Immigration and the demand for life insurance: Evidence from Canada, 1911

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Abstract (105 words)

This paper analyses the determinants of the demand for life insurance using sample data from the 1911 Census of Canada. We find that immigrants' demand for life insurance was on average around seven percent lower than that of native born Canadians and varied depending on the time that elapsed since immigration. The results imply substantially lower risk aversion of immigrants and possibly indicate the importance of personal networks for informal risk sharing that could evolve over time. We also find that the value of life insurance held by immigrants increases with time elapsing since immigration and converge towards the value of individuals born in Canada.

Keywords: Insurance, welfare, migration, Canada

JEL Classifications: G22, J61, N31

1. Introduction

The rapid economic growth and high levels of immigration experienced in Canada in the period from the turn of the twentieth century up to the beginning of the Great War makes the backdrop of this analysis one of significant interest to economists and historians alike. On average, Canadian GNP increased annually by 6.21 per cent over the period, representing the highest level of real output growth that the Canadian economy has ever experienced (McInnis, 2008). From the onset of the twentieth century until 1911, Canada's population expanded by more than 33%, which was almost entirely due to the arrival of around 1.8m immigrants (The Canada Year Book, 1911). Those developments coincided with an equally remarkable growth of the Canadian insurance market, which became increasingly important for investment and the continued expansion of the Canadian economy, as well as for protecting households from increasing levels of income risk associated with growing urbanisation and industrialisation. An essential element in understanding this growth is an appreciation of the factors that influenced the demand for insurance among Canadian households and, in particular, what was the role of immigration in this process.

At this stage little is known about insurance demand by immigrants. On the one hand, demand for life insurance may be greater among immigrants as their potential for self insurance would be diminished. Immigrants would be likely to have less capacity for informal risk sharing as private networks are often, less extensive initially. On the other hand, demand for life insurance may be lower for immigrants if the individuals who emigrate have a below average level of risk aversion. New direct evidence suggests this to be the case for contemporary German migrants: individuals who are relatively willing to take risks expose a significantly higher probability to migrate (Jaeger et al., 2010). Furthermore, Amuedo-Dorantes and Pozo (2002) find that immigrants have a lower propensity to accumulate precautionary savings and it is possible that the demand for insurance follows a similar pattern. However, a decrease in precautionary savings may be due to the impact of remittances on saving capabilities. It would be thus expected that the length of time since immigration would diminish the influence of both of these effects, as more extensive family risk sharing networks evolve and immigrants become assimilated.

In this study we investigate the determinants of insurance demand and direct the focus on the issue of immigration. The time period under investigation is very interesting, not only due to its remarkable growth dynamics - in particular the very high share of new immigrants - but also due to the possibility to study household's preferences free from any interference of

government provided insurance. In 1911 state sponsored substitutes for private insurance were unavailable and governmental involvement in the Canadian insurance market was only in a regulatory capacity. Furthermore, employers were unlikely to provide workers with life insurance (Di Matteo and Emery, 2002). Therefore the decision to purchase insurance at this point in time can be viewed as being based on purely private motivations.

The database used in this research is a representative sample of the population of Canada in respect to both demographics and geography, taken from the 1911 Census. The data set contains detailed records regarding holdings and value of life insurance, as well as a wide selection of control variables, including the respondent's country of birth and, for immigrants, the time that elapsed since arrival to Canada. Based on around 1700 observations we estimate the probability of holding life insurance as a function of the available control variables. We find that immigrants demand around seven percent less life insurance. The probability that an immigrant holds life insurance is grossly independent from the number of years since arrival in Canada, however there is considerable variation in the holding for different cohorts. The findings provide an indication on the existence of a lower risk aversion among immigrants. Furthermore, the lower demand for life insurance among individuals who immigrated more than twenty years before 1911 could be an indication for an improved availability of private networks that facilitate informal risk sharing. The results further imply that the value of life insurance is consistently lower for immigrants who hold such policies and that it converges towards the Canadian average with every year that elapses since immigration. The sharp increase of the value of life insurance for immigrants could also be a sign of their economic outperformance of non-immigrants.[1]

An important motivation for a historical study of this type lies in its potential to contribute to the understanding of the determinants of insurance demand in a developing economy. Canada in 1911 was an industrialising, urbanising and rapidly growing country whose primary exports were agricultural. This is a similar situation to the one many developing economies are experiencing today. The development of the insurance market in Canada during the late nineteenth century was vitally important to the economic growth of the country (Drummond, 1962). The growth of formal financial services such as life insurance has also been suggested as an important force behind economic development in

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[1] Evidence provided by Borowiecki (2011) suggests that composers' productivity in the 19th century increased due to migration. As speculated by the author, this could have been the case due to the diverse background and experience of the migrant individual.

underdeveloped countries (e.g Brainard, 2008). This is not only because of insurance companies' role in the provision of investment funds, but also in increasing the efficiency of diversification of individual household risk. In the absence of well developed insurance markets, households are forced to rely on sub-optimal informal insurance arrangements, such as holding cash savings or the accumulation of physical asset stocks (Rosenzweig, 2001). The availability of formal insurance can therefore provide a more efficient mechanism for poor households to pool idiosyncratic risk.

A study conducted by Di Matteo and Emery (2002) is of particular relevance to this analysis due to the common period and region under examination. The study investigates the relationship between personal wealth and demand for life insurance, based on male probated decedents in Ontario in 1892. Consistent with theoretical literature on the demand for life insurance, and contrary to the findings in much of the empirical literature, wealth accumulation was found to be a substitute for market purchases of life insurance. Di Matteo and Emery's evidence suggest that households primarily demanded life insurance when they lacked accumulated reserves or wealth to provide self-insurance, often early in the life cycle. This study will draw to an extent on their analysis but will differ with respect to the specific research motivation and variables under scrutiny. The principal focus of this study is the relationship between insurance uptake and immigration. Any difference between the agrarian, newly settled west and the relatively urbanised east is also investigated. The additional information uncovered in this analysis can be combined with Di Matteo and Emery's investigation and should help deepen the understanding of the determinants of insurance demand during this period of remarkable growth and development in Canada.

