.000	1.541	0.000	1.814	0.000
BC	1.389	0.000	1.349	0.000	1.464	0.000
Mother tongue						
English	1.000	--	1.000	--	1.000	--
French	1.371	0.000	1.328	0.000	1.294	0.000
Other	1.175	0.000	1.047	0.175	1.050	0.576
Aboriginal	1.006	0.876	1.024	0.532	0.904	0.000
Sample size	1,529,280		1,247,050		556,918	
Pseudo-Rsq	0.012		0.007		0.007	

Notes: p-values based on robust standard errors. Controls for father's region of birth are set to zero for all individuals other than 2nd generation Canadians.

Table 6a:

Multinomial Logit Model of Educational choice for men,
Marginal effect on own education choice of 10 pt increase in share of father's
cohort with a given education level.

	HS or less		Apprenticeship		Other p- secondary		Univ. Degree	
	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z
Father's cohort education level								
1 st generation								
HS or less	0.025	0.000	-0.003	0.000	-0.015	0.000	-0.008	0.000
Apprenticeship	-0.003	0.000	0.006	0.000	-0.002	0.000	-0.001	0.000
Other p-sec	-0.015	0.000	-0.002	0.000	0.024	0.000	-0.007	0.000
Degree	-0.008	0.000	-0.001	0.000	-0.007	0.000	0.016	0.000
2 nd generation								
HS or less	0.012	0.000	-0.001	0.000	-0.007	0.000	-0.004	0.000
Apprenticeship	-0.001	0.000	0.003	0.000	-0.001	0.000	-0.001	0.000
Other p-sec	-0.007	0.000	-0.001	0.000	0.012	0.000	-0.003	0.000
Degree	-0.004	0.000	-0.000	0.000	-0.003	0.000	0.008	0.000
Prob outcome	0.404		0.064		0.346		0.187	

Table 6b

Multinomial Logit model of education choice for men,
Marginal effect of given characteristic on own education choice

	HS or less		Apprenticeship		Other post- secondary		Univ. Degree	
	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z
FB	-0.058	0.000	-0.035	0.000	-0.004	0.611	0.097	0.000
Arr 92-96	0.172	0.000	-0.003	0.696	-0.069	0.000	-0.100	0.000
Arr 87-91	0.126	0.000	0.001	0.857	-0.051	0.000	-0.076	0.000
Arr 82-86	0.098	0.000	0.001	0.787	-0.043	0.000	-0.056	0.000
Arr 77-81	0.050	0.000	0.003	0.581	-0.016	0.061	-0.037	0.000
Arr 72-76	0.005	0.552	0.003	0.479	0.004	0.614	-0.013	0.027
Arr 67-71	--		--		--		--	
Prob outcome	0.404		0.064		0.346		0.187	

Note: given the restrictions imposed on current age and age at arrival in Canada, more recent arrival cohorts are not contained in our estimating sample.

Table 6c:
Multinomial Logit model of education choice,
Marginal effect of given characteristic on own education choice

Country of birth	HS or less		Apprenticeship		Other p- secondary		Univ. Degree	
	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z
USA	-0.009	0.514	0.004	0.548	-0.040	0.002	0.045	0.001
UK	--		--		--		--	
W. Europe	0.010	0.331	-0.004	0.340	0.008	0.460	-0.014	0.123
E. Europe	-0.089	0.000	-0.017	0.001	0.034	0.007	0.071	0.000
Africa	-0.157	0.000	-0.017	0.016	0.023	0.125	0.151	0.000
South Africa	-0.102	0.001	-0.024	0.024	-0.007	0.823	0.133	0.000
Western Asia	-0.074	0.000	0.001	0.905	-0.009	0.530	0.082	0.000
South Asia	0.030	0.015	-0.020	0.001	-0.044	0.000	0.034	0.001
JAP/KOR/HK	-0.226	0.000	-0.037	0.000	-0.038	0.003	0.301	0.000
Other East Asia	-0.058	0.000	-0.002	0.717	0.021	0.037	0.039	0.000
C/S America	0.018	0.128	-0.004	0.533	0.022	0.053	-0.036	0.000
Caribbean	-0.021	0.069	-0.006	0.262	0.041	0.001	-0.013	0.171

Table 6d
Multinomial Logit model of education choice,
Marginal effect of given characteristic on own education choice

