

**The Social Rate of Return to Investing in Character: An Economic Evaluation of Alberta's
Immigrant Access Fund Small Loan Program**

J.C. Herbert Emery
Ana Ferrer

Department of Economics
University of Calgary
Calgary, Alberta
T2N 1N4
hemery@ucalgary.ca
aferrer@ucalgary.ca

March 2010

The Social Rate of Return to Investing in Character:

An Economic Evaluation of Alberta's Immigrant Access Fund Micro Loan Program

Abstract

Skilled immigrants have been identified as a key source of labour supply for addressing the expected labour market shortages in Canada arising from an aging population and strong economic growth. The integration of immigrants into the workforce often requires that they have the necessary accreditation to work at their chosen occupation. However, credential recognition has proven to be a significant labour market barrier for skilled immigrants. We estimate the social rate of return of investing in immigrant credentials by analyzing the results of the the Immigrant Access Fund (IAF), an institution providing small loans on a not for profit basis to assist Alberta immigrants in acquiring the Canadian accreditation and training they need to work their field of expertise. Under very conservative assumptions, our assessment of the average social return to the IAF loan program demonstrates that this is a very high return social program with annual real rates of return of 33% or more. These returns are even higher for higher earning occupations such as health and engineering.

Introduction

Skilled immigrant workers have been identified as a key source of labour supply for addressing the expected labour market shortages in Canada arising from an aging population and strong economic growth (Emery 2006; IAF March 31, 2009). However, the integration of immigrants into the workforce requires that they have the necessary accreditation to work at their chosen occupation in the Canadian labour market. Credential recognition has proven to be significant labour market barrier for skilled immigrants in Canada as evidenced by the high rates of underemployment of this group.¹ To address the underemployment of skilled immigrants in Alberta, the Immigrant Access Fund (IAF) provides small loans on a not for profit basis to assist immigrants in acquiring the accreditation and training they need to work their field of expertise. These loans assist educated immigrants in moving from low-income “survival” jobs to jobs that better utilize their valuable knowledge and skills. Although anecdotal evidence suggests that the IAF program has produced successes, there is no analytical evidence as to the overall economic value of the program. Our assessment of the social return to the IAF’s loan program offers a tool to evaluate the program success and to compare it with other programs aimed to enhance the integration of immigrants in the labor market. The annual social return of the IAF program is estimated around 33%.

Canada is among the world’s top destinations for immigrants, with 200,000 newcomers accepted every year. The Canadian visa program emphasizes skills and education as entrance requirements in order to facilitate labour market integration of immigrants. Despite this, reports on the socio-economic status of immigrants are discouraging. Immigrants are more likely to work in low wage occupations, experience higher rates of unemployment, and be below Low Income Cut offs (Picot & Hou, 2003; Picot, Hou & Coulombe, 2007). The underemployment of skilled immigrants also represents a loss for the Canadian economy in terms of lower GDP.

Research suggests that for immigrants, difficulty with credential recognition is at the heart of this problem. A substantial part of immigrant skills depreciation concerns the devaluation of foreign experience (McDonald and Worswick 1997; Green and Worswick 2003), and lower

¹ A 2007 IAF report cited that 49 % of skilled immigrants in Alberta reported that they were overqualified, 45 % were working in the fields which are not related to what they studied, and 64% found there was no consideration for their foreign education and/ or for work experience. The IAF study drew these statistics from International Qualifications Assessment Service (IQAS) Assessment Services Study, Alberta Employment, Immigration and Industry, 2007

literacy skills among immigrants (Ferrer, Green and Riddell, 2005). While formal education still has considerable value for immigrants, relative to those who do not have formal education, the overall value that the market puts on immigrant skills is below that of the native born.² The assessment and the recognition of immigrants' foreign credential appear to depend on factors like the importance attached to the education-based skills, the procedure, and the behaviour of employer in front of the unknown (Reitz, 2001b, Reitz, 2003, Oreopoulos, 2009).

To address the foreign credential recognition problem, a range of government and non-government stakeholders have launched initiatives to help immigrants in the assessment and recognition of their foreign credentials. There is a patchwork of funds available from both profit and non-profit organizations to support immigrants seeking to acquire Canadian accreditation, skills upgrading, including language skills, cultural orientation to the Canadian workplace, resume writing, etc.... These programs are delivered by federal or provincial government (the Immigrant Loans Program, and provincial credential recognition programs in BC Manitoba and Saskatchewan), employers, credit unions and banks (HSBC "Passport Account" and "ICICI Bank of Canada "Newcomer Accounts"), educational institutions and micro-credit organizations (Immigrant Access Fund in AB and the Ottawa Community Loan Fund) and community organizations (The Black Creek Micro-Credit Program).³

Microfinance, or small loans programs have been emerging as a potentially useful approach for helping immigrants to settle in the host country (The Globe and Mail Feb. 20, 2010). Interest in microfinance was spurred in the 1990s when attention was drawn towards new financial institutions that aimed to bring financial services to the poor (The Economist 1997; The New York Times 1997; San Francisco Examiner 1999; Goetz and Sen Gupta, 1996). Academic research in the area of microfinance boomed (Besley and Coate, 1995; Brau and Woller, 2004; Karlan, 2007; Morduch et Al., 2009; Woller, Dunford & Woodworth, 1999). Although most of the current research is focussed on developing countries and the needs of the very poor, part of the activity in

² Ferrer and Riddell (2008). The situation was easier for immigrants in 1960 due to the lack of high levels of education among the native-born (Baker and Benjamin, 1994; Li, 2001; Reitz, 2001a; Beach and al., 2003). However, rising education levels among the native born, particularly university graduates, during the 1970s and 1980s reduced the comparative advantage of immigrants, even though they continued to arrive with relatively high levels of education and experience.

³ The Black Creek Micro-Credit Program is a loan support program established in 2007 as a part of the Black Creek Community Capacity Project, partnering with [Access Community Capital Fund](#) and [Alterna Savings](#) to support individuals in the community who need assistance with funding for business and skills development.

microfinance is concerned with credit constrained low-to medium income households. The microfinance challenges in the United-States and Canada differ from those experienced in South America and India. A traditional component of microfinance in developing world, peer monitoring and joint liability to assist repayment, has proven unsuccessful in the developed world. In addition, the socioeconomic structure of developing countries (extensive public social networks; small size of the microenterprise sector and increased competition from large retailer firms) generates a low demand for loans devoted to buy equipment and finance small business, the main purpose for microfinance in third World countries (Morduch and Schreiner, 2001; Coyle, Wehrell and MacDonald, 2006). For this reason, microfinance in North America has mostly focused on training, which emerges as a much more important constraint in leaving poverty than financial constraints are (Morduch and Schreiner, 2001).

Microfinance is a relatively new enterprise in the business of helping credit constrained immigrants who are seeking to acquire Canadian accreditation and education upgrades. Micro-credit programs target immigrants in temporary need, acting as lenders of last resort. Immigrants are expected to have exhausted other sources of financing first, such as EI grants or student loans, prior to applying to the IAF for a loan.⁴ The loans will generally cover tuition costs with only some institutions allowing borrowing to cover living expenses and other costs. In general, the impact of the programs is small, though growing, and repayment rates are very high. To date, however, there has been little effort toward systematic evaluation of these micro-finance programs.⁵

The Immigrant Access Fund

The IAF is an Alberta-based not-for-profit organization that with its partner organizations provides internationally trained/educated professional and trades people with loans of up to \$5,000 (exceptions to \$10,000 are considered) to help with the costs of tuition fees, books and courses materials, exam fees, living and travel expenses, qualification assessment and professional

⁴ In contrast, it is believed that for profit lenders like banks have the primary goal of building long term financial relationships. Unlike the government, these institutions have the long term goal of becoming financially sustainable, although this is not currently a reality (Buckley and Griep, 2003).