The rest of this study is structured as follows. In section 2 historical background of Canada in 1911 is presented. Section 3 reviews literature on the demand for insurance. Section 4 introduces the data used. The results of our analysis are presented in section 5. Section 6 concludes.

2. Canada in 1911

The period from confederation in 1867 to the beginning of the Great War was a time of huge economic and demographic change for Canada. The population more than doubled from 3.5 million in 1867 to 7.9 million by 1914. During the decade 1901 to 1911 alone, the population grew from 5.4 million to 7.2 million. This growth was driven by predominantly

high levels of immigration. The period 1901-1911 witnessed average annual immigration of around 150,000 (Canada Yearbook, 1911, 1914). Immigrants came from all corners of the globe but government immigration policy favoured settlers from European countries. The vast majority of new settlers came from the British Isles, due to the strong cultural and economic links that existed between Britain and her former colony. Canada also attracted a large number of American migrants seeking new farmland that the effectively "full" American west could no longer provide. The reason for the high levels of immigration was a concerted effort on behalf of the Canadian government to extend its control over the Western provinces, particularly the 'prairie' provinces of Alberta, Saskatchewan and Manitoba, by inducing settlement there. Eager to exploit the immense natural and agricultural resources of the vast western territories, and wary of the United States' own territorial ambitions in the area, the government issued the Dominion Lands Act in 1872. The act was modelled on American homestead legislation and provided the legal authority under which lands were to be given to intending settlers in return for the payment of a small fee and the performance of specified settlement duties – e.g., building a habitable residence and cultivating a certain area annually (Regehr, 2011). As a result of this scheme, the number of farms in the region increased from 55,000 in 1900 to 250,000 in 1911. This increase, coupled with an expansion of the western railway network, led to a huge agricultural boom driven largely by the production of wheat. Canada became a major player on the world wheat markets, Canadian wheat constituting 14% of world wheat exports in 1914 (Solberg, 1987). Canada also became a significant exporter of animal products, fishery products and minerals (New York Times, 1912).

Alongside the growth in agriculture, Canada's financial sector grew alike. The insurance sector in Canada was well developed by the beginning of the twentieth century (Drummond, 1962). The nominal value of life insurance in force in Canada rose from $43 million (Canadian Dollars) in 1870 to $856 million by 1910 while the total assets of Canadian life insurance companies rose from a value of $21 million in 1890 to $171 million by 1910. Indeed insurance companies were a major player in capital markets, lending more money in mortgages in the decade before the Great War than the designated mortgage companies, while at the same time becoming heavily involved in the Canadian bond market (Drummond, 1962). The industry was highly competitive, with Canadian insurance companies competing with both British and American firms for market share. Nevertheless, the insurance market in Canada continued to be a profitable one. The high profits earned by the life insurance

companies led the public to believe that the accumulated premiums were not being invested in the best interests of the policy holders and that company directors were operating imprudently. As a result of this speculation a Royal Commission on Life Insurance Companies was established to investigate these claims in 1906. The commission found evidence of improper management of funds by the life insurance companies and recommended amendments to legislation to protect the policy holders' interests. The commission's report became the basis for the Insurance Act of 1910 that was designed to better regulate the growing Canadian insurance market (Bishop, 1912).

Life insurance in Canada was indeed an important financial asset, both as a form of income protection for households and to Canadian Capital markets as a source of funds for investment. The maturing of the population over the period of economic and geographic expansion increased the demand for insurance while competition among the major companies boosted supply. As a result the proportion of the population holding a life insurance policy steadily increased. According to Di Matteo (2002) 18% of Canadian males held life insurance in 1901. By 1911 this figure had reached 35%. 90% of policy holders were insured by commercial insurance companies while the remainder held policies with fraternal and other mutual benefit societies.

Alongside the growth in life insurance contracts an expansion of accident and illness insurance also took place. Premiums collected on accident and Illness insurance increased from just over $500,000 in 1896 to nearly $3 million in 1911. Despite this increase, the uptake of illness insurance policies was low in comparison to life insurance. Illness insurance was particularly problematic. Due to the few treatments available at the time and their relatively low cost, many individuals saw little need to insure themselves against the expense of medical care (Thomasson, 2003). This was coupled with reluctance among insurers to issue policies due to a lack of understanding regarding the risk and the inability to set premiums accordingly. Moral hazard and adverse selection were recognised as being acute problems. According to The Insurance Monitor (1919). "the opportunities for fraud [in health insurance] upset all statistical calculations... Health and sickness are vague terms open to endless construction. Death is clearly defined, but to say what shall constitute such loss of health as will justify insurance compensation is no easy task" (p. 38). As a result illness insurance represented only a small fraction of the total insurance market. Accident insurance was more common, with premiums collected for accident insurance in 1911 2½ times greater than those collected for illness insurance (Canada Yearbook, 1912). While health insurance

remained a private concern until the introduction of state sponsored schemes beginning in the 1940s, industrial accident compensation was an important political issue at the turn of the twentieth century (IAIABC, 2010). Following the establishment of worker's compensation programmes in Europe and a number of US states, the Canadian government commissioned the Meredith Report in 1910 to investigate the possible implementation of such scheme in Canada. The report, delivered in 1913, identified the inadequacies in the provision of compensation to injured workers and recommended a system of collective liability of employers in exchange for a waiver of the right to sue for workers (Meredith, 1913). The report's recommendations were implemented initially in Ontario in 1915 and quickly adopted by successive provinces. In 1911 however, involvement of the state in the Canadian insurance market was restricted to regulatory actions.

3. Demand for Insurance

Demand for insurance has commonly been linked with the motivation to accumulate assets. Insurance is judged to be an asset similar in form to savings and is as such, important to a household's life time utility maximisation strategy. The motivation to save or acquire insurance is usually explained in three principal ways; the lifecycle motivation, the bequest motivation and the precautionary savings motivation. Life-cycle saving is the accumulation of assets during working years to finance consumption when income earning capacity has been reduced due to old age. The bequest motive can be defined as the accumulation of assets during working years in order to provide offspring with an inheritance. Precautionary savings is the accumulation of assets to deal with short-term unforeseen economic difficulties. The life-cycle theory predicts that households wish to smooth consumption over their life time and that consumption will be a function of permanent or average income and not just current income (Japelli and Modigliani, 2003). The idea of a hump shaped asset/age curve would imply that savings would be low, perhaps even negative, early on in the life cycle. This form of life-cycle asset accumulation behaviour has been identified by Di Matteo (1997) in data from the late nineteenth century. Life-cycle savings motivations have been also found to have gained in importance as the number of individuals reaching retirement age increased over the course of the nineteenth century (Carter and Sutch, 1996).

