Education, Credentials and Immigrant Earnings*

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August 2004

Abstract

The extent to which the education and skills of immigrants are utilized and rewarded in the labour market is a major policy issue. This study examines how the human capital of immigrants is rewarded in the Canadian labour market. In order to focus on immigrants' credentials, we distinguish between two dimensions of educational attainment: years of completed schooling and degrees, diplomas or certificates received. Doing so allows us to estimate "sheepskin" effects -- the gain in earnings associated with receipt of a degree or diploma, controlling for years of schooling. Using data from the 1981, 1986, 1991 and 1996 Censuses, we study the evolution of the returns to the human capital of immigrant and native-born workers in Canada. Like earlier studies, we find that the work experience of immigrants in their country of origin is valued much less than the experience of comparable native-born workers. A similar result holds for the years of schooling of immigrants. However, the estimated sheepskin effects for immigrants are generally higher than those of native-born Canadians. Thus, the frequently heard claim that the credentials of immigrants are not recognized needs to be treated with some caution. For immigrants the increase in earnings associated with completing an educational program is higher than that of a comparable native born worker.
***JEL* codes**: J15, I2

* An earlier version of this paper was presented at the Canadian Economics Association meetings and at the UBC Applied Microeconomics workshop. We are grateful to David Green, Christopher Worswick and Arthur Sweetman for valuable comments and suggestions and to the SSHRC for research support.

Introduction

The extent to which the education and skills of immigrants are utilized and rewarded in the labour market is a major policy issue. Indeed, in Canada some analysts claim that the unrecognized skills and credentials of the foreign born represent a substantial loss to the economy and a significant burden on new arrivals.[1] Because of these concerns, several recent government reports have identified the recognition of immigrants' credentials as a priority for Canadian immigration and labour market policy.[2] As stated by a recent federal Minister of Citizenship and Immigration, "It is important to reduce any barriers faced by new immigrants in settling into their new communities. This is why we have changed the selection criteria for certain immigrants and why our partners are working to resolve the problem of credential recognition."[3]

This study examines how the human capital of immigrants is rewarded in the Canadian labour market. In order to focus on immigrants' credentials, we distinguish between two dimensions of educational attainment: years of completed schooling and degrees, diplomas or certificates received. Doing so allows us to estimate "sheepskin" effects -- the gain in earnings associated with receipt of a degree or diploma, controlling for years of schooling. Using data from the 1981, 1986, 1991 and 1996 Censuses, we study the evolution of the returns to the human capital of immigrant and native-born workers in Canada. Like earlier studies, we find that the work experience of immigrants in their country of origin is valued much less than the experience of comparable native-born workers. A similar result holds for the years of schooling of immigrants. However, the estimated sheepskin effects for immigrants are generally higher than are those of native-born Canadians. Thus, the frequently heard claim that the credentials of immigrants are not recognized needs to be treated with some caution. For immigrants the increase in earnings associated with a degree or diploma (for given years of education and experience) is higher than that of a comparable native born worker.

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[1] The Conference Board of Canada estimates the loss of income associated with unrecognized skills/credentials of the foreign born to be approximately 3.2 billion dollars, and identifies immigrants as one of the groups most disadvantaged in the labour market because of unrecognized learning (Conference Board of Canada, 2001). Reitz (2001) estimates that the annual loss due to under-utilization of immigrants' skills is 2.4 billion dollars.

[2] See, for example, Advisory Council on Science and Technology (2000) and Human Resources Development Canada (2002).

Our paper also offers insights into the decline in the earnings of recent immigrants, in particular into the extent to which the decline is associated with lower valuation of educational attainment. To explore this avenue, we analyse the dynamics of the valuation of years of schooling and credentials between 1980 and 1995. In order to account for changes in the composition of the immigrant population, we also examine the relationship between country of origin and the value placed by employers on the human capital of immigrants. Although we find important differences in how the market rewards the education of immigrants from different regions, there is little evidence of a downward trend in the valuation of immigrant credentials between 1980 and 1995.

Background and previous literature

Two main factors may influence the earnings differential between natives and immigrants. First, migration decisions may create a selection bias amongst the immigrant population that can be either positive or negative. On the one hand, people with superior ability may have more to gain from migrating. If so, immigrant selection is positive. The higher than average ability of immigrants will eventually translate into higher labour market earnings. On the other hand, the decision to immigrate may arise from the desire to improve on a situation of excessive distress in the country of origin. In these cases, selection bias is less likely to be positive, and could even be negative if circumstances in the country of origin interfere with human capital accumulation, such as when the origin country is at war or at low levels of development. In general, these forms of selection bias will lead to permanent differences in earnings between the native born and immigrants. A second reason for an earnings differential is the depreciation of skills. Most human capital has a country-specific component (knowledge of institutions, culture and customs, establishment of networks, etc.) that is absent in recent immigrants. Therefore, the market value of immigrants' skills obtained in a foreign country is likely to fall below that of natives. In this case, the gradual accumulation of local human capital tends to close the earning differential.[4] Both reasons imply that immigrants from countries with

[3] The Honourable Denis Coderre, Minister of Citizenship and Immigration, press release, Ottawa, January 21, 2003.

[4] There could be, however, long term consequences to initial lack of local human capital. See Beaudry and DiNardo (1991).

institutional structures and levels of development closer to the host country should do better. Not only it is more likely that the decision to migrate leads to a positive selection bias, but also that their human capital is readily transferred to the new labour market.

To assess these possibilities, researchers would prefer to follow immigrants from their arrival in the new country. This sort of longitudinal information is often unavailable and most of the empirical work on native-immigrant earnings differentials uses pooled data from a series of cross-sectional surveys such as the Census. This quasi-panel methodology allows researchers to follow *groups of individuals* with the same characteristics. Using several census years it is possible to identify immigrants in the first 5 years of residence in the country and match this group with those that have been between 6 and 10 years in the country according to the next census.[5] Baker and Benjamin (1994), Bloom, Grenier and Gunderson (1995) and Grant (1999) use this quasi-panel approach to examine the earnings behaviour of immigrants arriving in Canada prior to 1990.[6] These studies conclude that the entry earnings of recent immigrants have been declining since the early 1970s. Furthermore, they find that changes in the rate of earnings "catch-up" of these recent cohorts are generally not sufficient to compensate for the lower entry earnings. Subsequent research by Green and Worswick (2003), Frenette and Morissette (2003) and Picot and Hou (2003) concludes that the phenomenon of declining entry earnings of immigrants continued during the 1990s.

One explanation for the decline in immigrant earnings is the changing source country composition of immigrant flows. Since the late 1970s, immigration from traditional source countries such as the US and the UK has declined markedly, while immigration from other European countries, Asia, South America and Africa increased considerably. Therefore, a larger fraction of recent immigrants may have experienced more difficulty adapting to the Canadian labour market. This could occur for several reasons, ranging from larger cultural differences to the fact that lack of information may render their human capital less valuable for Canadian employers.

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[5] See, for example, Chiswick (1978) and Borjas (1985).

[6] McDonald and Worswick (1998) use data from the annual Survey of Consumer Finances, which allows them to investigate the influence of macroeconomic conditions on the earnings of immigrants. There is less evidence of a decline in immigrant quality in these data.

Recent contributions by Friedberg (2000), Schaafsma and Sweetman (2001) and Green and Worswick (2002) emphasize the importance of accounting for where immigrant human capital was acquired. In both Israel and Canada, lower returns to foreign experience appear to account for much of the gap in earnings between immigrant and otherwise comparable native born workers. Lower returns to education acquired in the country of origin may also contribute to the earnings differential. Studies by Bratsberg and Terrell (2002) for the US and Sweetman (2003) for Canada conclude that variations in the returns to foreign education across source countries are related to differences in school quality in the country of origin. Similarly, Bratsberg and Ragan (2002) and Clark and Jaeger (2002) find significant earnings differentials between immigrants that acquired schooling in the US and those that did not. The focus of these papers is usually on only one measure of schooling -- years of education.

In a previous study (Ferrer and Riddell, 2002) we found that credentials or "sheepskin effects" are relevant in the Canadian labour market. Degrees and diplomas have significant value for Canadian workers even after controlling for years of schooling and other measures of human capital. Sheepskin effects can be interpreted as the value of program completion -- the difference in earnings between those with a diploma and non-completers with the same years of schooling. Estimates of such effects are ideally suited for assessing claims that the credentials of immigrants are not appropriately rewarded.

To our knowledge, ours is the only paper that analyses the contribution of immigrant credentials to immigrant earnings.[7] Unlike most papers, which focus only on years of schooling or highest educational level, we are able to differentiate the effect of both measures of educational attainment. This allows us to explore in detail the issue of how immigrant credentials are rewarded in the Canadian labour market. Because our data do not contain fine enough information about the country in which a particular degree was obtained, we follow Schaafsma and Sweetman (2001) in using age at immigration to distinguish between Canadian and foreign education.

[7] Some studies, such as Li (2000), use dummy variables for the highest degree or level attained to control for education. However, because they do not also control for years of schooling, such studies do not identify sheepskin effects associated with completing an educational program.

Data

Our analysis uses data from the 1981, 1986, 1991 and 1996 Censuses. We restrict the sample to full time, full year male workers between 16 and 64 years of age, in Quebec, Ontario and the Western provinces.[8] The omitted provinces have few immigrants and for confidentiality reasons many variables in the public use files are more broadly categorized there. By restricting the sample in this way, we lose a small number of observations but gain detail for important variables such as year of arrival in Canada. From each census we take all immigrants and a 25% random sample of natives as a reference group.

Our dependent variable is the logarithm of weekly wages and salaries (excluding self-employment income). This choice, together with our focus on full time, full year workers, renders our sample different, to some extent, from that employed by others in the literature. These sample restrictions were chosen because we are interested in the "skill price" of labour services, which is better approximated by our measure of earnings.[9] In this way, we abstract from labour supply considerations relating to hours and weeks of work. We also exclude self-employment income as it typically includes returns to physical and financial capital as well as entrepreneurship.