⁵ One evaluation was done for an extinct program (the Immigrant Loan Program run in Vancouver). Another report by Karim Harji (May, 2007) evaluated the social impact of the Ottawa Community Loan fund (OCLF). The organisation helps small businesses; give loans for accreditation of foreign-trained professionals and for social enterprises/co-ops. It was found that the production of social value of this organization is significant.

association fees, or other things relating to becoming able to work in their field.⁶ The IAF is different from other programs providing micro loans to immigrants in other provinces in terms of how it funds its loans (other micro loan programs have bank partners to fund approved loans), how it delivers its loans (through loan delivery partners rather than a bank) and applicant eligibility (immigrants from all occupations are welcome to apply; other programs have restrictions). These unique characteristics have led to IAF being the largest and most successful micro loan program for immigrants in Canada.

The IAF program started in Calgary in 2005 and expanded to Edmonton in August of 2007. As of October 2009 a total of 375 loans had been approved—233 (62%) through the Calgary loan delivery partner Momentum, and 142 (38%) through the Edmonton loan delivery partner, the Edmonton Mennonite Centre for Newcomers. The average IAF loan is \$4,619. Since 2007 more than \$1.6 million in loans has been committed and \$1.4 million disbursed. The repayment rate is 98% (only seven loans have been written off), which is extremely high for a micro loan program. The high repayment rate is more remarkable given that sixty-five percent of IAF loan recipients were unemployed when they applied to the IAF. Of the 35% that were employed, 50% were working in ‘survival’ jobs and 50% were working in their field, but not in positions commensurate with their skills and experience. Twenty percent of applicants had monthly expenses that exceeded their income.

The IAF has a unique operating model in that it partners with other agencies to deliver its micro loans. IAF’s Calgary partner is Momentum, and its Edmonton partner the Edmonton Mennonite Centre for Newcomers (EMCN). IAF develops strong relationships with other agencies and organizations working with immigrants on accreditation, training, and employment matters and counts on them to refer their clients to IAF for loans. The IAF board is diligent not to duplicate services provided by others, preferring to support those services by referring IAF clients to them. The IAF also acts as a lender of last resort where its clientele consists of applicants who do not qualify for loans through commercial lenders or government programs. Loan approvals are based on the applicant’s character, not their collateral. Loans are registered with a credit agency, so loan recipients can build their credit rating in Canada. Interest is paid at 1.5% above prime; recipients

⁶ The significant stakeholders/supporters of the loan program are the loan delivery partners Momentum (Calgary) and the Edmonton Mennonite Centre for Newcomers; the Alberta government; The Calgary Foundation; HSBC Bank Canada; RBC Financial Group and the United Way of Calgary and area.

pay interest only while completing their accreditation/training (maximum two years) and have another two years to pay back the principal. IAF loans are not limited to predetermined occupations but while IAF borrowers represent 63 different occupations, engineers, accountants, physicians and nurses account for 50% of loan recipients.

Loans are presently being funded by a \$1 million line of credit which has been secured by personal guarantees of Calgary business and community leaders. To date, almost all of IAF's operating funds to cover application assessment, loan delivery and loan administration have been provided by the provincial and federal governments (since IAF only recently obtained charitable status, funding options were limited). Being so heavily dependent on government for operating funds leaves the IAF vulnerable to funding cutbacks and shifts in government priorities. Since borrowers are only expected to repay the loan principal and prime plus 1.5 for interest, the IAF is not recouping these administration and loan delivery costs through the loan contract. This feature of the contract means that borrowers benefit from subsidized borrowing costs.

Administrative and loan delivery costs are substantial for the IAF. These costs likely lie between 50% and 100% of the loan principal.⁷ Private lenders are unlikely to be enthusiastic about making small loans like these without charging substantial interest costs to cover these high overhead costs. With the IAF program, the borrower repays the loan principal over 4 years at an interest rate of prime plus 1.5. The borrower is not charged to recoup the administration and loan delivery costs that are roughly equal to the amount of principal. In other words, the borrower is subsidized to keep the cost of borrowing reasonable. If this loan were to be made by a commercial lender, then presumably the loan repayment would be set so that the lender covers the opportunity cost of the funds allocated to the principal and administrative costs. For example, a borrower would effectively borrow \$10,000 to receive \$5,000 in funds for their use. Over a four year period at a 5% interest rate, the borrower would have paid a total of \$12,160.⁸ Accounting for the

⁷ From email correspondence with Dianne Fehr, 298 loans approved from the IAF program start to March 31/09 totaling \$1,392,845. Total Administration and loan delivery costs from program start to March 31/09 was \$1,241,806. On the other hand, for the fiscal year 2008/09 the IAF incurred costs of \$492, 270 to approve \$723,145 in loans to 159 people, although some of the costs were for managing existing loans.

⁸ The continuously compounded interest r can be calculated as:

If v is the cash inflow in the future, p is the cash outflow now, r is the annual interest rate and T is the time to cash inflow, we can use the formula $((1+r)^T)*p=v$ to calculate total payments on a loan. So if the borrower must repay \$10,000 at 5% interest, the total payments over four years would be \$12,160. Since the borrower only received \$5,000

repayment of the administration loan delivery costs means that the borrower would have paid an effective annualized rate of interest of around 22%. If the repayment of the loan is not guaranteed then the lender could require an even higher interest to compensate for the risk.

Who are the IAF Applicants?

In this section we first present the characteristics of the IAF borrowers based on data collected by the IAF at the time of the loan application and over the term of the loan. We compare these borrowers to the characteristics of recent immigrants to Calgary and Edmonton according to 2006 Census data. The mean characteristics of loan applicants are presented in the first column of Table 1. Columns 2 and 4 represent the same values for recent immigrants to Edmonton and Calgary. Columns 3 and 5 show changes in the overall fraction of immigrants arriving between 2001 and 2006 relative to the fraction arriving between 1996 and 2001 for selected characteristics.

The typical loan IAF applicant is male and has been in Canada for 1 to 2 years before applying for a loan, although there is a considerable fraction of applicants that have been in Canada for more than 5 years (16%). The distribution of time between arrival and application does not vary much between the two main cities.

The majority of the applicants reside in Calgary (57%) and the rest from Edmonton (40%) with only 3% coming from other Alberta locations. The overall distribution of borrowers by gender is fairly equal across cities. The majority of the loan applicants are from Asia (31%), Africa (31%), South America (14%) and countries of the Middle East (15%). These two last groups are more likely to be in Calgary, while Asians are more likely to apply for the loan in Edmonton. More South American and Asian women apply for these loans than immigrant men from those regions.