Theories of insurance demand also predict that insurance purchase is related to the motivation to preserve income streams, so that the individual can provide for himself and his

family. Income streams could be interrupted by illness, accident or other unforeseen economic hardships. Insurance can protect households from a collapse in their consumption that would otherwise follow a break of income. Savings, often referred to as self-insurance, could also provide this function. However savings take time to accumulate. Therefore insurance would represent a better instrument by which to preserve future household consumption early in the life-cycle. This implies therefore that insurance purchase would be negatively related to age (Hammond et al., 1967). The bequest motivation for the acquisition of life insurance can be seen as an extension of the life cycle motivation. As transfers across generations link the life cycle of the household head to that of its dependents, the relevant utility maximising economic agent may be the household itself and not the household head. The purchase of life insurance is seen as a transaction made on behalf of the insured dependents, where the principal intention is to provide offspring with an economic safety net of their own (Lewis, 1989).

Household income is also considered to have a significant effect on the level of life insurance demand. The relationship between income and the demand for life insurance is however argued to be very complex and depends on the degree of household risk aversion and how it changes with income (Cleeton and Zellner, 1993). Households solely dependent on the income of the household's head could likewise be expected to have a higher demand for life insurance. Theory predicts that the presence of a wage earning spouse or of working children would reduce the demand for life insurance since there is less dependence on the household head's income for household consumption. Duker (1969) finds that working-wife families with fully-employed husbands spent less on life insurance than households without a wage-earning wife. Similarly, Kantor and Fishback (1996) in their analysis find that the probability a household had life insurance coverage was negatively (but insignificantly) correlated with the wife's annual income. Occupation is also likely to influence the demand for life insurance. Higher classification occupations are thought to be associated with increased levels of insurance demand as this grouping is likely to have higher incomes, and therefore a higher ability to save. Higher skilled occupations are also likely to have a greater "awareness" of the benefits of life insurance (Hammond et al, 1967). Lower skilled occupations are anticipated to have a lower demand for insurance for the opposite reasons.

A distinction must be made at this point between two different types of life insurance contract that were available during this period. The first type of life insurance was 'ordinary' or 'whole life' insurance. This form of insurance embodies a savings component where a

household that does not make a claim by the time the insurance policy matures receives a share of the accumulated premiums plus an interest payment. The second type is 'Term Life Insurance' whereby a premium is paid by the insured and the household retains none of its payments. It therefore contains no savings component and is often referred to as 'pure insurance'. Campbell (1980) indicates that the purchase of whole life insurance might be interpreted as an expression of household life cycle needs since it provides decreasing term insurance and increasing accumulated savings over the insured individuals' life time. As the majority of policies issued in Canada during this period were 'ordinary' life insurance contracts (Di Matteo and Emery, 2002) and the data do not distinguish between the two types, it is the 'ordinary' form of life insurance we assume we are observing. The fact that the motivations behind the purchase of both types of insurance may be different represents a potential, yet unavoidable, limitation of this analysis.

Finally, it is important to recognise that demand for life insurance purchase is affected by a large number of variables that are difficult to isolate and measure. Attitudes toward death, family, saving, time preferences, the influence of insurance agents and risk in general all create differences among individual utility functions of households. The fact that we are unable to control for these variables leaves our analysis vulnerable to omitted variable bias, with consequences for the inferences that may be drawn.[2]

4. Data

To estimate the demand for insurance in early twentieth century Canada a sample of information on 1,694 households was taken from the 1911 Census of Canada. The sample was transcribed from the original handwritten returns and converted into a digital database consisting of information from two provinces; Ontario representing the more industrial and longer established eastern region and Manitoba representing the newly settled frontier or "prairie" region.[3] The choice of the regions is conducted so as to represent the distribution of the population of Canada during this period. The sample consists of data for household heads and is summarized in Table 1.

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[2] A further variable that is not available and yet is considered to affect the level of life insurance demand is the level of education, as it is associated with a better understanding of the benefits of life insurance (Truett and Truett, 1990). Level of education is however expected to be correlated with higher skilled occupations and hence the inclusion of occupation controls presumably captures a significant portion of any education effect.

[3] Appendix 1 provides further details on the sample selection procedure.

The sample covers 95% male, as the census covers household heads, with an average age of 45 years. Around 54% of the households were located in rural areas and the remainder in urban regions. 79% of household heads reported having a spouse within the household. The average number of dependent children – that is children aged 18 or under without a personal source of income – is equal to 1.6 per household. Around 70% of the household head was born in Canada while the remaining immigrated from predominantly England but also Ireland, Scotland, France or the USA. The proportion of the household heads that were not Canadian born in the sample is 30%, which compares to the population statistics for the time of 22% of the total population and 25% of the total male population. For the immigrants the number of years since arrival in Canada was also recorded. The sample data indicates that the average number of years since immigration was 20 years.

Occupation of the household head is separated into six categories according to the classification method developed by Katz (1975). These are socio-economic occupational status categories with Occ1 as the highest, Occ5 as the lowest, and Occ6 as an unclassifiable occupation. Category Occ1, for example, contains lawyers, merchants, doctors, etc. Category Occ2 contains accountants, teachers and small businessmen. Category Occ3 includes skilled tradesmen such as blacksmiths and carpenters while Occ4 contains barbers, drivers and other semi-skilled occupations. Category Occ5 is mainly unskilled labour while Occ6 is unclassifiable or unemployed. The largest category was Occ2 (including farmers) and the smallest was Occ4. Less than 8% of the sample was unclassifiable or unemployed.