Father's country of birth	HS or less		Apprenticeship		Other p- secondary		Univ. Degree	
	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z	dp/dx	P> z
Second generation	-0.041	0.000	-0.026	0.000	-0.035	0.000	0.103	0.000
USA	0.034	0.004	0.005	0.488	-0.012	0.297	-0.027	0.000
UK	--		--		--		--	
W. Europe	-0.043	0.000	0.008	0.005	0.054	0.000	-0.019	0.000
E. Europe	-0.050	0.000	0.006	0.134	0.026	0.000	0.019	0.001
South Asia	-0.128	0.000	-0.019	0.011	0.013	0.346	0.135	0.000
East Asia	-0.155	0.000	-0.021	0.000	0.032	0.003	0.144	0.000
Caribbean	-0.029	0.013	-0.028	0.000	0.079	0.000	-0.021	0.007
Other regions	-0.051	0.000	-0.015	0.002	-0.004	0.637	0.070	0.000

Table 7a: Log average weekly earnings for men – OLS regression

	age 28-65, no FB who arrived as adults		age 28-65, no FB who arrived as adults, apprenticeship holders only	
	coef	p-value	coef	p-value
Highest education				
Less than HS	-0.140	0.000	n/a	
HS only	0.000	--	n/a	
Apprentice	0.127	0.000	n/a	
Apprentice*1 st gen	0.005	0.745	n/a	
Apprentice*2 nd gen	0.010	0.312	n/a	
Other trades	0.027	0.000	n/a	
Diploma	0.171	0.000	n/a	
Degree	0.456	0.000	n/a	
Higher degree	0.711	0.000	n/a	
1st gen	-0.007	0.699	-0.047	0.502
arr0206	n/a		n/a	
arr9701	n/a		n/a	
arr9296	-0.179	0.011	-0.036	0.862
arr8791	0.000	--	0.000	--
arr8286	-0.049	0.024	0.078	0.388
arr7781	0.006	0.749	0.073	0.343
arr7276	0.013	0.452	0.035	0.645
arr6771	0.032	0.075	0.174	0.019
arr6266	0.022	0.255	0.162	0.029
arr61p	0.016	0.380	0.110	0.133
Own place of birth (1 st gen)				
UK/Ireland/Aus/NZ	0.000	--	0.000	--
USA	-0.022	0.173	-0.155	0.006
Western Europe	0.030	0.005	-0.015	0.635
Eastern Europe	0.017	0.393	-0.119	0.094
Western Asia	-0.054	0.069	-0.351	0.000
South Asia	-0.069	0.002	-0.259	0.054
Jap/Kor/HK	-0.018	0.371	-0.252	0.028
Rest of East Asia	-0.051	0.006	-0.356	0.000
Americas	-0.022	0.197	-0.088	0.167
Caribbean	-0.115	0.000	-0.267	0.000
Pacific	-0.080	0.157	0.039	0.812
Africa except RSA	0.046	0.067	-0.080	0.494
South Africa	-0.015	0.742	-0.102	0.675
Second gen.	0.002	0.690	0.003	0.863
Father's region of birth (2 nd gen)				
UK/Ireland/Aus/NZ	0.000	--	0.000	--
USA	-0.041	0.002	-0.062	0.139
Western Europe	0.023	0.001	-0.008	0.721
Eastern Europe	0.036	0.000	0.024	0.393
Western Asia	-0.040	0.232	-0.139	0.573

South Asia	0.000	0.986	-0.010	0.916
Jap/Kor/HK	0.060	0.029	0.189	0.304
Rest of East Asia	0.040	0.003	-0.013	0.855
Americas	-0.003	0.873	-0.102	0.166
Caribbean	-0.113	0.000	-0.287	0.004
Pacific	-0.112	0.113	0.033	0.490
Africa except RSA	-0.027	0.402	-0.087	0.398
South Africa	-0.051	0.402	-0.301	0.279
born7983	n/a		n/a	
born7478	-0.159	0.000	-0.071	0.000
born6973	-0.058	0.000	-0.031	0.009
born6468	0.000	--	0.000	--
born5963	0.045	0.000	0.037	0.000
born5458	0.059	0.000	0.047	0.000
born4953	-0.016	0.000	-0.026	0.038
born4448	-0.187	0.000	-0.173	0.000
born4143	-0.414	0.000	-0.389	0.000
Married	0.000	--	0.000	--
Never Married	-0.314	0.000	-0.221	0.000
Wid/Sep/Div	-0.131	0.000	-0.093	0.000
ATL	-0.222	0.000	-0.222	0.000
PQ	-0.157	0.000	-0.279	0.000
ONT	0.000	--	0.000	--
PRAIRIES	-0.200	0.000	-0.192	0.000
AB	0.097	0.000	0.111	0.000
BC	-0.033	0.000	-0.013	0.190
Mother tongue				
English	0.000	--	0.000	--
French	0.013	0.001	-0.011	0.448
Other	-0.062	0.000	-0.074	0.000
Aboriginal	-0.138	0.000	-0.105	0.000
n	993,224		75,112	
Adj-Rsq	0.113		0.056	

