The Effect of Household Characteristics on the Probability of Homeownership in Canada

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Major paper presented to the Department of Economics of the University of Ottawa in partial fulfillment of the requirement of the M.A. degree.

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Ottawa, Ontario
January 2017

Abstract

I study the probability of owning a home for Canadian households and how it is related to the characteristics of households. The characteristics considered include the respondent's marital status, age, household income before taxes, employment status, the number of vehicles owned, the size of the household and the province of residence. I exploit data from the Survey of Household Spending in 2009. A logit model is estimated to capture the effect of the household characteristics. The main finding is that the probability of owning a home increases as the respondent gets older. A married respondent is more likely to own a home than an unmarried respondent. People with higher incomes are also more likely to own a home. The probability of owning a dwelling increases when vehicles are owned by the household. Province of residence is also an important factor which affects homeownership. However, the respondent's level of educational attainment and the size of the household do not affect the probability of homeownership.

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1. Introduction

Homeownership is a form of housing tenure in which the individual owns the home in which he or she is living. This home could be of any type, like a house, apartment or condominium. A dwelling is usually the single most expensive purchase a household makes, and often costs several times the household's annual income. A life goal for many families, the purchase of a dwelling represents both consumption and investment for households. An owned home provides a household with economic and social benefits that spread to other parts of people's lives.

The homeownership rate in a country is the proportion of households that own their dwelling. Table 1.1 ranks countries by their homeownership rates. Romania had the highest homeownership rate in the world, 96.4%, in 2015. Canada and United States had similar homeownership rates, 66.5% in 2014 and 63.5% in 2016 respectively. There was a pretty low rate in Switzerland, 44.5%, in 2014.

Table 1.1 Homeownership rates in selected countries

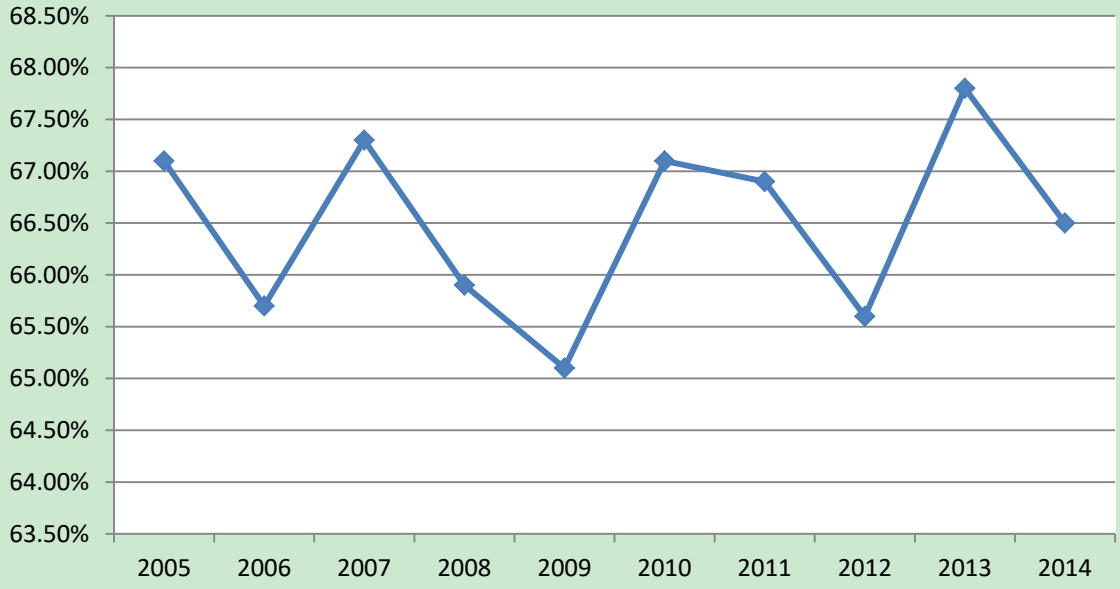
Country	Homeownership rate (%)	Date of information
Romania	96.4	Dec/2015
Singapore	90.8	Dec/2015
Slovakia	90.3	Dec/2014
China	90.0	Dec/2014
Croatia	89.7	Dec/2014
Lithuania	89.4	Dec/2015
Netherlands	67.8	Dec/2015
Canada	66.5	Dec/2014
United States	63.5	Sep/2016
United Kingdom	63.5	Dec/2015
Switzerland	44.5	Dec/2014

Source: Wikipedia (2016).