In addition to the occupation controls, further records are available on whether a household head is a farmer. 48% of the sample was recorded by the enumerator as "Farmer". The high share of farmers is plausible and partially attributable to Canadian government policy that encouraged immigration of agricultural over industrial workers (Green et al., 2002). Tenant farmers and land-owning farmers had a degree of income risk protection, in so much as other members of the household could assist in farm work. Furthermore, both types of farmers availed of risk management and diversification techniques that to some extent decreased exposure to income shocks (Stead, 2004). The direction of the influence of being a farmer on the demand for insurance might presumably be expected to be the same for both types. Additionally, farm land can be seen as an asset and hence a land-owning farmer could

rely on that land as a substitute asset to insurance and would therefore have less need for formal insurance contracts.[4]

The variables of most importance to this analysis are those concerning life insurance holdings. 37% of the sample reported holding a life insurance policy with an average value of $1851 and average annual premium of $47. In 1911 there were 1,335,191 life policies in force, with an average value of $712 (Canada Yearbook, 1912). The average amount paid in premiums was $24. The total number of polices divided by the total population would imply that 19% of Canadians held a life insurance policy. If it is assumed that a substantial majority of these policies were held by men, then a better approximation can be made by dividing the number of policies by the male population, implying that the proportion of the male population holding a life insurance policy was 35%. As the heads of households are the principal earners within the household, it is assumed that the need and the ability to purchase life insurance would be greater among this group than for individuals whose earnings represent a supplemental income. For this reason the figure of 37% from the sample can view as being broadly representative of the population. The total value of premiums divided by the total number of policies gives average premiums of $24 for life insurance. These are less than the average premiums in the sample but represent a comparable cost per dollar of insurance calculated at the average levels.

The sample includes only rudimentary data on income earned in the previous year. Only a small sub-sample of 32% of the household heads provided such information. As farmers or immigrants did not usually report income on their returns, the data on income is biased towards non-farmers who were more likely to purchase a life insurance policy and non-immigrants. Given the prime objective of the article – to analyse insurance demand of immigrants – the income data is of little value. A similar problem is encountered by Di Matteo and Emery (2002) who do not have any income records and are forced to rely on the occupation variables that provide some approximation for the missing variable. In this study, in addition to occupation controls we have records that indicate whether there was a second wage earner within the household. It is again only a rough indicator for household's income, nonetheless together with the occupation variables, the bias resulting due to the absence of exact measures of household's income should be somewhat mitigated.

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[4] As the enumerators were not instructed to differentiate between farmers who owned their own farm and tenant farmers, the limitations of the data prevent an examination of this effect in isolation. See Offer (1991) for a discussion of determinants of farm tenure in England.

5. Empirics

Life Insurance Holdings

In order to uncover the factors influencing whether a household possessed a life insurance policy in Canada in 1911, a binary response approach is required. In this formulation the outcome of the discrete choice, to hold an insurance policy or not, is viewed as a reflection of an underlying probit model. The model is estimated using Maximum Likelihood Estimation and marginal effects are computed at the means of the independent variables.[5]

The results are presented in columns (1) to (5) of Table 2. The first column summarizes the point estimates for a regression with a set of control variables that potentially influence the decision to buy life insurance, as has been discussed in Section 3. The probability of holding life insurance increases if the head of household is male or married. The estimated coefficients on the quadratic age polynomial indicate that the probability of holding life insurance increases with age, albeit at a decreasing rate. Each additional dependent child decreases marginally the probability of holding life insurance but the result is not statistically significant. Being a farmer has a strong negative effect of around 32% on the demand for life insurance. The probability of holding life insurance correlates negatively with the level of skill involved in an occupation. Occ1 category has the highest probability followed by Occ2, Occ3 and Occ4. Being in Occ5 reduces the probability in relation to the reference category, i.e. Occ6. The negative sign could be caused by the diversity of Occ6 which contains all those individuals who were undefined or unemployed. Having a second source of income in the household increases the probability of holding life insurance by around 5%; the coefficient is however estimated outside the usual confidence intervals. The marginal effect of changing from non-Prairie region to Prairie region is marginally negative and not significant. All in all the results are consistent with previous research; in particular with Di Matteo and Emery (2002).

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[5] A set of diagnostics has been conducted. First, an OLS regression is implemented using the same dependent and independent variables as the initial probit model and the variables are checked for colinearity. Judging on Variance Inflation Factors no serious problems with colinearity among these variables has been detected. Second, a link test is carried out in order to check for a specification error such as omitted variables. The test confirms that meaningful predictors have been chosen and as the link test is not significant, the model is quite unlikely to be misspecified. Third, a Wald chi-squared test is conducted and a resulting *p*-value which is significant at the 1% level indicates that the model has at least some degree of explanatory power. Finally, Hosmer and Lemeshow's goodness-of-fit test indicates that the model fits the data well.

In the next specification, which is reported in the second column, it is accounted for the occurrence of immigration. The indicator variable Immigrant takes the value one if the individual emigrated to Canada and zero if born in Canada. The point estimate is estimated with high precision and indicates that immigrants were about 7% less likely to hold a life insurance than Canadians, all else equal. It can be also observed that the remaining control variables remain unaffected by the additional dummy variable. In column (3) further controls for religious background of the respondent are included. This step is motivated by Di Matteo and Emery (2002) who found heterogeneity in insurance demand depending on religious background.[6] Consistently, we find positive and significant coefficients on most types of religions, with Roman Catholics the base category. This result corresponds with the study by Di Matteo and Emery who found Roman Catholics made less use of the life insurance market. It is also encouraging to observe that the coefficient for immigrants remains in this specification satisfactory stable in sign, size and significance. Next, we estimate a further regression with a set of controls for the country of birth. We use Canadian born individuals as the base category and a set of indicator functions for the remaining countries. It can be viewed in column (4) that the coefficients on country of origin are usually negative, albeit not always statistically significant. The largest point estimates are found for individuals born in France or in a country from the "Other Country" category and indicate a close to 30% lower propensity to hold life insurance.