The variables related to educational attainment are compatible across these censuses, with the exception of the indicator for high school graduation. We created this variable for the 1981 and 1986 samples, for which it did not exist, from other census information. We employ five indicators for completion of educational programs: high school, trades certificates or college diplomas obtained without completing high school, college or other non-university post secondary diplomas in addition to high school graduation, university bachelor's degrees, and university postgraduate degrees (degrees in medicine, veterinary and optometry, master's degrees and doctorates). Other variables used through the analysis are geographical location (province and census metropolitan area), marital status and language. However, we could not control for aboriginal and

[8] Most previous studies of immigrant earnings in Canada focus only on men. The analysis of a similar female sample deserves a paper of its own.

[9] Several previous studies, including Baker and Benjamin (1994), Grant (1999) and Schaafsma and Sweetman (2001), use a somewhat broader sample consisting of those who worked 40 or more weeks in the reference year and reported positive earnings. Results using this broader sample are similar to those reported here and are available on request.

visible minority status because the definition of these variables changes considerably through the censuses.

Immigrants' age at arrival is a categorical variable taking four values: 0-13, 14-19, 20-35, and 36-64. In order to have a consistent definition of place of birth for immigrants through the four census years, we create six dummies for country of origin according to the wide categories of the 1981 Census. These are the US/UK, Europe (including Eastern Europe and Ireland), Asia (including the Middle East), South and Central America, Africa, and Other (includes Caribbean, Bermuda and Oceania).

Table 1 shows the means of individual characteristics and labour market outcomes for both native born and immigrant workers, the latter separated according to whether their age at immigration was less than 20 or 20-64 (referred to as "youth" and "adult" arrivals in what follows). There is little difference between immigrants and Canadian born with respect to hours and weeks worked in any particular year, although weekly hours have been increasing over time for both groups. During the early 1980s, the average immigrant enjoyed weekly wages that were 4% above those of natives. This earnings advantage of immigrants deteriorated steadily over the next fifteen years. By 1995 the average weekly wage of immigrants was 97% of the average Canadian born worker. However, note that the deterioration in immigrant earnings mainly affected immigrants arriving as adults. The fall in relative earnings of youth arrivals is only 2%, whereas it is around 9% for immigrants arriving in Canada at 20 years of age or older.

Educational attainment increased over time for all groups in our sample, both in terms of years of schooling and in terms of degrees. The fraction of workers with completed post-secondary increased over the period for all groups, although more so for youth immigrants (47% to 57%) and native-born Canadians (42% to 55%) than for adult immigrants (56% to 62%). Note, however, that immigrants, in particular those at least 20 years old on arrival, still have an advantage in terms of measured human capital relative to Canadian workers. Compared to the native born, adult arrivals have, on average, 7 more years of experience,[10] and similar years of education. Immigrant-native born differences in education are even more evident in terms of degrees than in years of schooling. Not only is the fraction of adult immigrants with post-secondary education

[10] That is, potential experience = age - years of education - 6.

greater, but also the distribution of post-secondary education is skewed towards higher level degrees. In each year a higher fraction of older arrivals hold bachelor's or postgraduate degrees than either youth arrivals or Canadian born. Indeed, the fraction of adult immigrants with a postgraduate degree is more than double that of the Canadian born. Thus, nothing in these data indicates that lack of human capital is responsible for the decline in immigrant earnings.

Table 1 also reveals that an important source of change in immigrant characteristics is the shift in country of origin. Several facts are worth noting:

- The fraction of adult immigrants arriving from Europe declined by 41% (46% for the UK). The drop in European youth arrivals was much smaller (about 20%).
- Asian immigration more than doubled between 1981 and 1996.
- The proportion of immigrants from South America increased by 42%.

The changing composition of immigration by region of origin suggests that recent immigrants from “non-traditional sources” -- countries other than the US and the UK -- may have skills that are less transferable to the new labour market. As mentioned above, not only obvious issues like language, technological development, and customs are at play, but also local employers' familiarity with foreign institutions (educational or otherwise). For example, immigrants from non-traditional source countries may find that the degree they hold has a lower value than a similar Canadian degree because employers have limited information about the educational institution, or because the educational program has different content than the Canadian equivalent. These factors may contribute to lower immigrant earnings despite the fact that immigrants' measured human capital has not decreased relative to that of Canadian born.

We examine this possibility further in Table 2. Here we display the same labour market indicators as in Table 1 for three groups of immigrants: Anglophone immigrants (from US/UK), other Europeans, and immigrants from Asia. We restrict the immigrant sample to those with 10 years of experience or less in the local labour market to focus on the period in which the depreciation of immigrants' human capital is the highest. We provide two different native-born reference groups. One includes native born workers with 10 years or less of experience in the labour market (NB(10)). The second reference group is composed of native-born workers with between 10 and 20 years of labour

market experience (NB(20)). Note that the average immigrant in Table 2 has similar overall experience to the workers in the reference group NB(20), around 16 years of experience. In contrast, their “Canadian experience” (measured by the "years since migration" variable) is similar to the NB(10) group, around 6 years. This way, we are able to observe the importance of local and foreign experience for the earnings of different immigrant groups. Table 2 shows that immigrants from the US/UK have earnings similar to the NB(20) reference group, Canadian workers with the same total experience, whereas immigrants from other regions are closer to the NB(10) reference group. For the former group, experience acquired in the home country seems to be relevant in the new labour market. However, employers appear to place less value on the foreign experience of immigrants from non-traditional sources.

In the case of immigrants from Europe, the distribution of educational attainment has changed considerably over the sample years. During the 1980s education levels were lower than those of either group of Canadian born workers. During the 1990s, they reached levels close to those of Canadians with similar potential experience (NB(20)). This is most likely due to the shift, within European migration, from Southern Europe to Eastern Europe that started during the late 1980s. Despite the rise in education levels for this group, their earnings fell relative to those of native Canadians.

Immigrants from Asia are the group that suffered most from the decline in earnings. In 1981, Asian immigrants earned 77% of the earnings of native-born workers with 20 years of experience and the same as Canadians with 10 years of experience. By 1996, Asians received 67% of the earnings of the more experienced Canadian workers (NAT(20)) and 87% of the earnings of Canadians with 10 years of experience. Note that, for this group, educational attainment also worsened over the years. However, this is unlikely to explain all of the earnings decline, since earnings were already low in 1981 (relative to either Canadian group) despite the fact that education levels at that time were higher than those of Canadians. Additionally, comparisons with Asian immigrants are more difficult because their distribution of educational attainment is more disperse than that of Canadian workers. There are a greater percentage of Asian immigrants with high school graduation or less (46% versus 40% of Canadians), but those with post secondary

education are more likely to have higher degrees.[11] Overall, the data in Table 2 suggests that the human capital (experience and possibly education) of immigrants from the US/UK is not discounted by Canadian employers, that of European immigrants is somewhat discounted, and that of Asian immigrants is substantially discounted.

Tables 1 and 2 suggest that the Canadian labour market places a different value on the human capital of immigrants by region of origin. This observation supports the hypothesis that the changing composition of new arrivals may have contributed to the decline in immigrant earnings. Shifts in the importance of different source countries may have resulted in imports of human capital that are less valued by local employers.

Table 3 shows the relationship between years of education and degrees for both groups. In accordance with the results from Table 1, the distribution of years of education for immigrants is skewed towards more years and the distribution of degrees is skewed towards higher degrees.[12] For any given degree, immigrants show more variation in years of schooling than do the Canadian born. Therefore, in the case of immigrants, years of schooling may be less informative than degrees for Canadian employers.

Empirical analysis

To examine the value that the labour market places on immigrant credentials, we take advantage of the extensive information on educational attainment in the Canadian Census. In particular, the Census reports both years of schooling and all diplomas, certificates, and degrees received rather than simply the highest degree. We define "years of education" as the sum of years of schooling completed in primary and secondary school, in university, and in post secondary institutions other than university. We also generate degree dummies corresponding to whether the individual has a high school diploma ("HS grad"), a trades certificate or college diploma but not a high school diploma ("T/C without HS"), a college diploma or trades certificate and high school graduation ("T/C with HS"), a university bachelor's degree ("University BA") and a postgraduate degree (“University Grad”). Note that these credential dummies are

[11] In 1995, 36% of Asians had a university education and 11% held a post graduate degree, whereas only 29% of Canadians had university education, and only 4% held a post graduate degree.
[12] 47% of all immigrants have more than 14 years of education versus 36% of native-born Canadians. Similarly, 22% of all immigrants have a university degree versus 16% of Canadians.

specified in a cumulative fashion (for example, "HS grad" equals one for all those with a high school diploma, including those with higher degrees).

To explore the possibility that experience and education have different impacts on the earnings of immigrants and native-born Canadians, we begin by estimating separate log earnings equations for both groups, treating each Census as an individual cross-section. These results are reported in Appendix Tables A1 and A2. For each Census year, the first set of estimates is based on the standard human capital earnings function, with a linear term in years of schooling and a quadratic in experience. Although not reported, the regressions also include controls for marital status, language, province, and census metropolitan area. Among immigrants we also include a quadratic in "years since migration" (ysm) to account for assimilation to the Canadian labour market, and indicators for cohort arrival years to control for changes in immigrant quality.

This specification is similar to that used in previous research on immigrant earnings, and the results are also very similar. For native born workers, the return to work experience ranges from 3.5% to 4.0% per year of experience early in the career, substantially higher than the return received by immigrant workers (2.2% to 2.4%).[13] Both groups display diminishing returns to additional experience. The return to experience increases somewhat over the 1981-1995 period for native born workers, but not for immigrants. Returns to education are also significantly higher for native born workers. The gain in earnings associated with an additional year of schooling ranges from 5% in 1981 to 6% in 1995, with some evidence of a modest upward trend. For immigrant workers the comparable gains range from 2.2% to 2.6%, and display no trend.