Notes: sample is restricted to individuals aged 28-65 who are not currently enrolled as students and who have positive weeks worked in the reference year. P-values are based on robust standard errors.

Table 7b: Log average weekly earnings for women – OLS regression

	age 28-65, no FB who arrived as adults		age 28-65, no FB who arrived as adults, apprenticeship holders only	
	coef	p-value	Coef	p-value
Highest education				
Less than HS	-0.260	0.000	n/a	
HS only	0.000		n/a	
Apprentice	-0.121	0.000	n/a	
Apprentice*1 st gen	-0.043	0.217	n/a	
Apprentice*2 nd gen	0.024	0.328	n/a	
Other trades	-0.091	0.000	n/a	
Diploma	0.227	0.000	n/a	
Degree	0.582	0.000	n/a	
Higher degree	0.857	0.000	n/a	
1st gen	0.060	0.002	0.053	0.744
arr0206	n/a		n/a	
arr9701	n/a		n/a	
arr9296	-0.285	0.000	-0.414	0.186
arr8791	0.000	--	0.000	--
arr8286	-0.078	0.002	-0.115	0.544
arr7781	-0.003	0.890	-0.106	0.525
arr7276	0.001	0.977	-0.090	0.598
arr6771	0.013	0.513	-0.094	0.591
arr6266	-0.015	0.497	-0.122	0.499
arr61p	-0.028	0.164	-0.027	0.870
Own place of birth (1 st gen)				
UK/Ireland/Aus/NZ	0.000	--	0.000	--
USA	-0.067	0.000	0.209	0.102
Western Europe	0.014	0.222	0.015	0.876
Eastern Europe	0.020	0.313	0.124	0.377
Western Asia	0.008	0.798	0.087	0.635
South Asia	0.048	0.052	0.144	0.274
Jap/Kor/HK	0.087	0.000	0.308	0.048
Rest of East Asia	0.052	0.009	-0.068	0.690
Americas	-0.032	0.111	0.079	0.635
Caribbean	-0.012	0.525	-0.216	0.199
Pacific	0.054	0.326	0.409	0.063
Africa except RSA	-0.019	0.497	0.140	0.403
South Africa	-0.006	0.908	0.140	0.667
Second gen.	0.030	0.000	0.031	0.538
Father's region of birth (2 nd gen)				
UK/Ireland/Aus/NZ	0.000	--	0.000	--
USA	-0.047	0.001	-0.006	0.954
Western Europe	0.019	0.014	0.026	0.661
Eastern Europe	0.001	0.912	-0.039	0.658
Western Asia	0.039	0.231	0.137	0.308
South Asia	0.123	0.000	0.308	0.128

Jap/Kor/HK	0.105	0.000	-0.123	0.721
Rest of East Asia	0.124	0.000	0.091	0.511
Americas	-0.028	0.250	0.618	0.050
Caribbean	0.000	0.982	-0.524	0.117
Pacific	0.156	0.008	0.247	0.203
Africa except RSA	0.068	0.019	-0.007	0.973
South Africa	-0.024	0.707	n/a	
born7983	n/a		n/a	
born7478	-0.158	0.000	-0.122	0.000
born6973	-0.087	0.000	-0.087	0.002
born6468	0.000	--	0.000	--
born5963	0.060	0.000	0.062	0.008
born5458	0.087	0.000	0.067	0.010
born4953	0.047	0.000	0.012	0.665
born4448	-0.098	0.000	-0.024	0.439
born4143	-0.273	0.000	-0.193	0.007
Married	0.000	--	0.000	--
Never Married	0.050	0.000	0.157	0.000
Wid/Sep/Div	0.041	0.000	0.060	0.003
ATL	-0.200	0.000	-0.091	0.048
PQ	-0.122	0.000	-0.082	0.027
ONT	0.000	--	0.000	--
PRAIRIES	-0.139	0.000	-0.098	0.000
AB	-0.018	0.000	0.084	0.002
BC	-0.074	0.000	0.050	0.082
Mother tongue				
English	0.000	--	0.000	--
French	0.034	0.000	-0.016	0.662
Other	0.001	0.820	0.005	0.889
Aboriginal	-0.074	0.000	0.017	0.635
n	897,320		17,465	
Adj-Rsq	0.122		0.018	