A principal aim of this research was to uncover the level of demand for life insurance among immigrants relative to the native born population. The results indicate so far that, on average, individuals born outside Canada are likely to have a lower level of demand for life insurance. Also of interest however is whether any differences can be detected based on the number of years that elapsed since the individual immigrated to Canada. In order to analyse the effect of years since immigration an additional model is estimated for the immigrant household heads for whom date of arrival is given. The indicator function for individuals born in England is now dropped and serves as the reference category. As can be seen in column (5) the coefficient on the newly introduced variable is marginal in size and clearly

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[6] The authors speculate that Roman Catholics might have been less informed about the benefits of life insurance, as they were somewhat less literate that the average, and hence would demand less insurance. Furthermore, the Anglican and Protestant were substantially more influential in the banking and finance sector, hence presumably also more aware of the diversification advantages of the life insurance asset.

insignificant. No evidence can be found on a linear association between years since immigration and the probability of holding life insurance by immigrants.[7]

In order to enable visual inspection of the results, we construct figures based on Monte Carlo simulation techniques and a specification with country of birth controls, as has been presented in column (4) of Table 2. Figure 1 illustrates how the probability of holding life insurance changes over lifetime for individuals of various nationalities. The picture visualises that immigrants display in general lower probabilities of holding life insurance. In particular, English or Irish immigrants hold somewhat less life insurance than Canadians while immigrants from France or any other country have a considerably lower holding. There is only a tentative indication for a convergence of the probabilities. Next we investigate how the time since immigration influences the demand for life insurance. Figure 2 presents the probability of having life insurance as a function of years that elapsed since arrival in Canada for immigrants and the average holding of 38.6% for Canadians. It can be observed that immigrants increase their life insurance portfolio over the first eighteen years since their arrival in Canada. However, after that time, their demand starts to decrease over a period of almost four decades. The emerging picture is very interesting as it could be seen to provide indirect evidence for the development of private networks of the immigrant. Such networks play an important factor in informal risk sharing and hence, if the individual obtains alternative ways to protect herself from economic difficulties, her demand for life insurance decreases.[8]

Value of Life Insurance

Another variable of interest in a study of life insurance demand is the value of such policy. As 37% of the sample holds life insurance, there are only 619 observations left for the proposed analysis. It would therefore desirable to use information from the entire sample in the estimation in order to maximize statistical power. We use thus a Heckman 2-Step approach and estimate a probit model for demand for life insurance in order to obtain the Inverse Mills Ratio that is the ratio of the probability density function to the cumulative

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[7] We have also tried to measure the time since immigration with a quadratic polynomial and found consistently insignificant results.
[8] Unfortunately, as the research is based on cross-section data, we are not able to illuminate whether the concave relationship between insurance holdings and the time that elapsed since immigration is due to individual's life cycle changes or caused by cohort heterogeneity. Such cohort heterogeneity could be caused, for example, by some unobservable differences between generations.

distribution function. The ratio is then included in a second stage least squares estimation of the determinants of the value of the life insurance purchased using only observations for individuals who held a life insurance policy. The results are displayed in Table 3.

The first column of Table 3 summarizes results for a model with the usual control variables and an indicator function that takes the value one if the observation is for an immigrant. The model is basically consistent with results from the previous specifications. The value of life insurance holding is higher, albeit not always statistically significant, for male or married. Life insurance value is increasing with age at a decreasing rate and takes on higher values for high skilled workers. It is interesting to observe that being an immigrant corresponds with a substantially lower value of life insurance. All else equal, immigrants' life insurance value is estimated to be around $1200 lower than for non-immigrants. In the second column we include a set of indicator functions for the country of origin of the respondent. The point estimates on the additional dummy variables are negative for all immigrants except for those from USA. However, only the negative coefficients are significant and substantial in size. Finally, in column (3) we include a measure for the time that elapsed since immigration to Canada and estimate a model for the relatively small sub-sample of immigrants who hold life insurance. While many of the point estimates lose their significance, the coefficient on the measure of time since arrival in Canada is positive and highly significant. The estimate indicates that with every year that passes since immigration, the value of life insurance holding increases by around $20, all else equal.

In analogy to the previous approach, we turn next to a graphical analysis. Figure 3 illustrates the changes of the value of life insurance over the lifetime while differentiating between nationalities of the respondent. Value of life insurance is estimated to peak in the late 60's and takes clearly the highest value for individuals born in Canadian. Consistently with previous observations, life insurance for French immigrants or those from the "Other Country" category has the lowest value. Next we analyse how the value of life insurance changes as a function of the time that elapsed since immigration. Figure 4 presents the results. It can be seen that the value of the immigrant's life insurance increases sharply during roughly the first twenty years since immigration. It is also interesting to observe that the value of life insurance holdings of the immigrants converges to the average value of the Canadians.

6. Conclusion

This study investigates life insurance demand of immigrants in Canada in 1911. This important time period in Canadian history is characterised by a remarkable economic and population growth. Moreover, state intervention on the equally rapidly growing insurance market is limited only to regulatory actions. As a result, the decision to purchase insurance at this point in time can be viewed as being based on purely private motivations. Based on a sample from the Census of Canada we investigate those motivations for immigrants. The results indicate that immigrants' life insurance holdings are on average around seven percent lower than that of individuals born in Canada. This pattern holds independent from the time that elapsed since immigration. Interestingly, the relationship is found to be concave: insurance demand grows during the first eighteen years or so after immigration and begins to fall afterwards. This study also discloses that the value of life insurance is consistently lower for immigrants who hold such policies and that it converges towards the Canadian average with every year that elapses since immigration.

We interpret the emerging pictures as, firstly, a possible indication for lower risk aversion of immigrants and, secondly, tentative evidence of the development of private networks that enable informal risk sharing and hence subsequently decrease individuals demand for insurance. Furthermore, the sharp increase of the life insurance value that occurs during the roughly first two decades after immigration may be a sign for immigrants' economic outperformance of Canadians. Borowiecki (2011). for example, demonstrates that 19th century born composers experience the largest productivity gains after they have migrated.

The decision made by a Canadian household head to purchase life insurance in 1911 was largely based on an individual choice of how to best ensure the wellbeing and continued prosperity of their family. Increasing life expectancy meant the accumulation of assets became more important than ever while a growing reliance on human capital derived earnings ensured that the income required to obtain these assets became ever more subject to risk. Life insurance could act as an instrument by which to accumulate assets and protect against risk at the same time. Despite the fact that variables controlling for wealth and education are unavoidably omitted, the analysis produces interesting findings nonetheless.

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Tables

Table 1. Descriptive Statistics.