Data from Trading Economics (2016) shows the homeownership rate in Canada between 2005 and 2014, plotted in chart 1.1. During this period, the lowest homeownership rate was in 2009, 65.1%, and the highest rate was in 2013, 67.8%. The homeownership rate in 2014 was 66.50%, which is the same as the average over these ten years.

Data from the 2011 National Household Survey, presented by Situ and LeVasseur (2013), show that 9.2 million of 13.3 million Canadian households, or 69%, owned their dwelling in 2011. Situ and LeVasseur note that this homeownership rate is similar to the rate in the 2006 Census, which means that the homeownership rate remained stable after a period of increasing growth between 1991 and 2006. Four in five families consisting of a couple, or 82.4%, owned their dwelling. Among non-family households, less than half owned their dwelling, or 48.5%. More than half (55.6%) of lone-parent households in 2011 owned their dwelling.

Chart 1.1 Canadian Homeownership Rate



Source: Trading Economics (2016).

Homeownership rates in Canada also differ by age group. Table 1.2 shows that the age group 55 to 64 is usually the group with highest homeownership rate from 1971 to 2006. Younger people aged 20 to 34 have the lowest homeownership rate, which is always below the average for all ages. Homeownership rates have increased for the 55-64 and 65-74 age groups over the past 35 years.

Table 1.2 Homeownership rate by age group, all households (unit: %)

	All ages	20 to 34	35 to 54	55 to 64	65 to 74	74 and older
1971	60.3	36.1	69.5	71.5	68.9	65.7
1976	62.3	44.3	72.6	71.8	66.1	61.0
1981	62.5	44.6	73.8	73.6	66.1	57.1
1986	62.6	42.6	72.4	75.0	68.5	57.5
1991	63.0	41.9	71.1	75.8	70.6	58.7
1996	64.0	41.0	69.9	76.4	73.3	62.3
2001	66.3	41.4	70.9	77.2	75.4	66.3
2006	68.9	46.0	72.9	77.9	76.3	68.0

Source: Statistics Canada (2011), Chart 14.1.

In Canada, there are also important differences in homeownership rates across provinces. Table 1.3 shows the provincial homeownership rates in Canada in 2013. There are three types of dwelling tenure: owned with a mortgage, owned without a mortgage, and rented. The overall homeownership rate in Canada is 67.8% in 2013, while the rented dwelling rate is 32.2%. Among the provinces, Newfoundland and Labrador has the highest ownership rate in 2013, 76.0%, while Quebec has the lowest ownership rate at 62.5%. The ownership rate in Ontario is 68.6%, which is close to the average across provinces.

Table 1.3 Homeownership rate in Canada, 2013 (unit: %)

	Owned dwelling with mortgage	Owned dwelling without mortgage	Owned dwelling	Rented dwelling
Canada	38.1	29.7	67.8	32.2
Newfoundland and Labrador	33.7	42.3	76.0	24.0
Prince Edward Island	36.5	38.1	74.6	25.4
Nova Scotia	33.8	36.0	69.8	30.2
New Brunswick	37.4	37.5	74.9	25.1
Quebec	35.3	27.2	62.5	37.5
Ontario	40.9	27.7	68.6	31.4
Manitoba	37.3	29.7	67.0	33.0
Saskatchewan	32.4	37.8	70.2	29.8
Alberta	39.6	33.2	72.8	27.2
British Columbia	37.1	31.1	68.2	31.8

Source: Statistics Canada (2015), Table 203-0027.