The coefficients associated with immigrant arrival cohorts show the pattern of increasingly large negative entry effects, as found in previous studies. For example, in 1981 the most recent entry cohort was the group arriving during the 1976-80 period, with an estimated entry effect coefficient of -0.228 (approximately 25% lower earnings than canadians). In 1986 the entry effect for the most recent arrivals had grown to -0.359, and this pattern continued in 1991 (-0.371 for the 1986-90 arrival cohort) and 1996 (-0.457 for the 1991-95 cohort). Nonetheless, all cohorts show some evidence of earnings catch-

[13] The percentage increase in wages associated with a dummy variable coefficient is calculated as $(e^{\hat{a}} - 1)$

up over time. For example, the coefficient associated with the 1981-85 arrival cohort increases from -0.359 in 1986 to -0.219 in 1996.

The estimates reported in column 2, 4, 6 and 8 add the sheepskin dummies. Doing so results in little change in the returns to work experience but a large decline in the returns to years of schooling. For the native born, this coefficient drops by approximately 2 percentage points -- from 5.0 - 5.6% to 3.0 - 3.5%. For immigrants the decline is even larger -- from 4.0 - 4.6% to 2% or less. Thus the result that the returns to work experience and years of schooling are significantly greater for native born than for immigrant workers continues to hold when we control for the influence of completing educational programs.

The estimated sheepskin effects are moderate to large in size and statistically significant. For example, for the native born the impact of high school completion, holding constant years of schooling, ranges from about 5% to 8% and that associated with a university bachelor's degree ranges from 13% to 19%. Among high school dropouts, the earnings gain associated with obtaining a trades certificate or college diploma is 5-7%. Most of the estimated sheepskin effects are fairly stable over time -- the main exception being that associated with trades/college for high school graduates.

The striking result is that the sheepskin effects for immigrants are precisely estimated and generally larger than their counterparts for native born workers. For example, the earnings gain associated with high school completion ranges from 6.8 - 8.4%, and the equivalent earnings gain for a trades certificate or college diploma without high school ranges from 10 - 12%. Of particular note are the large estimated gains (15 - 17%) associated with post-graduate degrees. These are much larger than the equivalent estimates for native-born Canadians.

With the addition of controls for program completion, there continues to be evidence of an upward trend in the returns to experience for native born workers but not for immigrants. In contrast, the returns to years of schooling are relatively stable over time for both groups. However, there are some noteworthy changes over the sample period in the earnings gains associated with particular educational programs. For the native born, the returns to high school completion are higher in 1996 than in previous

years, while those for university programs fall somewhat. For immigrants, there are modest increases over time in the earnings gains associated with most programs.

Controlling for degrees and diplomas also results in larger negative entry effects for all immigrant cohorts. The previously discussed patterns, however, are unchanged. Negative entry effects worsen over the period, but for a given arrival cohort the earnings gap relative to the native born diminishes with time in Canada.

We next pool data from the four Census years to form an artificial panel. For ease of interpretation we also pool immigrant and native-born workers, but include interactions between immigrant status and the various human capital variables. The interaction terms provide an easy way of comparing the marginal effects of experience, years of schooling, and diplomas and degrees on the earnings of the two groups.

As discussed previously, recent research indicates that it is important to take into account where immigrant human capital was acquired. Unfortunately, the Canadian census does not have information as to where a particular educational program was obtained. Also, age at migration is coded in intervals, which limits our ability to identify foreign education and experience. We imperfectly control for Canadian-acquired education by reporting separate estimates for immigrants arriving in Canada before and after the age of 20. As a further check we also report results for immigrants arriving after age 35, who are highly likely to have completed their education before arrival.

These results are reported in Table 4. The specification in columns 1 and 3 is the standard human capital earnings function, and corresponds to the first set of estimates reported for each Census year in Tables A1 and A2. The coefficient estimates associated with the non-interacted education and experience variables are those for native-born workers, who are common to all specifications in Table 4. These show patterns very similar to those seen previously in Table A1. Returns to experience are about 3.7% per year of experience early in the career, declining to 2.5% after 10 years of work experience. Education raises earnings by 5.4% per year of schooling, similar to estimates for Canadian males in other studies (see, e.g., Ferrer and Riddell , 2002). Immigrants arriving as adults experience much lower returns to their human capital. The earnings gain associated with a year of experience is 1.1% (3.7 - 2.6) early in the career, less than one-third of that of the native born. The gap between immigrant and native-born returns

is not as large in the case of education, but the immigrant returns are nonetheless substantially lower (3.8% per year of schooling versus 5.3%). However, these sharp differences between immigrants and native born Canadians are not evident in immigrants who arrived in Canada before the age of 20. Youth arrivals experience lower returns to experience (3.3% versus 3.7% early in the career) and schooling (4.8% per year versus 5.3%) than native-born Canadians, but the differences are small.

There are also large differences between youth and adult arrivals in the estimated entry effects (not shown in Table 4) and rates of earnings assimilation after arrival. For those arriving after age 20, their earnings catch up to the native born at a rate of 1.7% per year in the period shortly after arrival, falling to 1.3% after 10 years and 0.9% after 20 years. Earnings catch-up among those arriving before age 20 is about one-half as large. These differences reflect the fact that entry effects experienced by youth arrivals are small and not statistically significant. There is simply little "catching up" to accomplish. Overall, these estimates indicate that immigrants arriving before age 20 are much more similar to native born workers than their adult arrival counterparts. This evidence is consistent with the view that foreign-acquired education and experience are valued much less than education and experience acquired in Canada. The human capital of immigrants who completed their education in Canada is valued similarly to that of the native born.

Columns 2 and 4 present the results of our sheepskin specification. For native born workers, the estimated sheepskin effects are moderately large: an earnings gain of approximately 6% for high school completion and for a trades certificate or college degree without high school. For high school graduates, a college diploma or trades certificate yields a further 3.3% increase. A university BA is associated with an earnings increase of over 16% in addition to that associated with high school completion, and a post-graduate degree brings a further 6.5% gain. Immigrants arriving as adults continue to receive lower returns to years of experience and schooling than native-born workers. However, they derive higher returns from their degrees (except for high school) than do Canadians. The interaction term between immigrant status and bachelor's degrees is positive but small in size and barely significant. Thus both groups receive substantial returns of similar magnitude from completing university bachelor's programs. The largest differences are those for non-university post-secondary -- 4 - 6% higher -- and

postgraduate degrees -- 12% higher. Compare these results with those obtained for immigrants arriving in Canada before 20 years of age (column 4). None of the estimated sheepskin effects are significantly different from those of native-born Canadians.

Restricting the sample to those arriving after 19 years of age provides some assurance that high school education was acquired in a foreign country. However, this is less likely to be the case for post secondary education. As a further check, we report estimates for immigrants arriving after 35 years of age (column 5). The results are similar to those in column 2, with immigrant-native born differences being even more pronounced. Entry effects (not shown) are larger in size, earnings assimilation is somewhat more rapid, and the returns to years of schooling and experience are much smaller. Estimated sheepskin effects for high school and university bachelor's degrees remain similar in size to those for the native born, but earnings gains from completion of other programs are even higher. These results suggest that separating the sample into immigrants arriving before and after age 20 distinguishes reasonably well between those who completed their schooling in Canada and those who did not.[14]

Immigrants receive lower returns to years of schooling than the native born, but earnings gains from program completion that are generally larger. How do the total returns to education compare for the two groups? Table 5 shows total return calculations based on estimates for immigrants arriving after age 20. Among high school graduates with 12 years of schooling, the returns to education are much higher among the native born (12*0.033 + 0.058 = 0.45, approximately 57%) than immigrants (12*(0.033-0.023) + 0.058 +0.014 = 0.192 approximately 21%). An immigrant - native born differential remains at higher levels of education, but the size of the gap narrows. Among the most highly educated, the coefficient equals 0.9 for Canadian born and 0.7 for immigrants.

These results highlight the importance of differentiating between years of schooling and diplomas and degrees in analysing the effect of education on immigrant earnings. Immigrants receive lower returns to experience and years of schooling than do the native born, but equal or higher returns to completing educational programs. These

[14] We also used the Schaafsma and Sweetman (2001) decomposition of human capital into its "foreign" and "Canadian" components. The estimates are remarkably similar to those using age at immigration.

differences with the native born are especially pronounced for immigrants who completed their education before arriving in Canada.

The value of immigrant credentials

Year and cohort effects

This section examines changes over time in the earnings impacts of years of schooling and credentials. We also analyze whether the composition of immigrant cohorts has influenced immigrant-native born earnings differences.

Several important developments took place in Canada's economy during the sample period. Major recessions were experienced in the early 1980s and early 1990s, followed by periods of strong growth in the latter half of each decade. These changes in economic activity may have affected the returns to education of immigrants and native-born Canadians. In this respect, the 1981 census is based on labour force activity in 1980, a cyclical peak year just prior to the 1981-82 recession. The 1986 census is based on work activity in 1985, when the Canadian economy was operating at normal levels of activity. In 1990 the economy was entering a deep recession, while in 1995 the economy was still in the recovery phase from the 1990-92 downturn. Thus the four census years cover a variety of business cycle experiences. Another important development during the 1980s and 1990s was rapid growth in demand for skilled workers, as well as rapid growth in the supply of well-educated workers. The aggregate evidence shows little rise in the educational wage premium, as measured by the gap in wages between high school and university graduates (Murphy, Riddell and Romer, 2001). However, the educational wage premium for younger workers did increase (Card and Lemieux, 2001).