Loan applicants were equally likely to be employed (44%) or unemployed (42%) before applying to the IAF for a loan. Unemployment seems to be more prevalent in the city of Calgary and slightly more prevalent among women. Underemployment is 12% among all applicants. However, conditional on working at the time of the loan application, underemployment is much higher, about 27%, and is more concentrated among female immigrants (40%).

in funds and the balance of the loan was administrative costs, the effective annual interest payment is $22\% = \ln(\$12,160/\$5000)/4$.

When their accreditation plan is completed, three-quarters of borrowers intend to work in occupations related to health (39%), engineering (21%), or finance/accounting (16%). Female immigrants are overrepresented in health occupations (56% of all health occupations) and social sciences – education (60% of all social sciences occupations). Most of the immigrants are working toward occupations in regulated professions (81%), this is particularly so among women (88% of all women). The variable occupational change is a derived variable that is equal to one if the applicant’s area of expertise/occupation before coming to Canada is not the same as their intended occupation/accreditation (using two digit occupation categories). Only a small fraction (14%) plan to change their occupation category.

Overall accreditation or education plan completion rates are 45%, and 30% of borrowers reporting “working in their field”. Completion rates are slightly higher for men (48%) than women (41%) and are also higher in Calgary (54%) versus Edmonton (33%). This is likely due to the shorter time the Edmonton program has been operational. Conditional on completing their accreditation or education plan, 67% of the borrowers report “working in their field”, which can be interpreted as a raw measure of success. The rates are similar in Edmonton (71%) and Calgary (68%).

Additional tabulations in the appendix indicate the success of loan applicants. Table A1 summarizes the same characteristics as in Table 1 by loan status and indicates that loan defaults are more common among Calgary applicants, among African immigrants and among those who have been in Canada for some time before applying for the loan. Loan applicants in the health occupations are also more likely to default. Table A2 summarizes employment and program characteristics by place of birth and time between arrival and application. Accreditation program completion rates are higher among immigrants of European descent and those from the Middle East and substantially lower for Asian immigrants. Asian immigrants report higher rates of (unconditional) underemployment

Comparing the demographics of loan applicants and the overall recent immigrants to Calgary and Edmonton, it is obvious that loan applicants are not representative of the immigrant population. Loan applicants are less likely to be women than recent immigrants to Calgary and Edmonton. They are also less likely to be Asian and more likely to come from Africa, Latin America or the Middle East. Further, they are also over-represented in the health occupations and among occupations in natural and applied sciences (engineers). This implies that increasing

immigration levels will not necessarily increase the customer base of the IAF program. Looking at columns 3 and 5 reveals that a higher fraction of immigrants arriving between 2001 and 2006 come from countries more likely to apply for loans (an increase of 4% in immigration from Middle East and Africa, and a 3% increase in migration from South America (Calgary only). However, but the fraction of immigrants in health or engineering occupations has not increased over the period considered. This suggest that expansions of the program are unlikely to come from an increase in the fraction of immigrants that may benefit from it, but rather from increasing reaching efforts on the part of the IAF and its partners.

Methodology for Calculating the Social Rate of Return to the IAF Loan Program

The near 100% repayment rate for the principal and interest on the IAF loans made to date means that direct loan funds are being used in a way that covers their economic (or opportunity) cost. The administrative and loan delivery costs are really the more pertinent feature of the contract that requires evaluation as they are effectively a subsidy to the borrower. The use of public funds, or other donated funds, for this kind of purpose is economically justified if the social return to that expenditure exceeds the opportunity cost of those funds. In other words, would society be better off investing the funds in risk free bonds or expending them on a loan program that increases the earnings and employment outcomes of skilled immigrants?

A standard way for an economist to value the returns to society from immigrants investing in accreditation is to use an income based approach. Assuming that the wages/earnings of a worker reflect the value of their labour services to society, then lack of recognition of credentials implies an underutilization of resources for Canadian society. Lack of recognition of credentials combined with a systemic inability to assess these skills, precludes many qualified immigrants to find employment according to such qualifications, or even within their fields of expertise. The gain to society from recognizing these credentials would be represented by the gain in income that immigrants experience after accreditation.

If we wish to assess the value of Canadian accreditation for an immigrant, we need to assess the value of the stream of net benefits that they will produce from now until they retire compared to the value of the costs of training/credentialing which are incurred in the present. Since the funds devoted to training (plus interest) are repaid by the immigrants, the only costs to consider are the

opportunity costs (what could have been earned without accreditation) and the overhead costs of managing the fund A , which are at present absorbed by the IAF rather than paid by the borrower.

As a dollar received in the future has a value of less than one dollar today due to the opportunity cost of money, the costs and benefits of the investment are converted into *present value* terms. The *present value* of a dollar received in t years, is the amount of money that you would have to invest today at interest rate r to receive the one dollar in t years. The net present value (NPV) of an investment that will generate benefits B_t and costs C_t in each period t , is the simple sum of the Present Value of $B_t - C_t$ from the year in which the project begins to the date at which the project ends, year T . A value for r is assumed for the calculation that represents the risk free, market rate of return to alternative investments (e.g. if you invested in long term government bonds instead of education program). This value is usually between 4% and 5%.

Finally, we also consider the uncertainty involved in the investment. First, the immigrant maybe unable to finish the program, and second, there is no guarantee that the immigrant will find work in his or her area of expertise once accreditation is completed. In either case, the potential benefit of training is reduced to pB_t , where p is the probability of successfully completing the program and finding work in the chosen area of expertise.

$$NPV = PV - PC = \sum_{t=a}^{65} \frac{(p \cdot B_t - C_t)}{(1+r)^{t-a}} - A$$

In the context of the IAF program, the NPV of the accredited immigrant is the sum of the expected present value of benefits minus costs from the year in which the immigrant completes his accreditation. We compare these earnings to those obtained performing an unskilled job for which no Canadian post secondary education is needed. We consider several time horizons for the calculation of the returns. The average age at immigration is around 30 years and we allow two years for learning, applying and completing accreditation, hence a horizon of thirty something years from age 32 to age 65. If the NPV for the project is a positive number at the assumed interest rate, then the project is deemed to be worthwhile. If the NPV is negative, then the benefits are not large enough to generate the benchmark rate of return for the funds invested in the project.

An alternative way to use the NPV formula to evaluate an investment project is to calculate the Internal Rate of Return (IRR) to the investment. Instead of assuming a value for r to calculate the

NPV of the project, the costs and benefits are combined according to the NPV formula, and an algorithm is used to determine the interest rate that would yield an NPV of 0 for the project:

$$IRR = r^* \longrightarrow \text{where } r^* \text{ satisfies } NPV = \sum_{t=1}^T \frac{pB_t - C_t}{(1+r^*)^{t-1}} - A = 0$$

The IRR is interpreted as the real annual rate of return to the investment which is directly comparable to annualized rates of return to other investments like stocks, bonds, real estate or IRR's from other projects.

To do these calculations, a pre-tax age-earnings profile is generated for someone working with recognized credentials (for the B_t values) and for what a person can be expected to earn without accreditation (for the C_t values). These age-earnings profiles are estimated by using data from the public use file of the 2001 census data for the province of Alberta to fit the earnings profile of an average individual according to their age and education level as follows (regression results are available in the appendix):

$$\ln(\text{wage}) = a + b \text{ age} + c \text{ age}^2 + d \text{ HS edu} + e \text{ BA edu} + f \text{ Grad edu} + \varepsilon$$

We use the predicted earnings from this regression to calculate the net present value, from age 32 to 65, of attaining accreditation. Because the empirical evidence suggests that immigrant experience is heavily discounted in Canada, we adjust the age profile to correspond to that of a person seven years younger. This corresponds to the idea that immigrants are likely to be treated as new entrants in the labor market since their foreign experience is not recognized. It also allows our simulated earnings to account for steep returns during the initial years of work after accreditation.