Notes: sample is restricted to individuals aged 28-65 who are not currently enrolled as students and who have positive weeks worked in the reference year. P-values are based on robust standard errors.

Table 8a: Incidence of positive work weeks in the reference year for men – Logistic Regression

	age 28-65, no FB who arrived as adults		age 28-65, no FB who arrived as adults, apprenticeship holders only	
	OR	p-value	OR	p-value
Highest education				
Less than HS	0.550	0.000	n/a	
HS only	1.000		n/a	
Apprentice	1.276	0.000	n/a	
Apprentice*1 st gen	1.010	0.867	n/a	
Apprentice*2 nd gen	1.000	0.993	n/a	
Other trades	1.169	0.000	n/a	
Diploma	1.362	0.000	n/a	
Degree	1.692	0.000	n/a	
Higher degree	2.077	0.000	n/a	
1st gen	0.875	0.112	1.011	0.983
arr0206	n/a		n/a	
arr9701	n/a		n/a	
arr9296	1.124	0.757	n/a	
arr8791	1.051	0.658	2.279	0.373
arr8286	1.000		1.000	
arr7781	1.167	0.101	0.912	0.865
arr7276	1.155	0.099	1.773	0.301
arr6771	1.083	0.371	0.699	0.491
arr6266	1.134	0.167	0.804	0.669
arr61p	1.216	0.018	1.108	0.834
Own place of birth (1 st gen)				
UK/Ireland/Aus/NZ	1.000		1.000	
USA	1.018	0.790	1.189	0.595
Western Europe	1.244	0.000	1.240	0.156
Eastern Europe	1.065	0.314	1.088	0.732
Western Asia	0.818	0.088	0.286	0.012
South Asia	0.731	0.002	0.454	0.098
Jap/Kor/HK	0.997	0.972	n/a	
Rest of East Asia	0.869	0.077	0.369	0.029
Americas	0.997	0.972	1.046	0.915
Caribbean	0.911	0.246	0.950	0.914
Pacific	0.992	0.978	0.772	0.822
Africa except RSA	1.003	0.975	0.243	0.003
South Africa	1.072	0.746	0.683	0.632
Second gen.	0.990	0.622	0.913	0.201
Father's region of birth (2 nd gen)				
UK/Ireland/Aus/NZ	1.000		1.000	
USA	1.043	0.290	1.090	0.519
Western Europe	1.161	0.000	1.166	0.121
Eastern Europe	1.079	0.014	1.239	0.066
Western Asia	1.092	0.510	0.248	0.010

South Asia	0.876	0.153	1.033	0.956
Jap/Kor/HK	1.257	0.090	2.396	0.241
Rest of East Asia	1.310	0.000	2.269	0.079
Americas	1.006	0.955	0.389	0.018
Caribbean	0.856	0.039	0.815	0.605
Pacific	0.543	0.028	0.097	0.034
Africa except RSA	0.958	0.750	0.692	0.644
South Africa	0.570	0.008	0.815	0.861
born7478	1.484	0.000	1.608	0.000
born6973	1.220	0.000	1.235	0.009
born6468	1.000		1.000	
born5963	0.862	0.000	0.835	0.006
born5458	0.674	0.000	0.611	0.000
born4953	0.356	0.000	0.296	0.000
born4448	0.129	0.000	0.100	0.000
born4143	0.057	0.000	0.039	0.000
Married	1.000		1.000	
Never Married	0.253	0.000	0.287	0.000
Wid/Sep/Div	0.506	0.000	0.512	0.000
ATL	0.916	0.000	0.837	0.000
PQ	0.897	0.000	0.740	0.000
ONT	1.000		1.000	
PRAIRIES	1.502		1.322	
AB	1.975	0.000	1.863	0.000
BC	1.115	0.000	1.135	0.003
Mother tongue				
English	1.000		1.000	
French	0.960	0.003	0.936	0.237
Other	0.839	0.000	0.842	0.009
Aboriginal	0.446	0.000	0.556	0.000
n	1,216,605		88,496	
Adj-Rsq	0.186		0.187	

Notes: sample is restricted to individuals aged 28-65 who are not currently enrolled as students. P-values are based on robust standard errors.