To examine these developments, we allow the earnings impacts of human capital to vary over time by interacting all education variables with Census year. In view of the results in Table 4, we confine the sample to immigrants that arrived in Canada after age 20, since those arriving at earlier ages behave like the native born. The results from this regression are shown in Figure 1, and the estimated coefficients in Table A3.

Figure 1 shows the returns to credentials (Figures 1(a) and 1(b)) and years of education (Figure 1(c)) through the period. For native-born Canadians, the variations over time in the estimated impacts are relatively small. The coefficient on years of

schooling is very steady in the 0.31 to 0.33 range. Sheepskin effects associated with high school completion are in the 5-8 % range in the four years and those for college diplomas or trade certificates (without high school) fall within a similar range of 5-7%. More variation in the sheepskin effects is evident for higher degrees. The premium associated with completing a college diploma or trade certificate (over and above that associated with high school graduation) is small and insignificant in 1981 and 1996, but positive, statistically significant, and equal to approximately 3% in 1986 and 6% in 1991. The estimated gains from university bachelor's degrees are large in all four years, and range from a low of 13% in 1996 to 19% in 1991. The greatest variation is that for the returns to postgraduate degrees, which decline from 11% in 1981 to below 5% in 1991 before recovering to around 7% in 1996.

The returns to years of schooling are significantly lower for immigrants than for native Canadians and the gap widens over the period. In contrast, the marginal value of immigrant credentials is consistently equal to or higher than that of natives. For both high school diplomas and university bachelor's degrees, immigrants' earnings gains are not significantly greater than those of the native-born. The estimated credential effects associated with the remaining degrees imply substantially higher returns for immigrants. Immigrant sheepskin effects are fairly stable over time, so the immigrant - native born differential is relatively constant. In the case of trade school or community college without high school, the differential falls from 7% in 1981 to 5% in 1991 before rebounding to approximately 9% in 1996. Those associated with trade schools or colleges, following high school completion, are fairly constant over time, in the 4-6% range. The most substantial difference in the two groups' sheepskin effects is that associated with postgraduate degrees. Although the differential is only 5% (and not statistically significant) level in 1981, when both groups received high returns from completing postgraduate programs, it equals 13-14% in the remaining census years.

Although there is some variation over the sample years, it is hard to see a general trend in the valuation of credentials. Panel 1 in Table 6 displays the p-values of an F-test on the significance of differences in the marginal value of a degree between 1981 and 1996. It shows that the impacts of high school and bachelor's degrees have not changed during the period for either native-born Canadians or immigrants. The marginal value of

graduate degrees has significantly diminished (at 10% confidence level) for Canadians, and significantly increased (at 5% confidence level) for immigrants.

In the debate about declining immigrant earnings, a key question is whether recent immigrants have less (or lower quality) human capital than earlier cohorts. Our raw data did not suggest that this is the case. We now examine this issue in more depth. In order to allow earnings assimilation to differ by cohort as well as by years of education and by degree received, we interact each of the education controls with both Census year and immigrant arrival cohort. Doing so allows us to explore not only whether the returns to credentials have a cohort-specific component, but also whether immigrants with different degrees assimilate differently.

Results from the above regression are summarized in Figure 2 and Table A4. For the sake of space we only report coefficients for cohorts immigrating after 1971. Figure 2(a) represents the returns to years of education for recent cohorts. Figures 2(b) through 2(f) plot the evolution of the marginal return to a particular degree for immigrants, relative to the marginal return that the same degree has for native Canadians.

There is some cohort variation in the returns to years of education. The general pattern seems to be a strong increase in the returns to years of schooling during the first five years in Canada, followed by an almost equally strong decline. Although it follows this general path, the 1980 cohort shows much higher returns to years of education than any other cohort. Later cohorts experience lower initial returns.

Differences in the estimated sheepskin effects at the time of entry do not follow a downward trend, as would be expected if the education of successive cohorts had lower value for Canadian employers. The observed differences seem more due to economic conditions at the time of entry. For most degrees, particularly bachelor's degrees, the 1980 cohort receives smaller earnings gains than the previous cohort. However, this does not signal the beginning of a trend. For most degrees, sheepskin effects of the 1985 cohort surpass those of previous cohorts. For subsequent cohorts, earnings gains remain at the same, or slightly higher, level than those of their predecessors. It is worth noting that even the low earnings gains experienced initially by the 1980 cohort recover over time relative to other cohorts. Furthermore, the behaviour of the 1985 and 1990 cohorts does not indicate an ongoing problem for successive cohorts of immigrants.

To assess cross cohort differences in sheepskin effects, the second panel of Table 6 shows the P-values of a test of the joint significance of differences in returns across cohorts during the first 5, 10 and 15 years of stay in Canada. There is no evidence of significant differences in the returns among different cohorts at similar points after arrival in Canada. Only in the case of bachelor's degrees do recent cohorts of immigrants receive higher marginal returns than do previous cohorts, after 15 years in Canada.[15]

Region of origin effects

We also examine the implications of changes in the composition of the immigrant population by country of origin. Figure 3 and Table A5 show the results of a regression in which we add the interaction of each of the education variables with the six main areas of origin: US/UK, Europe, Asia, South America, Africa, and Other (not shown). Some differences in the returns to human capital across source regions are evident. Immigrants from the US/UK behave most like the native born, with returns to years of schooling somewhat lower than natives and sheepskin effects that are a bit larger but generally not significantly different than those received by the native born. An exception is that for postgraduate degrees, for which the US/UK immigrant earnings gain is significantly larger. The behaviour of immigrants from Africa is also similar to (not statistically significantly different from) that of natives except for the larger earnings gains from postgraduate degrees. In contrast, there are large differences between natives and immigrants from Europe, South America and Asia. Immigrants from these regions benefit less than do natives from years of schooling but significantly more from degrees. Immigrants from all source regions receive larger earnings gains from postgraduate degrees than do natives, the biggest differences being those for immigrants arriving from Asia, South America and Africa. Immigrants from Europe and South America also receive sheepskin effect gains associated with bachelor's degrees that are approximately 8% greater than those received by native Canadians.

The third panel of Table 6 reports tests of the differences in the estimated sheepskin effects across source regions, relative to Canadians with similar degrees. There are no statistically significant differences associated with high school graduation. At the university bachelor's level, immigrants from Europe and South America receive

[15] In addition, an F-test of differences in assimilation rates by degree rejects this hypothesis.

significantly higher earnings gains, while immigrants from all source regions benefit more from postgraduate degrees than their native born counterparts. Because we cannot be certain that the educational program was pursued in the immigrant's home country, we also did tests using immigrants arriving after age 35. The patterns are similar to those reported in Table 6, although the immigrant - native born differences are no longer statistically significant for bachelor's degrees. However, for postgraduate degrees we continue to find large and statistically significant differences between the native born and immigrants from Europe, Asia, South America and Africa.

Conclusions

We utilize the rich detail on educational attainment in Canada's Census to examine differences between immigrants and the native born in the returns to human capital. Like other studies, we find that immigrant workers receive lower returns to years of schooling and experience than their native born counterparts. In contrast, this "discounting" of immigrants' human capital does not apply to diplomas and degrees. Our principal finding is that -- despite much belief to the contrary -- immigrant's credentials do appear to be valued in the Canadian labour market. Relative to immigrants without a degree or diploma, immigrants who have completed an educational program receive substantial earnings gains associated with these educational credentials. These earnings gains are as high as, and in many cases greater than, the earnings gains received by native-born Canadians for equivalent degrees, certificates or diplomas.

In the case of high school diplomas and university bachelor's degrees, we find that the earnings gain is approximately the same for immigrants and the native-born. Both native-born and immigrant workers who graduated from high school earn about 6 percent more than their counterparts with the same years of schooling but who have not completed secondary school. Similarly, both native-born Canadians and immigrants with a bachelor's degree receive earnings that are 15-20% higher than comparable individuals without a university degree. For college diplomas and trade certificates (with or without high school graduation) and university postgraduate degrees, the earnings gain for immigrants exceeds that for the native-born. The largest differences in sheepskin effects between immigrants and natives are those associated with postgraduate degrees.

These results suggest that it is important to take into account both years of schooling and degrees and diplomas in analysing immigrant earnings. Our previous study found that sheepskin effects are a clear feature of the relationship between education and earnings for native Canadians. This paper shows that this non-linearity is even more important in the case of immigrants.

Differences between immigrants and the native born in the returns to human capital are evident for immigrants arriving as adults, but not for youth arrivals. This suggests that the human capital of immigrants who complete their education in Canada is not discounted by the Canadian labour market, in contrast to the situation for immigrants who obtained their education before arrival.

We find little evidence of changes over time in the estimated sheepskin effects. The most substantial change is that for postgraduate degrees, the incremental value of which fell for native-born Canadians but increased for immigrants. Similarly, there are no major changes across immigrant arrival cohorts in the returns to human capital.

Another dimension we investigate is region of origin. Immigrants from the US/UK and the native born receive similar returns to both dimensions of education. However, immigrants from other regions generally experience lower returns to years of schooling and larger earnings gains associated with diplomas and degrees, especially postgraduate degrees. The changing composition of immigration is therefore resulting in imported human capital that is less valued on one dimension (years of schooling) and more valued on the other (credentials).

The fact that immigrant sheepskin effects are equal to or greater than those of the native-born does not imply that average earnings of immigrants with a given level of educational attainment are on a par with those of similarly educated Canadians. What our results do imply is that the gap in earnings between immigrants and the native-born is narrowed (or at least not widened) by completion of educational programs.