In this paper, I exploit data from the 2009 Survey of Household Spending to examine homeownership in Canada. I aim to find out which factors affect households' dwelling status with respect to owning a home or not. I use a logit model to test if there are factors that affect the probability of owning a home for households.

From my results, I find that the probability of owning a home increases significantly as the respondent's age goes up. A married respondent is more likely to own a home than an unmarried respondent. People whose income is higher also have a higher probability of owning a home. Households that owned one or more vehicles in 2009 are more likely to own a home than those that did not own a car. Province of residence is also an important factor which affects homeownership. However, the respondent's educational level and the size of household do not have much effect on the probability of owning a home.

My paper is organized as follows. Section 2 presents a literature review of some recent studies on homeownership. The data and variables I use, summary statistics, and the econometric model of my paper are described in section 3. Section 4 presents the empirical

results of my econometric model and the conclusions are presented in section 5.

2. Literature Review

As a home is an important single purchase for households, homeownership is often seen as a life goal for families. Here I review some relevant literature related to homeownership in Canada and other countries. The literature I discuss in this section focuses on studies of house affordability, factors which affect homeownership and geographical differences in homeownership.

2.1 Studies of Housing Affordability

Different measures of housing affordability can be found in the literature on homeownership in Canada. Rea, MacKay and LeVasseur (2008) provide a descriptive analysis of homeownership based on data from the 2006 Census of Canada. They define housing affordability as the percentage of household income devoted to shelter costs. If this proportion is larger than 30%, they consider housing to be unaffordable.

Crawford and Faruqui (2012) focus on the main factors behind the upward trend in household credit in Canada since the late 1990s, using household microdata from the Canadian Financial Monitor (CFM) survey from 1999 to 2011. They use a different measure of housing affordability than Rea, MacKay and LeVasseur (2008), the affordability measure (AFF). AFF is equal to the ratio of monthly mortgage payments to disposable income, (DI):

$$\text{AFF} = \frac{\frac{r}{(1-(1+r)^{-N})}M}{DI}.$$

In this equation, r represents the mortgage rate, N is the maximum amortization period in

months and *M* is the total value of the mortgage. Decreases in affordability are associated with increases in AFF. Increases in either house prices or interest rates increase AFF and therefore decrease affordability, while increases in disposable income or the amortization period will decrease AFF and increase affordability.

AFF is a household-level measure of affordability. In Crawford and Faruqui's (2012) econometric analysis, they include AFF in a probit model to examine the factors that can cause a household to transition from a renter to a house owner, estimated using their microdata for 2010. They conclude that lower mortgage affordability has a negative impact on the probability of purchasing a house, and that this impact is greater for younger households.

After analyzing data from the 12th Annual Demographia International Housing Affordability Survey, Cox and Pavletich (2016) discuss housing affordability in Canada in their descriptive analysis. An aggregate measure of housing affordability is defined in their study, called the "Median Multiple". It is calculated as the "median house price divided by gross annual median household income," (Cox and Pavletich 2016, 6). Housing is considered to be "severely" unaffordable when the index is larger than 5.0. When the index is between 4.1 and 5.0, housing is "seriously" unaffordable, and if it is between 3.1 and 4.0, housing is "moderately" unaffordable. Housing is considered to be affordable when the index is smaller than 3.0 (Cox and Pavletich 2016, 6). Cox and Pavletich argue that there has been a seriously unaffordable housing market in Canada recently, since the Median Multiple in 2015 was 4.2. Then they examine local house affordability in Canada and conclude that Vancouver has the most unaffordable housing as compared to all other cities in Canada, with a Median Multiple

of 10.8 in 2015. Although the housing affordability index in Toronto had decreased from 1971 to 2001, by 2015, it had reached 6.7, which is still much too high to be affordable. The city with the lowest Median Multiple in Canada is Moncton (NB), where the Median Multiple is only 2.3. Houses in other cities like Windsor and Thunder Bay are also affordable for households, as these cities have an index of no more than 3.