Table 8b: Incidence of positive work weeks in the reference year for women – Logistic Regression

	age 28-65, no FB who arrived as adults		age 28-65, no FB who arrived as adults, apprenticeship holders only	
	OR	p-value	OR	p-value
Highest education				
Less than HS	0.455	0.000	n/a	
HS only	1.000		n/a	
Apprentice	1.184	0.000	n/a	
Apprentice*1 st gen	0.773	0.001	n/a	
Apprentice*2 nd gen	0.985	0.810	n/a	
Other trades	1.226	0.000	n/a	
Diploma	1.612	0.000	n/a	
Degree	1.975	0.000	n/a	
Higher degree	3.229	0.000	n/a	
1st gen	1.022	0.712	0.712	0.365
arr0206	n/a		n/a	
arr9701	n/a		n/a	
arr9296	0.725	0.166	1.922	0.602
arr8791	0.958	0.587	1.064	0.898
arr8286	1.000		1.000	
arr7781	1.012	0.859	0.699	0.377
arr7276	1.067	0.290	1.444	0.342
arr6771	0.999	0.993	1.229	0.603
arr6266	1.020	0.757	0.920	0.833
arr61p	1.147	0.021	1.466	0.295
Own place of birth (1 st gen)				
UK/Ireland/Aus/NZ	1.000		1.000	
USA	0.890	0.017	1.039	0.903
Western Europe	1.102	0.001	1.053	0.803
Eastern Europe	0.942	0.252	0.624	0.189
Western Asia	0.660	0.000	0.538	0.250
South Asia	0.722	0.000	1.199	0.761
Jap/Kor/HK	1.024	0.750	1.328	0.677
Rest of East Asia	0.863	0.017	1.457	0.403
Americas	0.776	0.000	0.626	0.217
Caribbean	0.845	0.004	0.812	0.515
Pacific	1.127	0.548	n/a	
Africa except RSA	0.896	0.179	3.770	0.065
South Africa	1.110	0.559	n/a	
Second gen.	1.046	0.005	0.947	0.673
Father's region of birth (2 nd gen)				
UK/Ireland/Aus/NZ	1.000		1.000	
USA	0.968	0.309	1.571	0.063
Western Europe	0.976	0.241	1.019	0.905
Eastern Europe	1.019	0.451	1.228	0.299
Western Asia	0.761	0.002	0.769	0.688

South Asia	1.054	0.479	0.756	0.655
Jap/Kor/HK	1.290	0.024	n/a	
Rest of East Asia	1.123	0.040	0.995	0.993
Americas	0.775	0.001	1.494	0.657
Caribbean	1.162	0.024	0.661	0.394
Pacific	0.929	0.834	n/a	
Africa except RSA	1.097	0.397	9.534	0.039
South Africa	0.846	0.433	n/a	
born7478	1.040	0.001	0.991	0.916
born6973	0.933	0.000	0.926	0.334
born6468	1.000		1.000	
born5963	1.072	0.000	1.125	0.117
born5458	0.890	0.000	0.808	0.004
born4953	0.503	0.000	0.448	0.000
born4448	0.211	0.000	0.194	0.000
born4143	0.090	0.000	0.091	0.000
Married	1.000		1.000	
Never Married	0.855	0.000	0.939	0.314
Wid/Sep/Div	1.121	0.000	1.193	0.000
ATL	0.930	0.000	0.124	0.215
PQ	0.857	0.000	1.045	0.544
ONT	1.000		1.000	
PRAIRIES	1.390		1.411	
AB	1.300	0.000	1.358	0.000
BC	1.022	0.017	1.103	0.142
Mother tongue				
English	1.000		1.000	
French	0.994	0.590	0.937	0.353
Other	0.874	0.000	0.960	0.668
Aboriginal	0.599	0.000	0.723	0.000
n	1,229,426		23,938	
Adj-Rsq	0.145		0.097	

Notes: sample is restricted to individuals aged 28-65 who are not currently enrolled as students. P-values are based on robust standard errors.