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Table 1. Characteristics of Native Born and Immigrants by Census Year

	1981			1986			1991			1996		
	IMMIGRANTS		NB	IMMIGRANTS		NB	IMMIGRANTS		NB	IMMIGRANTS		NB
	Adult*	Youth*		Adult*	Youth*		Adult*	Youth*		Adult*	Youth*	
Weekly wage	791	765	751	756	751	735	747	742	731	712	739	741
Hours worked	40	41	40	40	41	41	39	40	41	41	43	42
Weeks worked	52	52	52	52	52	52	52	52	52	52	52	52
Age	45	36	38	46	37	38	46	38	38	46	40	40
Experience	26	18	20	27	18	19	26	18	19	26	20	20
Years of Education	13	13	12	13	13	13	14	13	13	14	14	14
% less than HS	32	35	36	33	31	33	26	26	26	22	22	22
% High School	10	19	22	12	20	22	15	22	24	15	22	24
% Non-University PS	35	29	26	31	28	27	33	31	32	30	33	33
% University BA	13	14	13	15	16	14	17	17	14	20	19	17
% University Grad	8	4	3	9	5	4	10	4	4	12	5	5
Years s. Migration	16	22	-	18	25	-	17	26	-	16	29	-
% USA	5	7	-	4	6	-	4	5	-	4	5	-
% UK	24	23	-	21	21	-	16	20	-	13	19	-
% Europe	44	57	-	41	54	-	34	50	-	27	45	-
% Asia	15	8	-	20	10	-	28	14	-	36	18	-
% South America	8	4	-	10	6	-	12	8	-	13	9	-
% Other regions	5	2	-	5	3	-	7	3	-	7	4	-
Observations	9652	4876	13312	9040	5427	13381	14229	8229	22059	12518	8055	19546

(*) Adult indicates immigrants arriving in Canada after age 19. Youth indicates immigrants arriving in Canada before 20 years of age.
Authors' tabulation using pooled data from the 1981, 1986, 1991 and 1996 Canadian Census.

Table 2. Characteristics of Native Born and Immigrants by Census Year and Country of Origin

	1981					1986					1991					1996				
	NB (10)	NB (20)	USA/ UK	EUR	ASIA	NB (10)	NB (20)	USA/ UK	EUR	ASIA	NB (10)	NB (20)	USA/ UK	EUR	ASIA	NB (10)	NB (20)	USA/ UK	EUR	ASIA
Weekly wage	629	817	863	678	632	593	778	855	619	549	601	758	859	638	546	582	758	798	609	507
Hours worked	41	41	41	41	40	41	41	42	41	40	40	41	42	40	38	42	43	43	42	40
Weeks worked	52	52	52	52	51	52	52	52	52	52	52	52	52	52	52	52	52	52	52	52
Age	25	34	36	35	35	26	35	38	36	35	27	35	38	37	36	27	36	38	37	37
Experience	6	15	15	17	15	6	15	17	17	16	6	15	16	17	16	6	16	16	17	17
YSM	-	-	6	6	6	-	-	6	5	6	-	-	5	5	5	-	-	5	5	5
Years of Educ	14	13	15	11	14	14	14	15	13	13	14	14	15	14	14	15	14	15	14	14
% less than HS	25	27	16	43	25	21	25	12	31	36	14	21	8	22	28	13	17	7	17	27
% High School	28	23	12	11	17	26	23	15	10	20	27	25	15	16	21	26	23	17	17	19
% Non-Univ PS	26	30	42	32	22	31	31	44	33	16	35	34	39	37	18	32	38	36	38	18
% Univ BA	17	15	16	8	27	18	17	17	13	19	20	16	22	13	24	25	17	25	14	25
% Univ Grad	4	5	14	6	9	4	5	12	13	10	4	4	16	13	9	4	5	16	14	11
# Obs.	4217	3613	843	789	1042	3879	4143	479	485	956	5824	7413	531	932	2048	4221	6404	416	1082	2493

NB (10) indicates Canadian born individuals with 10 years of labour market experience. NB (20) indicates Canadian born individuals with 20 years of labour market experience
Authors' tabulation using pooled data from the 1981, 1986, 1991 and 1996 Canadian Census.

Table 3. Cross-Tabulation of Highest Degree Received by Completed Years of Education

Years of School	No Degree		High School Graduation		Post Secondary (w/o High School)		Post Secondary (with High School)		University Bachelor's		University Graduate		Year Total	(%Share)		
	NB	IMM	NB	IMM	NB	IMM	NB	IMM	NB	IMM	NB	IMM	NB		IMM	
0 to 6	829	3495	0	0	60	106	4	2	0	0	0	0	893	(0.8)	3603	(3.3)
6 to 9	11741	12752	453	176	1374	1585	90	68	2	4	0	0	13660	(12.6)	14585	(13.3)
10	7787	5198	806	717	1297	1217	137	170	1	2	0	0	9928	(9.1)	7304	(6.7)
11	6289	3239	2054	1091	1687	1419	377	290	11	9	0	0	10418	(9.6)	6048	(5.5)
12	6273	5351	10952	6615	1968	1854	1675	1418	24	19	0	1	20892	(19.2)	15258	(13.9)
13	1631	2129	6113	4994	2146	1966	3486	2575	143	121	3	6	13522	(12.5)	11791	(10.8)
14	419	543	2955	2496	1758	1919	3804	3283	399	517	3	14	9338	(8.6)	8772	(8.0)
15	193	283	1665	1630	1328	1667	3289	3408	900	1131	27	47	7402	(6.8)	8166	(7.5)
16	84	172	814	877	1109	1710	2901	3782	3068	3398	90	325	8066	(7.4)	10264	(9.4)
17	33	69	256	387	253	783	1121	2248	4187	4991	347	767	6197	(5.7)	9245	(8.4)
18	6	30	64	105	23	86	328	652	2683	3731	1113	2403	4217	(3.9)	6549	(6.0)
19	2	9	20	33	11	35	102	303	1307	1925	1337	2981	2779	(2.6)	5286	(4.8)
20	0	2	7	12	3	10	31	124	462	858	279	530	782	(0.7)	1536	(1.4)
21	0	4	1	9	4	5	11	154	183	417	158	300	357	(0.3)	789	(0.7)
22	0	0	0	1	0	2	1	16	42	117	54	152	97	(0.1)	288	(0.3)
23	0	0	0	0	0	0	0	3	7	34	14	69	21	(0.0)	106	(0.1)
Degree Total	35287	33276	26160	19143	12921	14364	17357	18396	13419	16816	3425	7595	108569		109590	
Degree Share (%)	33	30	24	18	12	13	16	17	13	15	3	7	100		100	

Source: Authors' calculations from the 1981, 1986, 1991 and 1996 Census of Population.

Table 4. Returns to immigrant Credentials by Age at Arrival

	Arrived after 20		Arrived before 20		Arrived after 35
Experience	0.037	0.037	0.037	0.037	0.037
	(0.0006)	(0.0006)	(0.0006)	(0.0006)	(0.0006)
Exp2 (/100)	-0.057	-0.060	-0.057	-0.060	-0.060
	(0.0012)	(0.0012)	(0.0012)	(0.0012)	(0.0092)
YSM	0.017	0.015	0.009	0.008	0.018
	(0.0013)	(0.0013)	(0.0019)	(0.0018)	(0.0040)
YSM2 (/100)	-0.018	-0.015	-0.014	-0.013	-0.025
	(0.0032)	(0.0031)	(0.0032)	(0.0032)	(0.0140)
Ed. Years	0.053	0.033	0.053	0.033	0.033
	(0.0006)	(0.0009)	(0.0006)	(0.0009)	(0.0009)
HS Grad	--	0.058	--	0.058	0.058
		(0.0049)		(0.0049)	(0.0049)
T/C without HS	--	0.059	--	0.059	0.059
		(0.0056)		(0.0056)	(0.0056)
T/C with HS	--	0.033	--	0.033	0.032
		(0.0046)		(0.0046)	(0.0046)
University-BA	--	0.154	--	0.154	0.154
		(0.0062)		(0.0062)	(0.0062)
University-Grad	--	0.065	--	0.065	0.065
		(0.0090)		(0.0090)	(0.0090)
Exp * IMM	-0.026	-0.023	-0.004	-0.003	-0.034
	(0.0011)	(0.0011)	(0.0012)	(0.0012)	(0.0040)
Exp2 * IMM	0.036	0.031	0.007	0.006	0.040
	(0.0020)	(0.0020)	(0.0025)	(0.0024)	(0.0059)
Years of Ed*IMM	-0.015	-0.019	-0.005	-0.006	-0.027
	(0.0009)	(0.0013)	(0.0012)	(0.0017)	(0.0026)
HS*IMM	--	0.014	--	0.012	0.011
		(0.0089)		(0.0097)	(0.0193)
T/C w/o HS* imm	--	0.059	--	0.017	0.071
		(0.0090)		(0.0106)	(0.0199)
T/C with HS*imm	--	0.040	--	0.013	0.052
		(0.0080)		(0.0088)	(0.0180)
Univ-BA * imm	--	0.023	--	0.023	-0.008
		(0.0102)		(0.0116)	(0.0225)
Univ-Grad * imm	--	0.115	--	0.005	0.158
		(0.0130)		(0.0161)	(0.0259)
Obs	113,737	113,737	95,178	95,178	76,417
R-squared	0.267	0.280	0.274	0.285	0.283

NOTE: (1) Regressions also include controls for marital status, language, province, cma, year and cohort dummies.

TABLE 5. TOTAL RETURNS TO EDUCATION

	CANADIAN BORN	IMMIGRANTS
High School (12)	0.451	0.239
Trade w/o HS (13)	0.485	0.299
Trade w HS (14)	0.549	0.339
Bachelor (17)	0.769	0.485
Graduate (19)	0.899	0.693

Note: Estimates from Table 4, column 2.