Estimating the alternative earnings profile for non-accredited immigrants requires that an assumption be made about the nature of work they do and the level of education required for that work. We use the age-earnings profile for high school graduates as this alternative. This essentially assumes that these immigrants are treated as having no post-secondary credentials in the Alberta labour market. Compared to the reported levels of unemployment and underemployment of IAF borrowers we are going to understate the earnings gain that would come with accreditation since the high school graduate earnings are higher. We make this assumption for two reasons. First, it is not clear whether the poor labour market situation of IAF borrowers reflects permanent or

temporary situations, or voluntary or involuntary outcomes. Hence, we make the assumption that immigrants could obtain the earnings of high school graduates in the Canadian labour market if they choose to do so. Second, assuming a better non-accreditation labour market experience for immigrants introduces a downward bias in our calculation of the value of the IAF program. Since we do not know with absolute confidence what the true earnings profiles of immigrants are, this conservative assumption will allow us to think of our calculations as “lower bounds” for the program’s values.

The most general way to think about what will influence the social return to the IAF lending program is that the social return will be increasing in the size of the earnings gain of the immigrant with the credential and the probability of working in a job that requires the credential, and decreasing with the size of the upfront administration/loan delivery costs. The estimated age-earnings profile for a high school graduate and for a BA degree holder with a 10% chance of working in a job that requires and rewards the BA credential are shown in Figure 1. The two components of the NPV are represented by the blue and black column, which measure the present value of the difference in the income streams and the overhead costs respectively. The estimated earnings difference between an accredited and non-accredited immigrant peaks between 15 and 25 years after accreditation. This is calculated for a 10% chance of success at completing the program and finding a job in the field, a 5% interest rate and a 5,000 loan. Clearly, even with a 100% of principal administration cost, with a NPV of the accreditation of over \$10,000, investing in BA level accreditation is socially profitable in this scenario.

Occupations have different rates of success, and different earnings profiles. To account for these differences and offer as complete a picture as possible of the value of the IAF program, we present specific IRR for loans invested in acquiring different types of Canadian accreditation in a variety of scenarios. In particular, age-earning profiles are constructed for individuals in different occupations. In addition, this strategy allows us to show the sensitivity of the results to different assumptions about the post accreditation number of work years, the probability of success in completing the program and working in the desired occupation and the amount borrowed.

Table 2 shows the IRR of loans provided to obtain BA accreditation (panel 1) and graduate degree (either MA or PhD) accreditation (panel 2). We offer several possible scenarios. First, as mentioned before we consider that accreditation earnings are achieved with a range of

probabilities. This is intended to reflect that either accreditation may fail, or that, even if successful, the immigrant may not be able to find a suitable job in the field or at the desired level. Second, we consider different ages at which the immigrant will start working after accreditation. This is to take into account that the length of time necessary to acquire the proper credentials varies by field. Our base age is 32. We examine the sensitivity of the results to late accreditation (age 36) that may be more realistic for immigrants in the health professions (Emery et al, 2006). Finally we consider two different loan sizes, the maximum amount provided by the IAF to international medical graduates (IMGs) (\$10,000) and the average loan size (\$5,000). Based on consultation with the IAF managers, we assume an administrative cost on the loans of 100%.⁹

Column 4 in table 2 shows the internal rate of return on a loan to an immigrant to acquire a Bachelor's degree credential. For each scenario, we include the benchmark case of a no-risk outcome, characterized by one hundred percent probability of success in obtaining accreditation and work in the field of expertise. This no-risk outcome results in a calculated annual return of one hundred percent or more to the IAF loan program. This reflects the fact that compared to the cost of the loan, the increase in earnings with the credential over the remaining working life is enormous. In other scenarios with different risks, age of accreditation and overhead costs, the IRR ranges between 0.47 and 0.18. The IRR on graduate accreditation is even higher, ranging between 1 or more and 0.38. For a given probability of success in obtaining work with the credential, smaller loans offer a higher IRR, while lowering the probability of success reduces the IRR, *ceteris paribus*. Columns 5 and 6 show the IRR to specific degrees in Health sciences and Engineering, obtained when fitting equation (2) to individuals in the health industry and the "professional, scientific and technical services industry". Overall these estimates show that the social return on investments in accreditation are much higher than returns on conventional financial instruments. They are also much higher than the total, or social, rates of return to post-secondary education of Canadian students (Rathje and Emery 2002, Emery 2005).

The IRR allows for easy comparison between the returns of the program and alternative assets. However, given the variation in IRR by probability of success, it would be interesting to analyze the program in terms of this variable. We compute the minimum probability of success necessary

⁹ These costs likely lie between 50% and 100% of the loan principal but our choice of 100% produces conservative estimates of rates of return to the IAF loans program.

to yield a 5% return on the loaned funds and the cost of administering and delivering the loan. This is a useful tool to keep track of the performance of the IAF's loans and maybe useful in guiding the expansion of the program.¹⁰ For our analysis of the minimum probability of success we have introduced a change in our calculations. The nature of the discounting of experience profiles used in Table 2, presents some problems when applied to the case of physicians. Because physicians are paid a predetermined amount by service provided, the same discounting of experience profiles used for other occupations may not necessarily apply to an immigrant that successfully acquires a license to practice Medicine. Instead, we will consider the fact that physicians may get lower earnings during the residency period and while they establish their practice (for a total of three years). We maintain the previous experience profile for other health professionals.

The minimum probability of success necessary to yield a 5% return on the loan is reported in Table 3. The first column shows the case for BA credentials and columns 2 and 3 show the case for graduate accreditation, relative to working as a high school graduate or at a job requiring post secondary level education respectively. In general, variation in the overhead costs or the age at which accreditation begins has little influence in the minimum probability of success. Most of the variation comes from the accreditation obtained and our assumption about what is the alternative income stream of the immigrant if he does not acquire accreditation. For instance, for a loan to obtain a Bachelor's degree credential to yield 5% return, assuming that the immigrant will otherwise find a job at the level of a high school graduate, there needs to be a 70% probability of success in completing accreditation *and* finding a job at Bachelor degree level. This probability could be lower if the immigrant is obtaining a graduate credential (60%) or higher, if we are assuming that the alternative to obtaining the graduate credential is to work at Bachelor's degree level (87%).

These threshold probabilities for IAF value also vary by what field or occupation the accreditation is for. For instance, the minimum probability is 63% for engineers seeking a Bachelor's level accreditation. Note that acquiring a graduate accreditation does not reduce this probability, even when we assume that the alternative is to work at high school level. This suggests that that the net gain of a graduate degree in this field is likely very small. There is absolutely no

¹⁰ It requires, however, that in the future, the program collects information on the post accreditation outcomes of loan applicants

gain in income from acquiring a graduate credential in engineering if the immigrant can work at the Bachelor's level (Rathje and Emery 2002). In the case of health professionals other than physicians, the required minimum probability of success is 56%. Physicians have the lowest required minimum probabilities of success, ranging from 34% to 50% depending on our assumptions about alternative income streams if the IMG borrower does not acquire a medical license.