2.2 Studies of the Factors which Affect Homeownership

Although homeownership is considered to be a life goal by many people, many households in Canada rent a house for employment reasons or other reasons, even though homeownership may be affordable for them. In my paper, I would like to determine the factors that are related to households' homeownership. When a household is making the decision of whether to own a house or not, what factors affect its choice? The following studies will help me find out some of the reasons why a household decides to buy a house.

In an early econometric study of the determinants of homeownership, Li (1977) estimates a logit model using grouped data for families in Boston and Baltimore in 1970. The explanatory variables include dummy variables reflecting income, age of the head, size of the family and the race of the head. He also includes interactions between these variables in some specifications. He finds that for the three linear variables (age, income and size), a linear age effect can be rejected most significantly, while a linear income effect can be rejected least significantly. Among the interactions, the income-size interaction and the age-size interaction are most significant. He also argues that the importance of these interactions rises when the number of black families in both Boston and Baltimore increases.

Suttor (2009) focuses on rental housing in postwar Canada by comparing Canada to several other countries in his descriptive analysis. The percent of households renting in Canada remained relatively stable between 30% and 40% in the postwar period from 1950 to 2000. In Canada, there is a stronger positive relationship between the demand for rental housing and population growth compared with the US and Australia, as well as Europe. Other factors like migration, urbanization and the homeownership policy regime in Canada contributed to the high proportion of households renting. Suttor (2009) suggests that another possible factor is car ownership. Postwar car ownership in Canada was lower than in the US, which may be associated with less suburban house ownership in Canada than in the US. In my study, I introduce a variable which indicates how many vehicles a household owned in 2009. I aim to determine whether as the number of vehicles owned by a household increases, it becomes more likely that the household will own a home.

Harding, Solheim and Benedictow (2004) use the theory of the portfolio frontier to examine a household's investment in housing, with a particular interest in how taxes affect the housing market. They calibrate their model using data for Norway. They find that a high tax on housing does not necessarily decrease the holding of houses. They consider two taxes, a capital gains tax and a tax on implied rent. They point out that a capital gains tax on housing similar to the capital gains tax on equity will increase the proportion of housing assets in a household's portfolio, because the risk associated with holdings of housing assets is decreased by the capital gains tax. In addition, they suggest that a tax on implied rent does the opposite; that is, it makes households reallocate funds from housing to equity investment. In my study, I use household income before taxes to test if income affects the probability of

homeownership.

Kurz and Blossfeld (2004) argue that from the 1970s to the 1990s, the speed of economic growth slowed down and unemployment rates rose in most Western industrialized countries in their descriptive analysis. This slowdown limited the ability of young households to purchase homes. They argue that younger people are becoming homeowners increasingly later in life; because educational opportunities are greater for young people than the past, young people are spending more time in school. Employers also have a high demand for better-educated employees, further encouraging younger people to prolong their education and set up their households later. In my study, I use dummy variables for age groups to test if age affects the probability of owning a home.

Hou (2010) uses data from eight Canadian censuses of population between 1971 and 2006 to examine how the age profile of homeownership changes over generations. In his econometric analysis, he finds that the age profile of homeownership varies little with birth cohort. The results suggest that in Canada, the homeownership rate increases quickly with the age of the household head until age 40. Then the rate continues to rise but the rate of increase slows, and after age 75, it begins to fall. He also finds that family income is related to the level of homeownership, as is family type. He defines five family types: couples with children, couples with no children, female lone parent, male lone parent and non-family individual. The homeownership rate for couples with no children and non-family individuals increased greatly from 1971 to 2006 as the proportion of these two groups in the population increased, although couples who have children were always the most likely to own a house from 1971 to 2006. I also add dummy variables to indicate the size of a household. I expect

that a household will be more likely to own a home when there are more members in it.