	Mean	Std dev.	Obs.
Panel A: Household Controls			
Male	0.95	0.22	1694
Age	44.63	13.89	1691
Prairie	0.54	0.50	1694
Spouse	0.79	0.41	1693
Number Dependent Children	1.56	1.78	1691
Canada	0.70	0.46	1691
England	0.15	0.35	1693
Ireland	0.03	0.18	1693
Scotland	0.05	0.22	1693
France	0.01	0.09	1693
USA	0.02	0.13	1692
Other Country	0.04	0.19	1693
Immigrant	0.30	0.46	1691
Years Since Immigration	20.33	18.57	466
Panel B: Insurance Demand			
Life Insurance	0.37	0.48	1692
Value of Life Insurance	1851.39	2000.80	619
Premium Life Insurance	46.77	90.50	583
Panel C: Occupation			
Occupation1	0.04	0.19	1694
Occupation2	0.55	0.50	1692
Occupation3	0.17	0.37	1694
Occupation4	0.06	0.25	1693
Occupation5	0.09	0.29	1694
Occupation6	0.08	0.27	1693
Farmer	0.45	0.50	1694
Income (last year)	676.52	370.38	548
Second Income	0.19	0.39	1691
Panel D: Religion			
Methodologist	0.34	0.47	1678
Anglican	0.19	0.39	1693
Presbyterian	0.27	0.45	1691
Catholic	0.12	0.33	1693
Quaker	0.01	0.08	1693
Baptist	0.04	0.19	1692
Other Religion	0.02	0.15	1692

Table 2. The Demand for Life Insurance and Immigration.

	Probability of Having Life Insurance				
	Probit				
	(1)	(2)	(3)	(4)	(5)
Male	0.137**	0.136**	0.134**	0.133**	0.0294
	(0.0614)	(0.0619)	(0.0630)	(0.0614)	(0.132)
Spouse	0.183***	0.182***	0.179***	0.180***	0.109*
	(0.0309)	(0.0309)	(0.0313)	(0.0309)	(0.0579)
Age	0.0130**	0.0120**	0.0128**	0.0133**	0.0181*
	(0.00593)	(0.00594)	(0.00603)	(0.00597)	(0.0101)
Age Squared	-0.000162***	-0.000150***	-0.000158***	-0.000167***	-0.000201*
	(6.26e-05)	(6.30e-05)	(6.40e-05)	(6.34e-05)	(0.000104)
Number Dependent Children	-0.00449	-0.00530	-0.00535	-0.00720	-0.00651
	(0.00757)	(0.00757)	(0.00767)	(0.00761)	(0.0150)
Farmer	-0.320***	-0.323***	-0.307***	-0.317***	-0.307***
	(0.0365)	(0.0366)	(0.0379)	(0.0372)	(0.0666)
Occupation1	0.292***	0.290***	0.285***	0.284***	0.328*
	(0.0832)	(0.0835)	(0.0860)	(0.0843)	(0.168)
Occupation2	0.225***	0.219***	0.207***	0.224***	0.323***
	(0.0587)	(0.0592)	(0.0608)	(0.0591)	(0.112)
Occupation3	0.103*	0.108*	0.112*	0.113*	0.187
	(0.0617)	(0.0619)	(0.0638)	(0.0618)	(0.117)
Occupation4	0.0555	0.0634	0.0867	0.0706	0.154
	(0.0713)	(0.0719)	(0.0740)	(0.0723)	(0.131)
Occupation5	-0.129**	-0.118**	-0.105*	-0.118**	-0.0464
	(0.0561)	(0.0572)	(0.0599)	(0.0569)	(0.105)
Second Income	0.0485	0.0459	0.0460	0.0402	0.0321
	(0.0349)	(0.0349)	(0.0355)	(0.0349)	(0.0605)
Prairie	-0.00515	0.00739	-0.0282	0.0158	-0.150***
	(0.0255)	(0.0261)	(0.0268)	(0.0262)	(0.0554)
Immigrant		0.0712***	-0.0558**		
		(0.0268)	(0.0281)		
England				-0.0502	
				(0.0349)	
Ireland				-0.0367	-0.0419
				(0.0690)	(0.0746)
Scotland				0.0142	0.107
				(0.0574)	(0.0676)
USA				0.0437	0.0876
				(0.0906)	(0.104)
France				-0.292***	-0.212***
				(0.0552)	(0.0754)
Other Country				-0.273***	-0.203***
				(0.0382)	(0.0546)
Years Since Immigration					-0.000117
					(0.00179)

20

Methodist			0.151***		
			(0.0427)		
Anglican			0.126**		
			(0.0495)		
Presbyterian			0.228***		
			(0.0445)		
Quaker			0.221		
			(0.173)		
Baptist			0.263***		
			(0.0751)		
Other Religion			0.153		
			(0.0942)		
Observations	1680	1678	1660	1679	463
Pseudo R2	0.097	0.1	0.113	0.111	0.157

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
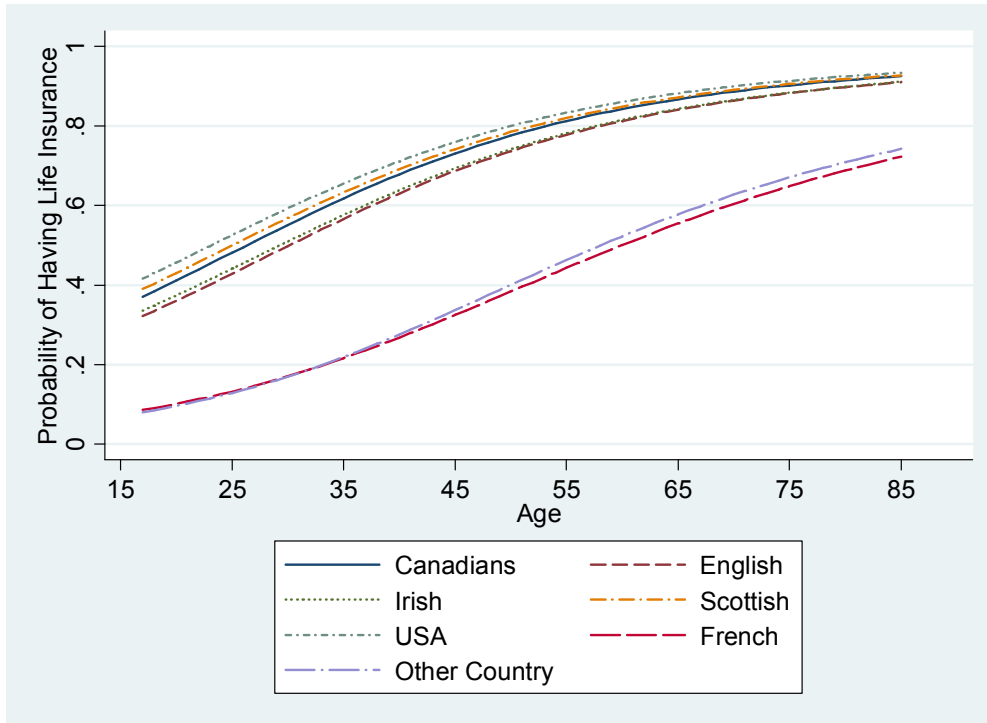
Table 3. Value of Life Insurance and Immigration.