As of the September 2009 Community Update from the IAF, few of the occupations represented by the IAF borrowers are showing success rates that are high enough to suggest that the IAF program is generating a social rate of return of 5% per year. Health related occupations have a success rate of 39% (33% for physicians and 42% for Bachelor level accreditation) and professional occupations have a 43% success rate. However, this seems to be a product of how recent the IAF loans had been made such that few borrowers have had sufficient time to complete their education and accreditation programs and find work in their field. Using information about the date when the loan was approved, we can recalculate the success rates among immigrants that obtained the loan more than 18 months ago, hence ensuring that they had sufficient time to complete accreditation and find jobs in their fields of expertise. The overall rate of completion among this group is 95%, but much lower for the health occupations (60%) and the professional occupations (49%) (See figure 2). The number of loan applicants that report working in their field of expertise (after 18 months or more into the program) is 64%, which is not far from the average minimum probability of success required in table 2. Around 68% of Health professionals and 65% of other professional occupations that completed the program are working in their field of expertise. Nevertheless, further improvement in the social return to the program may come from reducing the overhead/loan delivery costs of the IAF. This could be achieved through scale economies (more loans for fixed overhead costs), or by finding more economical arrangements for delivering loans, or by having borrowers pay back some portion of the administrative and loan delivery costs.

Conclusions

It is estimated that Alberta will have a labour shortage of 100,000 workers by 2015 (Emery, 2006). At the same time, underemployment of skilled immigrants is estimated to cost the Canadian

economy \$13 billion/year¹¹. In this context programs that help Alberta's immigrants to apply their skills and experience to help fill that shortage are under scrutiny by many government agencies and civic groups. This report evaluates the performance of the IAF in terms of the internal rate of return of the loans and the minimum probability of success that will yield a 5% interest on the loans. This provides interested parties with a tool to compare the returns obtained through this venue with alternative programs. It also suggests venues that may enhance the social rate of return of the program.

¹¹ Gordon Nixon, President & CEO of RBC Financial Group, 2006 Immigrant Access Fund Celebration Dinner.

References

- Alberta Ministry of Employment, Immigration and Industry. 2007. *Alberta Immigrants encouraged to reach their full potential*.
- Baker, Michael and Benjamin, Dwayne (1994). *The Performance of Immigrants in the Canadian Labor Market*. Journal of Labor Economics, 1994, Vol.12, no 3. University of Chicago Press.
- Beach, M Charles and Worswick Christopher (1993). *Is There A Double-Negative Effect On The Earnings Of Immigrant Women?* Canadian Public Policy. Vol. 14; Number 1, 1993. Canada.
- Besley and Coate, (1995). *Group lending, repayment incentives and social collateral*. Journal of Development Economics, Volume 46, Number 1, February 1995, pp. 1-18(18). [Elsevier](#)
- Brau, J. C. and G.M. Woller (2004) "Microfinance institutions: A comprehensive review of the existing literature and an outline for future research", *Journal of Entrepreneurial Finance and Business Ventures* 9 (1) (2004), pp. 1–26.
- Buckley, M., and L. Griep. (2003). *Towards Financial Self-Sufficiency: Feasibility Study for a Micro-Credit Project for Immigrant Women in Calgary*. Calgary: Alberta Network of Immigrant Women.
- Collins, D., Morduch, J., Rutherford, S., Ruthven, O. (2009). *Portfolios of the Poor: How the World's Poor Live on \$2 a Day*. Princeton University Press, Princeton.
- Coyle, Mary Roger Wehrell, Jordan MacDonald (November, 2006) Small is Beautiful, Big is Necessary; Canada's Commercial and Cooperative Answers to the Global Challenge of Microfinance Access. Presentation to the Global Microcredit Summit. Halifax, Canada.
- Emery, J.C. Herbert (November, 2006). Alberta's Labour Market Needs to 2015. The Institute for Sustainable Energy, Environment and Economy. *Paper No. 8 of the Alberta Energy Futures Project*. Copyright held by Institute for Sustainable Energy, Environment and Economy (ISEEE). University of Calgary.
- Emery, J.C. Herbert (2005) "Total and Private Returns to University Education in Canada: 1960 to 2000 and in Comparison to Other Postsecondary Training" in Charles M. Beach, Robin W. Boadway and R. Marvin McInnis eds., *Higher Education in Canada*. Kingston: John Deutsch Institute, Queen's University.
- Emery, Herbert, Crutcher, Rodney A., Harrison, Alexandra and Wright, Howard (2006). "Rates of Return to Investment in Skills Assessment and Residency Training of International Medical Graduates in Alberta" *Health Policy* 79.2-3: 165-174.
- Ferrer, Ana M and W. Craig Riddell (February, 2008). *Education, Credentials, and Immigrant Earnings*. [Canadian Journal of Economics, Vol. 41, Issue 1, pp. 186-216, February 2008](#).
- Ferrer, Ana; David A. Green, and W. Craig Riddell (2004). *International Adult Literacy Survey The Effect of Literacy on Immigrant Earnings Statistics Canada Human Resources and Skills Development Canada*. Catalogue no. 89-552-MIE, no. 12. Minister of Industry, 2004.
- Globe and Mail (Feb. 20, 2010) "Encouraging the entrepreneurial spirit" Anna Mehler Paperny and Tavia Grant.

- Goetz , Anne Marie and Gupta, Rina Sen. *Who Takes the Credit? Gender, Power, and Control Over Loan Use in Rural Credit Programs in Bangladesh*. World Development, Vol. 24, No. 1, pp. 45-63. 1996. Printed in Great Britain.
- Green David A. and Worswick Christopher (September, 2003). *Immigrant Earnings Profiles in the Presence of Human Capital Investment: Measuring Cohort and Macro Effects*.
- Immigrant Access Fund. June 30, 2008. *Report to the Community*. Retrieved November 2009 from <http://www.iafcanada.org/pdfs/IAF08CommunityReportAug.pdf>.
- Immigrant Access Fund. 2005. *About IAF: Microloans for internationally trained immigrants*. Retrieved November 2009 from <http://www.iafcanada.org/pdfs/About%20IAF.pdf>.
- Karim Harji (May, 2007). The Ottawa Community Loan Fund. A Research Report On Social Impact. Prepared for the Community Economic Development Technical Assistance Program (CEDTAP)
- Karlan, D. (2007) "[Social connections and group banking](#)," *Economic Journal*, Royal Economic Society, vol. 117(517), pages F52-F84, 02
- Li, Peter S. "The Market Worth of Immigrants' Educational Credentials", *Canadian Public Policy*, Vol. 27, No. 1 March 2001, pp. 23-38.
- McDonald , James Ted and Worswick, Christopher (1997). *Unemployment Incidence of Immigrants Men in Canada*. Canadian Public Policy. Vol. XXIII, N^O 4, 1997.
- Morduch, J., R. Cull and A. Demirguc-Kunt (2009) "Microfinance Meets the Market," *Journal of Economic Perspectives* 23(1)
- Morduch, Jonathan and Barbara Haley. RESULTS Canada for the Canadian International Development Agency (November 2001) . *Analysis of the Effects of Microfinance on Poverty Reduction*. NYU Wagner Working Paper No. 1014. June 2002. Canada.
- Morduch, Jonathan; Bauer, Michal and Julie Chytilová (December, 2008). *Behavioral Foundations of Microcredit: Experimental and Survey Evidence From Rural India*. Working Paper No. 73. The American University of Paris. Trustee Fund for the Advancement of Scholarship (TFAS).
- Oreopoulos, Philip (May, 2009). Why Do Skilled Immigrants Struggle in the Labor Market? A Field Experiment with Six Thousand Résumés. Metropolis British Columbia. Centre Of Excellence for Research on Immigration and Diversity
- Picot G. and Hou F. (2003), *The Rise in Low Income Rates among Immigrants in Canada*, Analytical Studies Research Paper Series, Catalogue 11F0019MIF # 198, 61 p. <http://www.statcan.ca/francais/research/11F0019MIF/11F0019MIF2003198.pdf>
- Picot G., Hou F. and Coulombe S. (2007), *Chronic Low Income and Low-income Dynamics Among Recent Immigrants*, Analytical Studies Branch Research Paper Series, Catalogue 11F0019MIE # 294, 48p. <http://www.statcan.ca/english/research/11F0019MIE/11F0019MIE2007294.pdf>
- Rathje, Kelly Ann and J.C. Herbert Emery (2002) "Returns to University Education in Canada Using New Estimates of Program Costs" in David Laidler ed. *Renovating the Ivory Tower: Canadian Universities and the Knowledge Economy*. Toronto: C.D. Howe Institute.