TABLE 6. DIFFERENCES IN THE RETURNS TO CREDENTIALS

	1. Tests of differences between 1981 and 1996*		
	HS	**Bachelor**	**Graduate**
Canadians (marginal value)	0.205	0.266	0.108
Immigr. (marginal value)	0.889	0.884	0.044
	2. Tests of differences across cohorts **		
	HS	**Bachelor**	**Graduate**
0-5 YSM	0.468	0.087	0.336
6-10 YSM	0.927	0.0540	0.875
11-15 YSM	0.038	0.055	0.416
	3. Tests of differences across countries ***		
	HS	**Bachelor**	**Graduate**
US / UK	0.462	0.356	0.017
Europe	0.247	0.000	0.000
Asia	0.108	0.304	0.000
South America	0.158	0.051	0.000
Africa	0.473	0.146	0.003

(*) Panel 1 shows p-values of an F-test on the significance of differences in marginal value of the degree between 1981 and 1996.
(**) Panel 2 shows p-values of an F-test on the joint significance of differences across cohorts
(***) Panel 3 shows p-values of an F test on the significance of the total returns to a given credential for a given group relative to the total returns of that credential for Canadian workers.

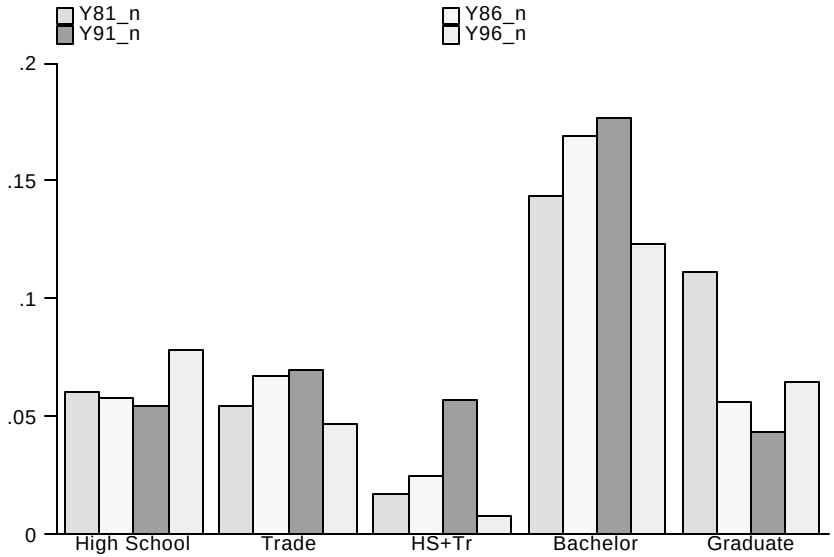

Fig.1(a) Total Returns to Canadian Credentials by Year

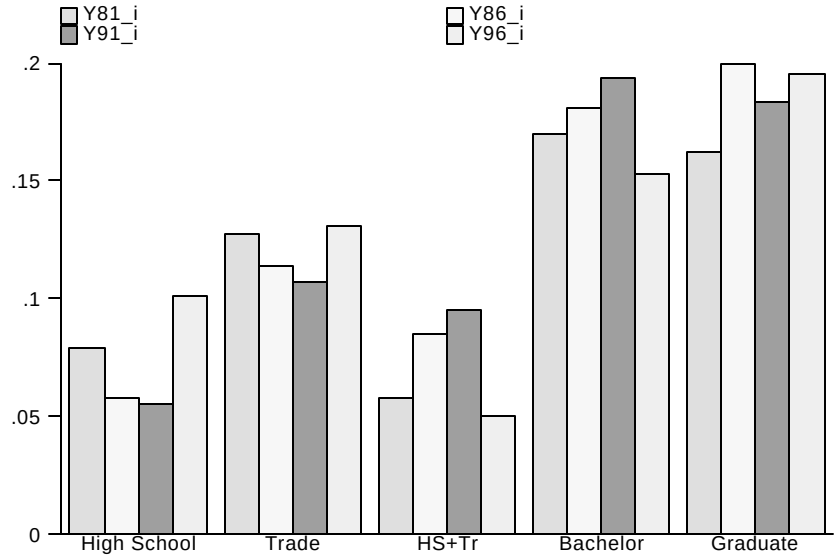

Fig.1(b)Total Returns to Immigrant Credentials by Year

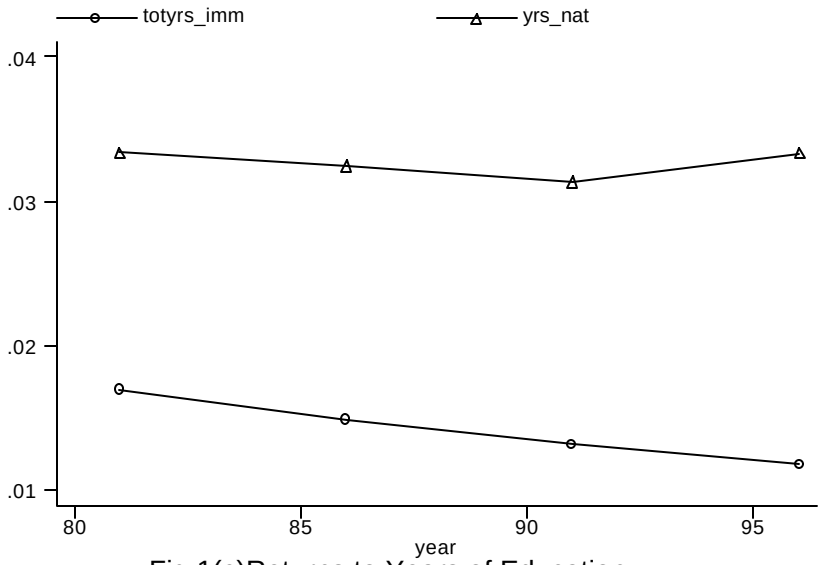

Fig.1(c)Returns to Years of Education

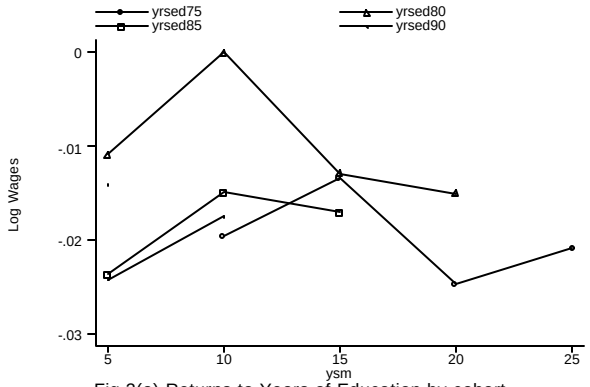

Fig.2(a) Returns to Years of Education by cohort

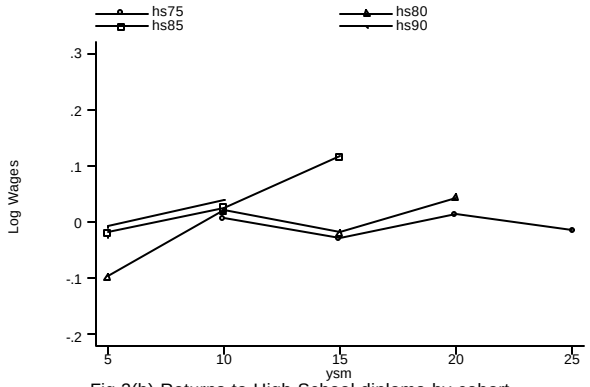

Fig.2(b) Returns to High School diploma by cohort

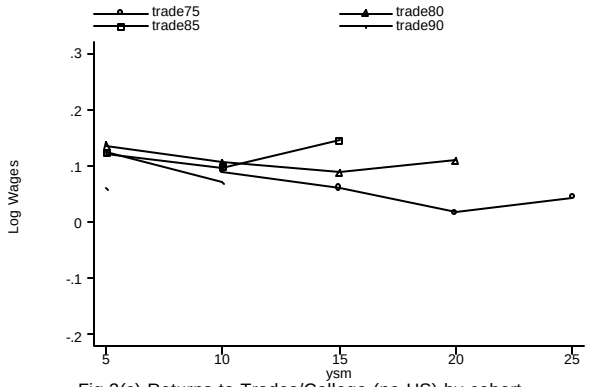

Fig.2(c) Returns to Trades/College (no HS) by cohort

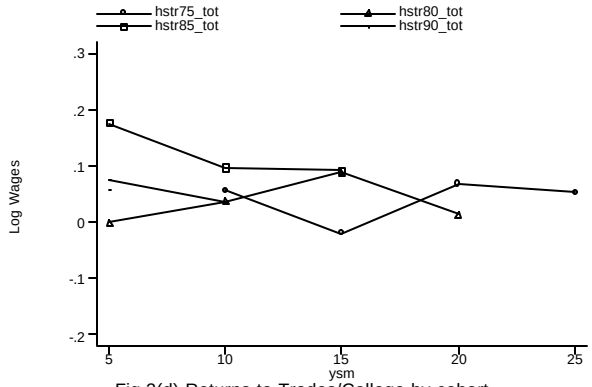

Fig.2(d) Returns to Trades/College by cohort

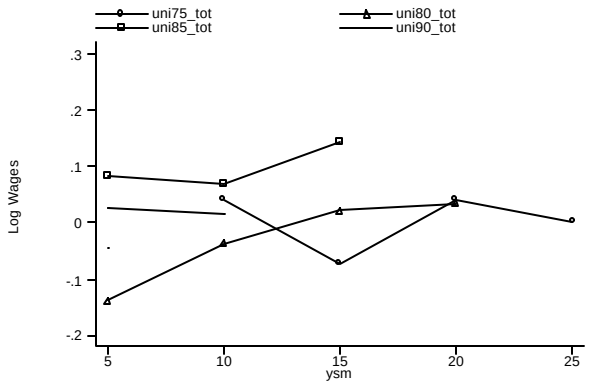

Fig.2(e)Returns to Bachelor degree by cohort

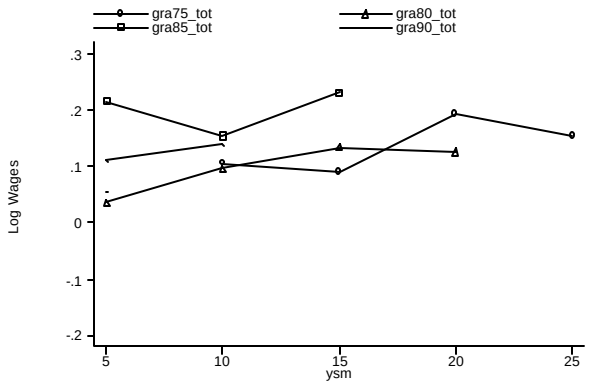

Fig.2(f)Returns to Postgraduated degree by cohort

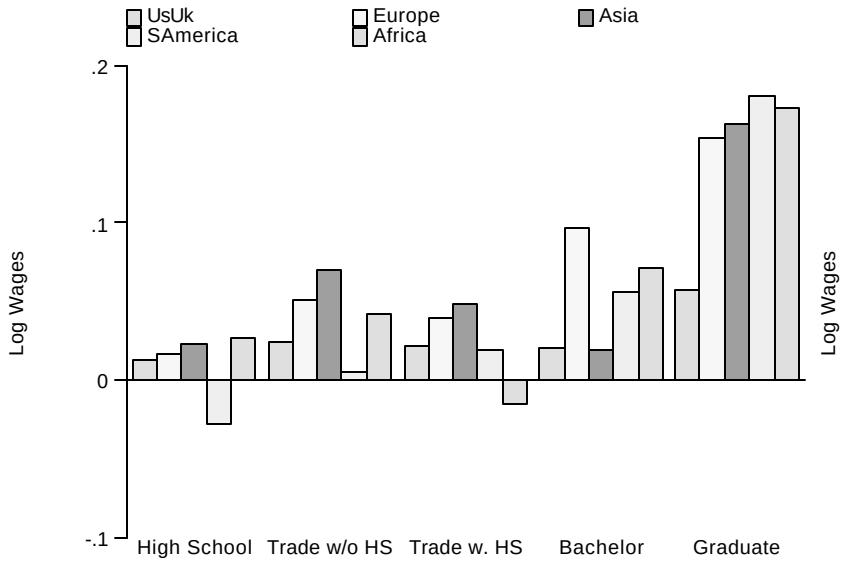

Fig. 3(a) Returns to Immigrant Credentials by Source Region

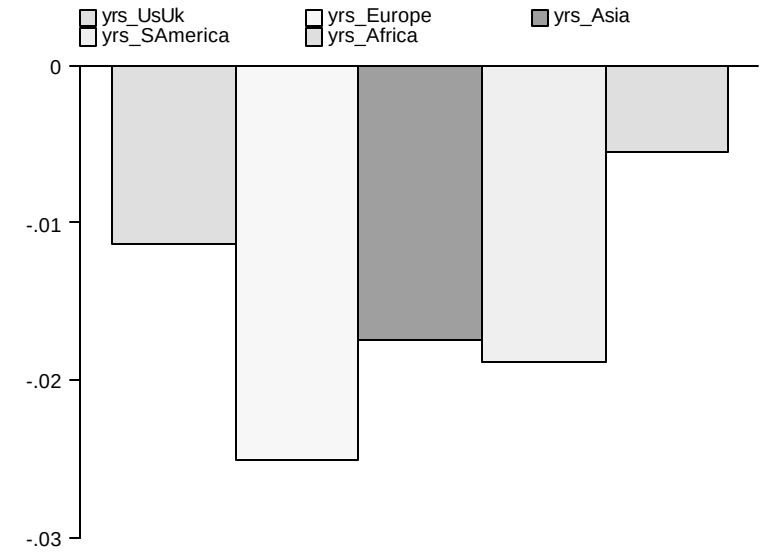

Fig 3(b) Returns to Years of Education by Source Region

Table A1. Returns to Education for Native Born Canadians 1981-96

	1981		1986		1992		1996	
	Traditional	**Credentials**	**Traditional**	**Credentials**	**Traditional**	**Credentials**	**Traditional**	**Credentials**
Experience	0.034	0.034	0.038	0.039	0.035	0.036	0.040	0.040
	(0.0011)	(0.0011)	(0.0012)	(0.0012)	(0.0010)	(0.0010)	(0.0011)	(0.0011)
Exp2 (/100)	-0.056	-0.057	-0.057	-0.060	-0.054	-0.057	-0.061	-0.065
	(0.0023)	(0.0023)	(0.0026)	(0.0025)	(0.0021)	(0.0021)	(0.0025)	(0.0025)
Yrs Edu	0.049	0.030	0.055	0.035	0.053	0.031	0.056	0.034
	(0.0013)	(0.0018)	(0.0013)	(0.0020)	(0.0010)	(0.0016)	(0.0012)	(0.0020)
High School	--	0.059	--	0.060	--	0.053	--	0.080