	Value of Life Insurance		
	Two-Stage OLS		
	(1)	(2)	(3)
Male	2,992**	2,990**	929.5
	(1,381)	(1,226)	(566.2)
Spouse	2,619	2,640*	-1,284
	(1,693)	(1,514)	(811.6)
Age	207.4*	226.4*	-292.1
	(115.4)	(120.3)	(182.9)
Age Squared	-2.322	-2.566*	3.273
	(1.419)	(1.484)	(2.070)
Number Dependent Children	-21.08	-47.16	127.4
	(67.04)	(74.07)	(88.88)
Farmer	-5,106*	-5,116**	3,296
	(2,713)	(2,425)	(2,270)
Occupation1	5,316**	5,341***	-557.3
	(2,223)	(2,002)	(2,566)
Occupation2	3,626**	3,779**	-2,987
	(1,749)	(1,663)	(2,124)
Occupation3	1,299	1,418*	-1,965
	(861.7)	(848.0)	(1,404)
Occupation4	292.6	411.7	-2,072
	(551.8)	(588.2)	(1,273)
Occupation5	-2,287**	-2,311**	15.55
	(1,119)	(989.1)	(782.0)
Second Income	59.61	-9.293	-595.7
	(372.6)	(321.0)	(453.4)
Prairie	141.9	239.2	1,699*
	(212.9)	(241.9)	(999.3)
Immigrant	-1,201*		
	(668.9)		
England		-985.2**	
		(492.3)	
Ireland		-970.1***	44.17
		(370.4)	(444.6)
Scotland		-20.50	-1,164
		(356.5)	(730.4)
USA		170.2	-693.0
		(522.8)	(857.0)
France		-6,886**	2,537
		(3,220)	(1,918)
Other Country		-6,213**	2,199
		(2,952)	(1,723)
Years Since Immigration			19.41**
			(8.716)
Inverse Mills Ratio	6,823	6,992*	-5,763
	(4,460)	(4,054)	(3,644)

Constant	-14,381	-14,982*	13,150
	(9,013)	(8,511)	(8,148)
Observations	615	616	149
R-squared	0.176	0.180	0.255

Note: Robust standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.
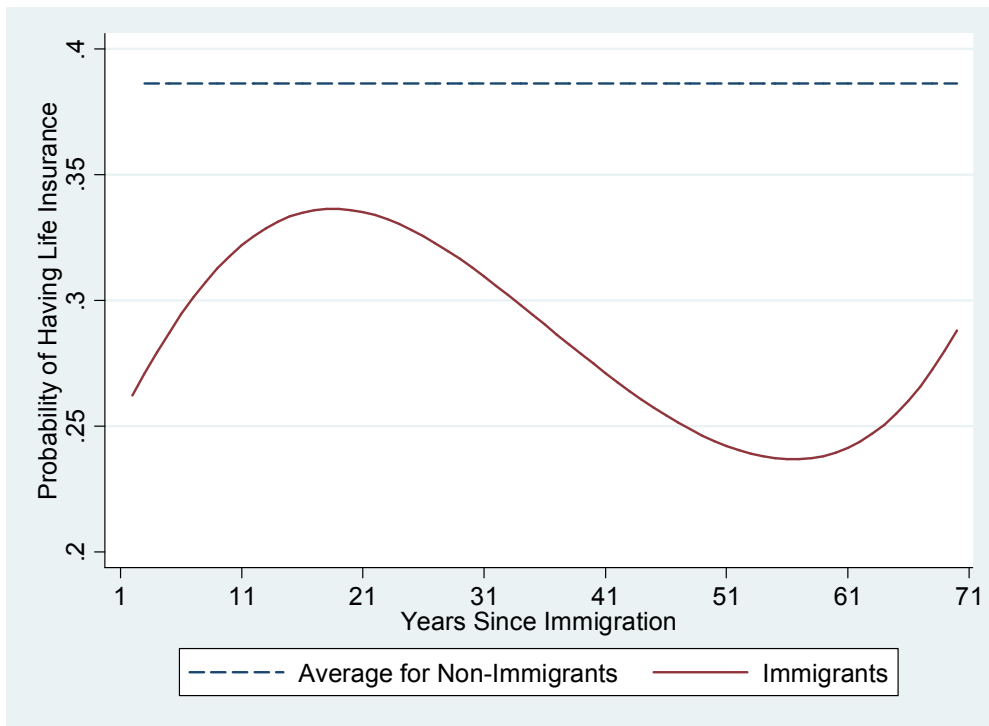
8. Figures

Figure 1. Probability of Having life insurance and age (by country of origin).

Note: Probabilities of having life insurance are obtained by the means of Monte Carlo simulation techniques and based on the model outlined in column (4) of Table 2.

Figure 2. Probability of having life insurance and years since immigration.

Note: Probabilities of having life insurance are obtained by the means of Monte Carlo simulation techniques and based on the model outlined in column (5) of Table 2, allowing for a higher order of the "Years Since Immigration" polynomial.