Reitz, Jeffrey 2001a. "Immigrant Skill Utilization in the Canadian Labour Market: Implications of Human Capital Research." *Journal of International Migration and Integration* 2 (3): 347-78.

Reitz, Jeffrey G. 2001b. "Immigrant Success in the Knowledge Economy: Institutional Change and the Immigrant Experience in Canada, 1970-1995." *Journal of Social Issues* 57 (3): 577-611.

Reitz, Jeffrey G. 2003b. "Occupational Dimensions of Immigrant Credential Assessment: Trends in Professional, Managerial, and Other Occupations, 1970-1996" In *Canadian Immigration Policy for the 21st Century*; edited by Charles Beach, Alan Green, and Jeffrey G. Reitz, 469-506. Kingston: John Deutsch Institute for the Study of Economic Policy, Queen's University.

Reitz, Jeffrey G. (2003). Occupational dimensions of immigrant credential assessment: trends in professional Managerial and other occupations, 1970-1996 in *Canadian Immigration Policy for the 21st Century*. pp. 469-506

Roodman, David and Morduch, Jonathan (June, 2009). *The Impact of Microcredit on the Poor in Bangladesh: Revisiting the Evidence*. Working Paper Number 174. The Center for Global Development.

Statistics Canada (2006) "Longitudinal Survey of Immigrants to Canada: A Regional Perspective of the Labour Market Experiences", Catalogue No. 89-616-XIE, January 2006.

Statistics Canada. 2001 Census Analysis Series. *The Changing Profile of Canada's Labour Force*. (February 2003). Cat. no. 96F0030XIE2001009.

<http://www12.statcan.ca/english/census01/Products/Analytic/companion/paid/pdf/96F0030XIE2001009.pdf>

Woller, G. M., Dunford, C. & Woodworth W. (1999) "Where to Microfinance?", *International Journal of Economic Development*, 1(1), 29-64.

Alberta Employment and Immigration. A Foreign Qualification Recognition Plan for Alberta announced November 7, 2008 at IAF Website <http://www.iafcanada.org/news.html>

Table 1. Mean Characteristic of Loan applicants and Census Immigrants

	IAF	2006 Census Calgary		2006 Census Edmonton	
	%	%	5 year change	%	5 year change
Demographics					
Female	0.39	0.51	0	0.52	0
Residence: Calgary	0.57	-	-	-	-
Residence: Edmonton	0.40	-	-	-	-
Residence: Other	0.03	-	-	-	-
Time between immigration and application					
Less than 3	0.06				
3 - 6 months	0.09				
6 – 12 months	0.17				
1 to 2 years	0.22	0.23*	0.01*	0.08*	0.01*
2 to 3 years	0.12				
3 to 4 years	0.11				
4 to 5 years	0.06				
More than 5	0.16	-	-	-	-
Place of birth					
South America	0.14	0.05	0.03	0.06	0.00
Europe	0.11	0.15	-0.03	0.14	-0.06
Africa	0.30	0.10	0.04	0.13	0.04
Middle East	0.15	0.08	0.04	0.10	0.04
Asia	0.31	0.54	-0.04	0.52	0.00
Labor force status before applying					
Underemployment (unconditional)	0.12	-	-	-	-
Employed	0.44	0.69	-0.04	0.62	-0.04
Program results					
Completed Program	0.45	-	-	-	-
Occupation when completed accreditation					
Trades	0.03	0.10	-0.02	0.12	-0.03
Health	0.39	0.05	0.00	0.07	-0.01
Natural Resources	0.01				
IT	0.05	0.17	0.01	0.11	-0.01
Engineer	0.21				
Finances	0.16	0.15	-0.01	0.13	-0.01
Business	0.06				
Social Sciences	0.07	0.07	-0.01	0.11	0.02
Other	0.03	0.46	0.04	0.46	0.05
Regulated Trade	0.45	-	-	-	-
Regulated Profession	0.81	-	-	-	-
Occupational change	0.14	-	-	-	-

(*) Refers to the percentage of the immigrant population arriving less than 5 years ago

Source: authors' calculations using data provided by the IAF on loan applicants and Statistics Canada, 2006 and 2001 Census of Population, Statistics Canada catalogue no. 97-564-XCB2006008.

Table 2. Internal Rates of Return of Loans Providing Accreditation

Panel 1. Accreditation BA					
<i>Overhead</i>	<i>Prob</i>	<i>Age Accred.</i>	<i>IRR (Average)</i>	<i>IRR Health*</i>	<i>IRR Engineering</i>
10000	1	32	1 or more	1 or more	1 or more
10000	0.75	32	0.18	1 or more	0.67
5000	0.75	32	0.33	1 or more	1 or more
5000	0.65	32	0	0.58	0.32
10000	1	36	1 or more	1 or more	1 or more
10000	0.75	36	0.22	0.76	1 or more
5000	0.75	36	0.47	1 or more	1 or more
5000	0.65	36	0	0.83	0.61
Panel 2. Accreditation Grad					
<i>Overhead</i>	<i>Prob</i>	<i>Age Accred.</i>	<i>IRR (Average)</i>	<i>IRR Health*</i>	<i>IRR Engineering</i>
10000	1	32	1 or more	-	1 or more
10000	0.75	32	0.53	-	0.71
5000	0.75	32	1 or more	-	1 or more
5000	0.65	32	0.38	-	0.42
10000	1	36	1 or more	1 or more	1 or more
10000	0.75	36	0.84	1 or more	1 or more
5000	0.75	36	1 or more	1 or more	1 or more
5000	0.65	36	0.54	1 or more	0.76

These estimates assume that individuals work from age 32 or 36, with the experience profile of a 25 or 29 year old individual.