In a related branch of the literature, Oswald (1997) argues that there is a strong relationship between the housing market and unemployment in his econometric analysis. After comparing data on unemployment rates and homeownership rates in both European regions and U.S. states from the 1960s to the 1990s, he suggests that as homeownership rates increase by 10 percentage points, the unemployment rate increases by 2 percentage points. He concludes that the rise of European unemployment since 1960 is explained by the rise of homeownership in Europe, and that current homeownership rate differences among OECD countries lead to the current difference of unemployment rates.

As Oswald's work was tentative instead of conclusive, a number of studies were carried out by other authors to explore the relationship between homeownership and unemployment. Green and Hendershott (2001) re-examine Oswald's study of the relationship between homeownership and unemployment rates. They note that Oswald (1997) argues that homeowners are less likely to move than private-sector renters. They are also less willing to look for a job when they are unemployed. Thus if homeowners become unemployed, they stay unemployed longer than renters do in Europe. Based on this statement made by Oswald, the two authors investigate the cross-sectional variation of changes in homeownership and unemployment rates in the US from 1970 to 1990. Then they re-estimate their model for six different age groups and find that the positive relationship between homeownership and unemployment rates only exists for middle-aged (35-64) households. Their explanation for why this happens is that "younger households have accumulated little wealth and have had less time to become attached to the geographical area than middle-aged households, and thus

are more likely to respond to unemployment by relocating." (Green and Hendershott 2001, 1510). In contrast, many members of older households are no longer in the labour force. They also suggest that households that are planning to move are less likely to purchase a home than those are not.

Pehkonen (1999) also investigates Oswald's hypothesis using regional data for 13 Finnish labour districts. In his econometric analysis, he finds that an increase of ten percentage points in the owner-occupation rate is associated with a one percentage point increase in the Finnish unemployment rate. This result is consistent with Oswald's and provides additional evidence that there is a positive relationship between homeownership and unemployment rates.

Leuvensteijn and Koning (2004) use longitudinal data on individuals from the Netherlands for the period 1989-1998, to jointly model homeownership and job duration to address the same issue that Pehkonen studied. They also include an instrumental variable, regional homeownership, in their homeownership model, for identification purposes. They find that the regional homeownership rate affects an individual's housing status significantly. This means that individuals who live in a region where there is a high proportion of homeowners are more likely to be homeowners themselves, holding all else constant. An important result is that they did not find homeowners any less likely to change jobs than tenants. They suggest that whether to buy a house or not is affected by the individual's job commitment, but that the reverse is not true. In my paper, I will try to examine the relationship between a household employment status and homeownership by including a dummy variable that indicates whether a household includes any wage earners or not.

As a normal good, a dwelling is usually the most expensive single purchase a household make and many studies have been done to determine if other factors also affect this purchase decision. After using data for people between 23 and 31 years old from 1997 to 2010, Mezza et al, (2016) argue that student loan debt can affect homeownership negatively, in that a 10% increase in student loan debt leads to a 1-2% decrease in the homeownership rate. Hood (1999) also examines the determinants of homeownership using the data from the National Longitudinal Survey of Youth on the 1996 panel in his econometric analysis. He finds that family income, race, gender, educational attainment, age, and marital status have significant positive effects on homeownership. He also finds that family size and parental homeownership do not affect homeownership significantly.

While some factors affect the probability of owning a dwelling, homeownership can also have social benefits. Coleman (2005) argues that homeownership can contribute to life satisfaction and he also quotes a result from the Joint Center for Housing Studies at Harvard University that homeownership contributed to both physical and psychological health.

2.3 Studies of Geographical Differences in Homeownership

Rea, MacKay and LeVasseur (2008) provide a descriptive analysis of homeownership based on data from the 2006 Census of Canada. They find that Quebec has a homeownership rate of 60.1%, the lowest in Canada in 2006, while Atlantic Canada has the highest rate, 78.7%. Seventy-one percent of households in Ontario own their houses, as do 71.8% of those in Saskatchewan. Canadian census data in 2006 indicate that for Canada as a whole, the percentage of homeowners spending 30% or more of their income on shelter was 17.8%,

while for renters, the percentage was 40.3%. They also find that in all Canadian regions except for Nunavut and the Yukon, the urban homeownership rate is lower than the rural homeownership rate. For geographical differences, I will include province/territory dummy variables in my model of the probability of owning a home.