Figure 3. Value of life insurance and age (by country of origin).
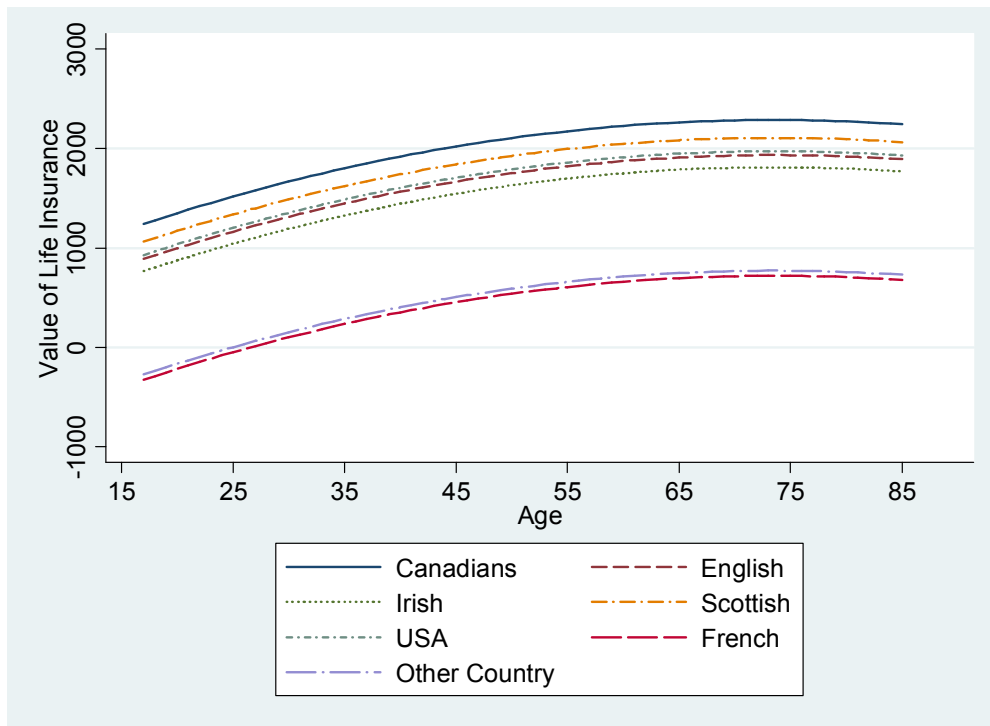
Note: Value of life insurance is estimated by the means of Monte Carlo simulation techniques and based on a model with same control variables as presented in column (2) of Table 3.

Figure 4. Value of life insurance and years since immigration.
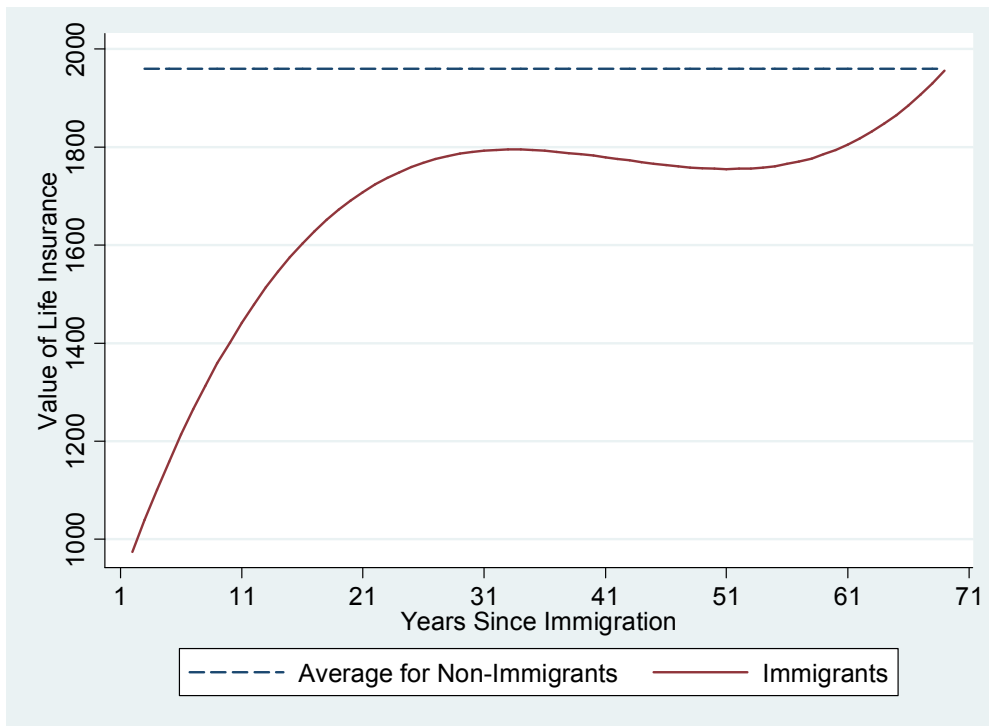
Note: Value of life insurance is estimated by the means of Monte Carlo simulation techniques and based on the model outlined in column (3) of Table 3, allowing for a higher order of the "Years Since Immigration" polynomial.

9. Appendix

Sample of the 1911 Census of Canada

Data was collected from the 1911 Census of Canada available to be publicly downloaded in its original form from Library and Archives Canada, www.collectionscanada.ca/archivianet/1911/index-e.html. The sample was chosen so as to be broadly representative of the population of Canada as a whole, in respect to both demographics and geography, and consisted of returns from Hartney, Deloraine and Township 5 in the Souris region of Manitoba and Peterborough and St. Catharines in Southern Ontario. The province of Manitoba was selected as being representative of the newly settled "prairie" region due to its rapidly growing population and agrarian based economy. Deloraine and Township 5 were rural areas consisting of allotments of farmland while Hartney was a small rural town with a population of around 600. The town's inhabitants were a mix of farmers and other occupations associated with farming such as merchants, blacksmiths and labourers. The cities of St. Catharines and Peterborough were selected to represent the established eastern region, being medium sized urban centres with established manufacturing and service industries. The city of St. Catharines had a population of 12,484 in 1911. The city was a centre of industry at the beginning of the twentieth century, particularly in the manufacture of textiles and paper. The development of industry was largely driven by access to electricity from the hydro-electric power plant built in 1898. Peterborough had a population of about 14,300 when it was incorporated as a city in 1905. The principal industries of the city included boat building and food processing.