Table 3. Minimum Probability of Success to yield a 5% interest rate ⁽¹⁾

	BA credentials	Graduate credentials	
	<i>Relative to HS earnings</i>	<i>Relative to HS earnings</i>	<i>Relative to Post-secondary earnings</i>
<i>General</i>			
Overhead 10000, age 36	0.71	0.61	0.87
Overhead 10000, age 32	0.71	0.61	0.87
Overhead 5000, age 36	0.70	0.60	0.87
Overhead 5000, age 32	0.70	0.60	0.87
<i>Engineering</i>			
Overhead 10000, age 36	0.63	0.62	0.99
Overhead 10000, age 32	0.63	0.62	0.99
Overhead 5000, age 36	0.63	0.62	0.99
Overhead 5000, age 32	0.63	0.62	0.99
<i>Health⁽²⁾</i>			
Overhead 10000, age 36	0.56	0.34	0.51
Overhead 10000, age 32	0.56	0.34	0.51
Overhead 5000, age 36	0.55	0.33	0.50
Overhead 5000, age 32	0.55	0.34	0.50

(1) Except when otherwise indicated, these estimates assume that individuals work from age 32 or 6 with the experience profile of a 25 or 29 years old.

(2) For the case of graduate credentials in the Health occupations, we have omitted the experience profile assumed in (1). Instead, we assume that the individual experiences a three year reduction in earnings, while completing the residency program and settling into practice.

Figure 1: Costs and Benefits of IAF Loans for Alberta Society

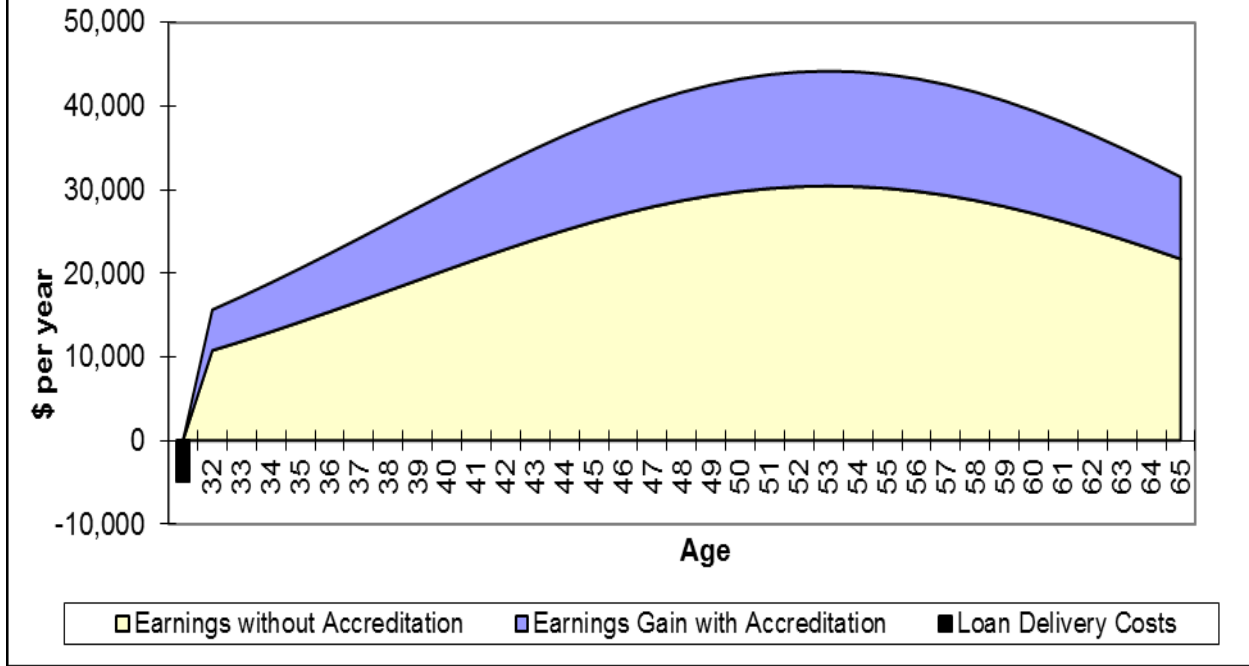
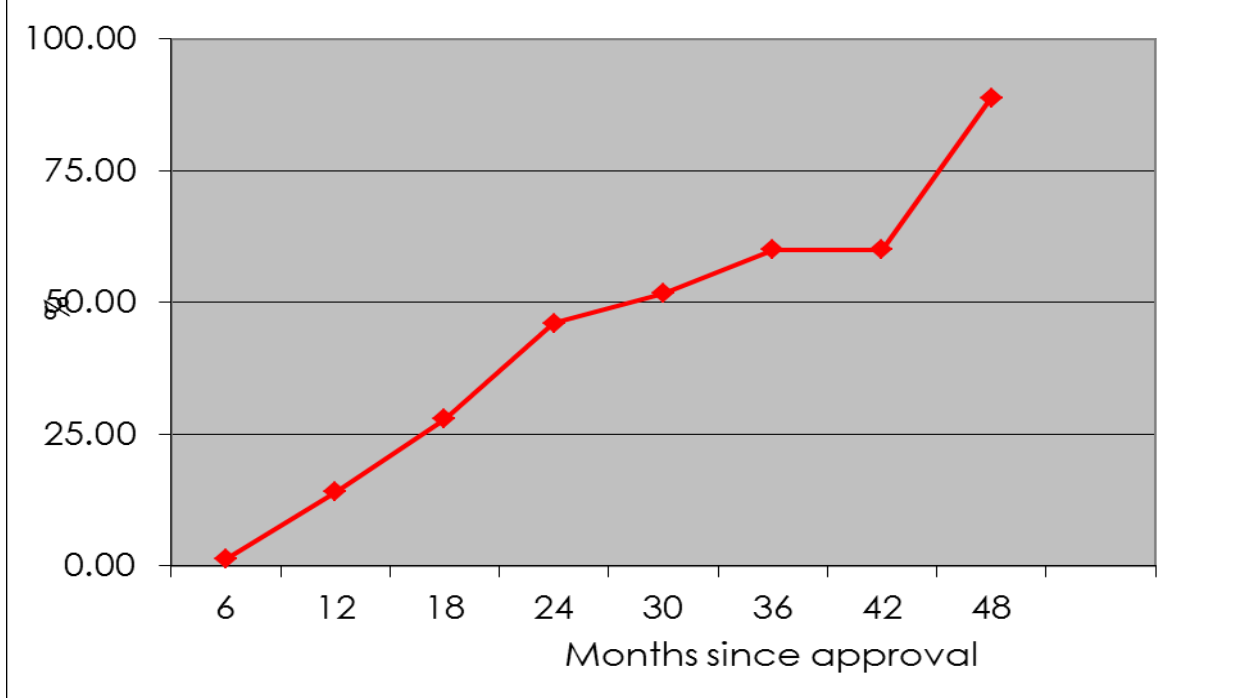