An article by the Quebec Federation of Real Estate Boards (2013) analyzes the results with respect to homeownership of the 2011 National Household Survey. It focuses on the homeownership rate, which is the ratio of home owning households to total private households. With a particular focus on Quebec, they point out that during 1971-2011, the number of households in Quebec who rent their house increased by 55%, while the number of households who own their house increased by 173%. Overall, the homeownership rate in Quebec increased by 14 percentage points from 1971 to 2011. Although this was the largest increase among the ten provinces, Quebec's homeownership rate was still the lowest in Canada. In Canada as a whole, the homeownership rate in 2011 was almost 70%, but in Quebec, it was only 61.2%.

This article also discusses some of the determinants of homeownership. Household income, borrowing conditions and demographic factors are highlighted. One important factor they mention is the comparison between the shelter costs of owning and renting. They suggest that as the ratio between the cost of owning and renting a property increases, households have more incentive to rent a dwelling. Households are more likely to own a home when this ratio is lower. They argue that the ratio between the cost of owning and renting was 137 percentage points in Quebec in 2011, while it was 133 percentage points in the rest of Canada, which explains the lower homeownership in Quebec.

3. Data, Variables, Summary Statistics and Econometric Model

In this paper, I use microdata from the Survey of Household Spending (SHS) in 2009. It was carried out in private households in Canada's 10 provinces and three territories by Statistics Canada. No microdata have been released for the newer surveys of household spending in 2010 and 2011, so I use data from the 2009 survey, which is the latest one with complete data on household spending. There are 256 variables and 10,811 observations in the original data file. I use some of these variables as described in the following sections. After deleting observations for which key variables are missing, there are 10,432 observations remaining in my sample.

Homeownership is based on the willingness of households to own a dwelling. This dwelling is also known as commercial real estate, and can be traded. The decision to buy a dwelling is both a consumption and an investment decision for households. The economic theory of consumption can thus provide some insights into the determinants of the demand for housing. First, as it is a normal good, the demand for a dwelling increases when the income of the household increases. Therefore, people with higher income may have more incentive to own a home or increase the size of the dwelling they are living in. In this case, income should be a potential factor that can affect the homeownership decision. As the educational level and employment status of individuals can affect household income, these two factors may also affect homeownership. Durability is another characteristic housing has. As Arnott (1987) says, "as the most durable of major commodities, a dwelling can be held by households for many years," (Arnott 1987, 959) Therefore, the age of individuals may also be a factor which can affect a household's decision to own a home. Other factors identified by

the studies reviewed in section 2 include household income, marital status, educational attainment and size of household. The number of owned vehicles and province of residence are also included.

3.1 Dependent Variable

In the original data set, there is a variable called *TENTOIP*, which is defined as "dwelling tenure at time of interview." It has three values: 1 = Owned without mortgage by the household; 2 = Owned with (a) mortgage(s) by the household; 3 = Rented by the household or occupied rent-free by the household. I generate a binary variable called *OWN* as an indicator of homeownership. It indicates whether the household owns or rents its home. In my study, OWN_i = 1 if *TENTOIP* = 1 or 2, and OWN_i = 0 if *TENTOIP* =3. This binary variable, *OWN*, is used as the dependent variable in my study.

3.2 Independent Variables

Regarding the independent variables, I include income, marital status, age, level of education, number of owned vehicles, employment status, geographical factor and the size of family. The definitions of all variables are shown in table 3.1.