		(0.0099)		(0.0109)		(0.0085)		(0.0112)
Trade	--	0.054	--	0.062	--	0.073	--	0.049
		(0.0109)		(0.0127)		(0.0102)		(0.0112)
HS + Trade	--	0.017	--	0.025	--	0.057	--	0.008
		(0.0106)		(0.0107)		(0.0073)		(0.0097)
Bachelor	--	0.156	--	0.156	--	0.175	--	0.126
		(0.0141)		(0.0144)		(0.0107)		(0.0122)
Graduate	--	0.121	--	0.048	--	0.045	--	0.062
		(0.0231)		(0.0201)		(0.0147)		(0.0168)
Observations	13,312	13,312	13,381	13,381	22,059	22,059	19,546	19,546
Adjusted R2	0.285	0.298	0.289	0.298	0.278	0.289	0.263	0.272

Note: Regressions include controls for language, marital status, province, cma

Table A2 Returns to Education for Immigrants 1981-96

	1981		1986		1992		1996	
	Traditional	**Credentials**	**Traditional**	**Credentials**	**Traditional**	**Credentials**	**Traditional**	**Credentials**
Experience	0.024	0.025	0.026	0.027	0.023	0.024	0.022	0.024
	(0.0012)	(0.0012)	(0.0013)	(0.00130	(0.0011)	(0.0011)	(0.0013)	(0.0013)
Exp2 (/100)	-0.041	-0.044	-0.043	-0.047	-0.039	-0.043	-0.035	-0.041
	(0.0022)	(0.0022)	(0.0023)	(0.0024)	(0.0021)	(0.0020)	(0.0025)	(0.0024)
Yrs Edu	0.039	0.021	0.042	0.020	0.040	0.013	0.045	0.017
	(0.0010)	(0.0014)	(0.0011)	(0.0016)	(0.0009)	(0.0014)	(0.0011)	(0.0016)
High School	--	0.069	--	0.072	--	0.066	--	0.081
		(0.0119)		(0.0122)		(0.0096)		(0.0125)
Trade	--	0.096	--	0.102	--	0.109	--	0.114
		(0.0105)		(0.0121)		(0.0104)		(0.0116)
HS + Trade	--	0.049	--	0.060	--	0.092	--	0.045
		(0.0113)		(0.0111)		(0.0080)		(0.0106)
Bachelor	--	0.147	--	0.185	--	0.210	--	0.177
		(0.0137)		(0.0139)		(0.0103)		(0.0126)
Graduate	--	0.151	--	0.138	--	0.160	--	0.159
		(0.0175)		(0.0174)		(0.0130)		(0.0144)
IMM5660	-0.051	-0.053	-0.028	-0.031	-0.002	0.000	-0.020	-0.020
	(0.0100)	(0.0099)	(0.0115)	(0.0114)	(0.0114)	(0.0113)	(0.0164)	(0.0163)
IMM6165	-0.055	-0.066	-0.072	-0.080	-0.036	-0.041	-0.025	-0.030
	(0.0123)	(0.0121)	(0.0138)	(0.0135)	(0.0129)	(0.0127)	(0.0169)	(0.0168)
IMM6670	-0.078	-0.091	-0.098	-0.108	-0.057	-0.064	-0.066	-0.076
	(0.0106)	(0.0105)	(0.0116)	(0.0114)	(0.0108)	(0.0107)	(0.0149)	(0.0148)
IMM7175	-0.172	-0.182	-0.168	-0.180	-0.139	-0.144	-0.117	-0.126
	(0.0118)	(0.0116)	(0.0128)	(0.0127)	(0.0114)	(0.0112)	(0.0151)	(0.0150)
IMM7680	-0.228	-0.234	-0.231	-0.235	-0.186	-0.188	-0.186	-0.191
	(0.0161)	(0.0160)	(0.0147)	(0.0145)	(0.01270	(0.0125)	(0.0163)	(0.0161)
IMM8185	--	--	-0.359	-0.373	-0.235	-0.244	-0.219	-0.230
			(0.0197)	(0.0194)	(0.0139)	(0.0137)	(0.0175)	(0.0174)
IMM8690	--	--	--	--	-0.371	-0.383	-0.340	-0.355
					(0.0141)	(0.0139)	(0.0166)	(0.0165)
IMM9195	--	--	--	--	--	--	-0.457	-0.479
							(0.0178)	(0.0177)
Observations	14,528	14,528	14,467	14,467	22,751	22,751	20,573	20,573
Adjusted R2	0.236	0.258	0.241	0.266	0.243	0.273	0.242	0.266