Figure 2. Success rate by Length of Loan



Appendix

Table A1. Characteristic of Loan applicants by Loan Status

Variable	Active		Written-off	
	Mean	Std. Dev.	Mean	Std. Dev.
Demographics				
Gender	0.39	0.49	0.38	0.52
Residence: Calgary	0.57	0.50	0.75	0.46
Residence: Edmonton	0.40	0.49	0.25	0.46
Residence: Other	0.03	0.17	0.00	0.00
Time between immigration and application				
Less than 3	0.06	0.24	0.00	0.00
3 - 6 months	0.09	0.29	0.00	0.00
6 – 12 months	0.17	0.37	0.00	0.00
1 to 2 years	0.22	0.42	0.25	0.46
2 to 3 years	0.12	0.33	0.25	0.46
3 to 4 years	0.11	0.32	0.00	0.00
4 to 5 years	0.06	0.23	0.13	0.35
More than 5	0.16	0.37	0.38	0.52
Place of birth				
South America	0.14	0.34	0.13	0.35
Europe	0.11	0.31	0.13	0.35
Africa	0.30	0.46	0.50	0.53
Middle East	0.15	0.35	0.13	0.35
Asia	0.31	0.46	0.13	0.35
Labor force status before applying				
Underemployment (unconditional)	0.12	0.33	0.00	0.00
Employed	0.44	0.50	0.63	0.52
Program results				
Completed Program	0.45	0.50	0.38	0.52
Occupation when completed accreditation				
Trades	0.03	0.17	0.13	0.35
Health	0.39	0.49	0.50	0.53
Natural Resources	0.01	0.07	0.00	0.00
Finances	0.16	0.36	0.13	0.35
IT	0.05	0.22	0.00	0.00
Engineer	0.21	0.41	0.13	0.35
Business	0.06	0.23	0.13	0.35
Social Sciences	0.07	0.25	0.00	0.00
Other	0.03	0.18	0.00	0.00
Regulated Trade	0.45	0.52		
Regulated Profession	0.81	0.39	0.86	0.38
Occupational change	0.14	0.35	0.38	0.52

Source: authors' calculations using data provided by the IAF on loan applicants

Table A 2. Employment Characteristic by Place of Birth and Gender

Place of birth	Male	Female
<i>South America</i>		
Completed Program	0.59	0.31
Underemployed before	0.07	0.19
Employed before	0.22	0.54
Occupational change	0.38	0.08
<i>Europe</i>		
Completed Program	0.61	0.67
Underemployed before	0	0.17
Employed before	0.3	0.44
Occupational change	0.14	0
<i>Africa</i>		
Completed Program	0.44	0.37
Underemployed before	0.09	0.17
Employed before	0.53	0.27
Occupational change	0.24	0.07
<i>Middle East</i>		
Completed Program	0.51	0.53
Underemployed before	0.05	0.06
Employed before	0.46	0.24
Occupational change	0.05	0
<i>Asia</i>		
Completed Program	0.39	0.38
Underemployed before	0.15	0.19
Employed before	0.51	0.48
Occupational change	0.12	0.14
<i>Total</i>		
Completed Program	0.47	0.42
Underemployed before	0.09	0.17
Employed before	0.46	0.42
Occupational change	0.18	0.08

Source: authors' calculations using data provided by the IAF on loan applicants

Regression results

General

Source	SS	df	MS			
Model	14835.0258	8	1854.37823	Number of obs = 29541		
Residual	36555.2841	29532	1.23781945	F(8, 29532) = 1498.10		
				Prob > F = 0.0000		
				R-squared = 0.2887		
				Adj R-squared = 0.2885		
				Root MSE = 1.1126		
lnwg	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	.2165554	.0028261	76.63	0.000	.2110161	.2220947
age2	-.002353	.0000352	-66.80	0.000	-.002422	-.002284
edu_2	.2193194	.019052	11.51	0.000	.1819767	.2566621
edu_3	.4463341	.0233768	19.09	0.000	.4005146	.4921536
edu_4	.3788685	.020914	18.12	0.000	.3378761	.4198609
edu_5	.5919368	.0208232	28.43	0.000	.5511225	.6327512
edu_6	.806562	.0821827	9.81	0.000	.6454802	.9676438
edu_7	.7455339	.0352019	21.18	0.000	.6765366	.8145312
_cons	5.121701	.0515388	99.38	0.000	5.020683	5.22272

/*health*/

Source	SS	df	MS			
Model	758.170457	8	94.7713071	Number of obs = 2844		
Residual	3118.70316	2835	1.10007166	F(8, 2835) = 86.15		
				Prob > F = 0.0000		
				R-squared = 0.1956		
				Adj R-squared = 0.1933		
				Root MSE = 1.0488		
lnwg	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
age	.1536429	.0102072	15.05	0.000	.1336286	.1736571
age2	-.0016184	.000123	-13.15	0.000	-.0018597	-.0013771
edu_2	.059658	.0815967	0.73	0.465	-.1003368	.2196529
edu_3	.3041929	.0894185	3.40	0.001	.128861	.4795248
edu_4	.4753599	.0717081	6.63	0.000	.3347546	.6159651
edu_5	.6782101	.0735779	9.22	0.000	.5339384	.8224817
edu_6	1.192593	.1075177	11.09	0.000	.9817721	1.403414
edu_7	1.005821	.1053347	9.55	0.000	.7992803	1.212361
_cons	6.078335	.2017905	30.12	0.000	5.682664	6.474006

/*education*/

Source	SS	df	MS			
Model	816.993035	8	102.124129	Number of obs = 2067		
Residual	2208.43531	2058	1.07309782	F(8, 2058) = 95.17		
				Prob > F = 0.0000		
				R-squared = 0.2700		
				Adj R-squared = 0.2672		
				Root MSE = 1.0359		
lnwg	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	

age	.1772646	.0118807	14.92	0.000	.1539652	.200564
age2	-.0017775	.0001425	-12.48	0.000	-.0020569	-.0014981
edu_2	.099775	.1058971	0.94	0.346	-.1079016	.3074517
edu_3	.4859851	.1277553	3.80	0.000	.2354419	.7365283
edu_4	.5234266	.1077202	4.86	0.000	.3121746	.7346787
edu_5	.8277403	.0930439	8.90	0.000	.6452704	1.01021
edu_6	.6844596	.3111234	2.20	0.028	.0743101	1.294609
edu_7	.9730638	.1003929	9.69	0.000	.7761816	1.169946
_cons	5.312201	.2415122	22.00	0.000	4.838567	5.785835

/* engineering*/

Source	SS	df	MS	Number of obs =	2408
Model	757.642249	8	94.7052812	F(8, 2399) =	89.69
Residual	2533.1443	2399	1.05591676	Prob > F =	0.0000
				R-squared =	0.2302
				Adj R-squared =	0.2277
Total	3290.78654	2407	1.36717347	Root MSE =	1.0276

lnwg	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
age	.2117879	.010655	19.88	0.000	.190894 .2326819
age2	-.0023577	.0001304	-18.09	0.000	-.0026133 -.002102
edu_2	.2218414	.0891024	2.49	0.013	.0471158 .396567
edu_3	.3798649	.104929	3.62	0.000	.174104 .5856259
edu_4	.4737558	.0833893	5.68	0.000	.3102333 .6372783
edu_5	.6899263	.0810633	8.51	0.000	.5309648 .8488877
edu_6	.5374082	.2942339	1.83	0.068	-.0395708 1.114387
edu_7	.7001484	.1000705	7.00	0.000	.5039149 .8963819
_cons	5.445177	.2062136	26.41	0.000	5.040802 5.849553