Note: Regressions include controls for language, marital status, province, cma

Table A3. Returns to Credentials, Year Effects

Edu.Yrs_81	**0.033**	**Edu.Yrs_81*Imm**	**- 0.017**	**Bachelor_81**	**0.144**
	(0.0016)		(0.0021)		(0.0137)
Edu.Yrs_86	**0.032**	**Edu.Yrs_86*Imm**	**- 0.018**	**Bachelor_86**	**0.169**
	(0.0016)		(0.0016)		(0.0137)
Edu.Yrs_91	**0.031**	**Edu.Yrs_91*Imm**	**- 0.018**	**Bachelor_91**	**0.177**
	(0.0014)		(0.0016)		(0.0101)
Edu.Yrs_96	**0.033**	**Edu.Yrs_96*Imm**	**- 0.022**	**Bachelor_96**	**0.123**
	(0.0017)		(0.0021)		(0.0118)
HS Grad_81	**0.060**	**HS Grad_81*Imm**	0.019	**Bachelor_81*Imm**	0.026
	(0.0098)		(0.0184)		(0.0217)
HS Grad_86	**0.058**	**HS Grad_86*Imm**	0.001	**Bachelor_86*Imm**	0.012
	(0.0108)		(0.0193)		(0.0217)
HS Grad_91	**0.055**	**HS Grad_91*Imm**	0.001	**Bachelor_91*Imm**	0.017
	(0.0084)		(0.0151)		(0.0160)
HS Grad_96	**0.079**	**HS Grad _96*Imm**	0.023	**Bachelor_96*Imm**	0.030
	(0.0111)		(0.0200)		(0.0199)
Trade_81	**0.055**	**Trade _81*Imm**	**0.073**	**Graduate_81**	**0.111**
	(0.0109)		(0.0168)		(0.0232)
Trade_86	**0.067**	**Trade_86*Imm**	**0.047**	**Graduate_86**	0.056
	(0.0125)		(0.0196)		(0.0200)
Trade_91	**0.070**	**Trade_91*Imm**	**0.037**	**Graduate_91**	0.044
	(0.0101)		(0.0166)		(0.0146)
Trade_96	**0.046**	**Trade_96*Imm**	**0.085**	**Graduate_96**	0.065
	(0.0111)		(0.0189)		(0.0166)
T/C w HS_81	0.017	**T/C w HS_81*Imm**	**0.040**	**Grad_81 *Imm**	0.051
	(0.0106)		(0.0180)		(0.0313)
T/C w HS _86	**0.025**	**T/C w HS _86*Imm**	**0.060**	**Grad_86 *Imm**	**0.143**
	(0.0106)		(0.0180)		(0.0288)
T/C w HS _91	**0.057**	**T/C w HS _91*Imm**	**0.038**	**Grad_91 *Imm**	**0.140**
	(0.0072)		(0.0271)		(0.0213)
T/C w HS _96	0.008	**T/C w HS _96*Imm**	**0.043**	**Grad_96 *Imm**	**0.130**
	(0.0096)		(0.0172)		(0.0242)
Observations			113,737		
R-squared			0.280		

Note: Regressions include controls for language, marital status, province, cma, years and years since migration, experience and cohort dummies

Table A4. Returns to Credentials, Cohort Effects

EdY*c75*y81	**-0.020**	**Hs*c75*y81**	0.007	**T*c75*y81**	**0.090**	**HT*c75*y81**	0.049	**B*c75*y81**	0.034	**G*c75*y81**	0.064
	(0.0037)		(0.0329)		(0.0343)		(0.0291)		(0.0328)		(0.0444)
EdY*c75*y86	**-0.013**	**HS*c75*y86**	-0.028	**T*c75*y86**	0.060	**HT*c75*y86**	0.008	**B*c75*y86**	-0.045	**G*c75*y86**	**0.164**
	(0.0043)		(0.0378)		(0.0396)		(0.0316)		(0.0401)		(0.0434)
EdY*c75*y91	**-0.025**	**HS*c75*y91**	0.013	**T*c75*y91**	0.018	**HT*c75*y91**	**0.055**	**B*c75*y91**	0.027	**G*c75*y91**	**0.152**
	(0.0034)		(0.0296)		(0.0314)		(0.0237)		(0.0294)		(0.0336)
EdY*c75*y96	**-0.021**	**HS*c75*y96**	-0.014	**T*c75*y96**	0.043	**HT*c75*y96**	0.067	**B*c75*y96**	0.015	**G*c75*y96**	**0.153**
	(0.0040)		(0.0441)		(0.0405)		(0.0359)		(0.0402)		(0.0442)
EdY*c80*y81	**-0.011**	**HS*c80*y81**	**-0.097**	**T*c80*y81**	**0.135**	**HT*c80*y81**	**0.095**	**B*c80*y81**	-0.042	**G*c80*y81**	**0.175**
	(0.0053)		(0.0483)		(0.0461)		(0.0456)		(0.0557)		(0.0710)
EdY*c80*y86	-0.000	**HS*c80*y86**	0.021	**T*c80*y86**	**0.106**	**HT*c80*y86**	0.015	**B*c80*y86**	-0.059	**G*c80*y86**	**0.133**
	(0.0049)		(0.0398)		(0.0452)		(0.0355)		(0.0431)		(0.0573)
EdY*c80*y91	**-0.013**	**HS*c80*y91**	- 0.019	**T*c80*y91**	**0.088**	**HT*c80*y91**	**0.108**	**B*c80*y91**	0.040	**G*c80*y91**	**0.111**
	(0.0041)		(0.0345)		(0.0375)		(0.0278)		(0.0333)		(0.0456)
EdY*c80*y96	**-0.015**	**HS*c80*y96**	0.044	**T*c80*y96**	**0.109**	**HT*c80*y96**	- 0.029	**B*c80*y96**	-0.010	**G*c80*y96**	0.092
	(0.0054)		(0.0426)		(0.0442)		(0.0367)		(0.0432)		(0.0539)
EdY*c85*y86	**-0.024**	**HS*c85*y86**	-0.018	**T*c85*y86**	0.123	**HT*c85*y86**	**0.193**	**B*c85*y86**	0.103	**G*c85*y86**	**0.131**
	(0.0067)		(0.0548)		(0.0718)		(0.0524)		(0.0612)		(0.0677)
EdY*c85*y91	**-0.015**	**HS*c85*y91**	0.025	**T*c85*y91**	**0.097**	**Ht*c85*y91**	**0.071**	**B*c85*y91**	0.044	**G*c85*y91**	**0.085**
	(0.0046)		(0.0351)		(0.0433)		(0.0291)		(0.0373)		(0.0433)
EdY*c85*y96	**-0.017**	**HS*c85*y96**	**0.116**	**T*c85*y96**	**0.145**	**HT*c85*y96**	-0.023	**B*c85*y96**	0.028	**G*c85*y96**	0.087
	(0.0055)		(0.0504)		(0.0514)		(0.0420)		(0.0480)		(0.0510)
EdY*c90*y91	**-0.024**	**HS*c90*y91**	-0.007	**T*c90*y91**	**0.125**	**HT*c90*Y91**	**0.082**	**B*c90*y91**	0.033	**G*c90*y91**	0.085
	(0.0042)		(0.0311)		(0.0383)		(0.0271)		(0.0337)		(0.0442)
EdY*c90*y96	**-0.018**	**HS*c90*y96**	0.039	**T*c90*y96**	0.069	**HT*c90*yy6**	-0.003	**B*c90*y96**	-0.022	**G*c90*y96**	**0.123**
	(0.0040)		(0.0353)		(0.0381)		(0.0301)		(0.0360)		(0.0416)
EdY*c95*y96	**-0.014**	**HS*c95*y96**	-0.026	**T*c95*y96**	0.060	**HT*c95*y96**	**0.085**	**B*c95*y96**	-0.019	**G*c95*y96**	**0.100**
	(0.0048)		(0.0411)		(0.0391)		(0.0370)		(0.0413)		(0.0447)
Observations	113,737										
R-squared	0.280										

Note: Regressions include controls for language, marital status, province, cma, years and years since migration, experience and cohort dummies. Bold characters indicate statistical significance at 5% confidence level

Table A5. Marginal Returns to Credentials, Source Region Effects

Yrsed* US/UK	**-0.011**	**Yrsed* Europe**	**-0.025**	**Yrsed* Asia**	**-0.017**	**Yrsed* S America**	**-0.019**	**Yrsed* Africa**	-0.005
	(0.0025)		(0.0015)		(0.0020)		(0.0026)		(0.0055)
HS* US/UK	0.013	**HS* Europe**	0.017	**HS* Asia**	0.024	**HS* S America**	-0.027	**HS* Africa**	0.027
	(0.0176)		(0.0144)		(0.0146)		(0.0193)		(0.0380)
Trade* US/UK	0.025	**Trade* Europe**	**0.051**	**Trade* Asia**	**0.070**	**Trade * S America**	0.005	**Trade* Africa**	0.042
	(0.0170)		(0.0119)		(0.0179)		(0.0201)		(0.0428)
HS w Tr* US/UK	0.009	**HS w Tr* Europe**	0.023	**HS w Tr* Asia**	0.025	**HS w Tr* S America**	**0.047**	**HS w Tr* Africa**	-0.041
	(0.0152)		(0.0138)		(0.0129)		(0.0179)		(0.0276)
BA* US/UK	0.008	**BA* Europe**	**0.081**	**BA* Asia**	-0.004	**BA* S America**	**0.084**	**BA* Africa**	0.045
	(0.0197)		(0.0193)		(0.0145)		(0.0235)		(0.0345)
Grad* US/UK	**0.037**	**Grad* Europe**	**0.056**	**Grad* Asia**	**0.142**	**Grad* S America**	**0.124**	**Grad* Africa**	**0.100**
	(0.0195)		(0.0235)		(0.0185)		(0.0333)		(0.0352)
Observations	113,737								
R-squared	0.285								

Note: Regressions include controls for language, marital status, province, cma, years and years since migration, experience, cohort and country dummies, years of education and degree.
Bold characters indicate statistical significance at 5% confidence level