There are two income variables in the data set: the income of the household before taxes and the income of the respondent before taxes. I use the former in my study, because the income of the respondent may not accurately reflect a household's purchasing power; the respondent may be the earner with the lowest income in the family. The explanatory variable I use here, total household income before taxes, includes household income from earnings

and other incomes, but excludes personal income tax refunds. There is one household with negative income before taxes in the data set, and the associated respondent has no job. Her spouse has a full time job and works 52 weeks a year. The negative annual income for this household may be caused by the imbalance of income and expenditure or other reasons. Because it is the only case with negative income in the data set, and the cause of the negative income is unknown, this observation is deleted. Thus income before taxes in my study is always positive. The range for income before taxes in this data set is 0 to $680,000. To avoid the influence caused by outliers, I create five dummy variables to represent the income. I expect a positive relationship between income and homeownership, which means that household in a group of higher income is more likely to own a home.

As mentioned in section 3, Hood (1999) finds that married individuals are more likely to own a home than unmarried individuals. I therefore include the marital status of the respondent in my study as an explanatory variable to test if this positive relationship between marital status and homeownership exists in my sample. There are three values for this variable in the original data set: 1 = married or common law; 2 = never married (single); 3 = other (separated, divorced, or widowed). I combine the values 2 and 3 and generate a dummy variable called *MARRY* to represent the marital status of the respondent. *MARRY* = 1 if a person is married or in a common law relationship; *MARRY* = 2 if a person is never married, separated, divorced or widowed. I expect that a married individual is more likely to own a dwelling than an unmarried individual.

I also aim to find out if individuals of different ages have different probabilities of owning a home. There are 14 age groups in the original data set and each contains a 5-year

range, from under 25 years old to over 85 years old. I expand the range to 10 years for each group, which decreases the number of groups. There are eight age groups in my study: less than 25 years old, 25-34 years old, 35-44 years old, 45-54 years old, 55-64 years old, 65-74 years old, 75-84 years old and 85 years old and over. I generate eight dummy variables to represent age. I expect that individuals in an older age group are more likely to own a home than those in younger age groups.

The respondent's educational level is also included in this study. I use the highest degree, certificate or diploma attained by the respondent to test if the level of education affects the probability of homeownership. The original variable has eight values representing the following categories: 1 = No degrees, certificates or diplomas; 2 = Secondary (high) school diploma or equivalent; 3 = Trade/vocational certificate; 4 = Apprenticeship certificate; 5 = Community college, CEGEP or nursing school diploma; 6 = University certificate or diploma below Bachelor's; 7 = Bachelor's degree (B.A., B.Sc., B.Ed.); 8 = University degree, certificate or diploma above a Bachelor's. There are 49 observations with no answer, so I delete them from the sample. I generate eight dummy variables to represent the respondent's education level. I expect that the probability for individuals with a higher educational level to own a home is higher than for those who have a lower level of education.

As mentioned in the literature review, Suttor (2009) argues that a lower suburban homeownership rate in Canada than the US may be related to a lower car ownership rate. In my study, I also want to test if car ownership is associated with the probability of homeownership. In the original data set, there is a variable representing the number of vehicles a household owned in 2009, which has values from "zero" to "four". The "zero"

value indicates that no vehicles are owned by household, while values from “one” to “three” are the actual number of vehicles owned by the household. If the value is equal to four, four or more vehicles are owned by the household. I generate five dummy variables, shown in table 3.1 to indicate how many vehicles are owned in a household. I expect that as more vehicles owned by a household, the higher the probability that this household will own a home.

Related to the income factor, employment may also affect the probability of owning a home. There is no direct description of employment status in the original data set, so I use the sum of the number of full-time earners and part-time earners in a family to stand for the employment status of the household. I generate a dummy variable called *EMPLOY* = 1 if the sum of numbers of full-time earners and part-time earners in a family is greater than 0, and it is equal to zero otherwise. I expect a positive relationship between *EMPLOY* and homeownership, which would imply that when there is at least one earner in a household, the probability of owning a home is higher than when there are no earners.

As mentioned in the introduction, the difference in homeownership rates between provinces is also large. Table 1.3 shows that the homeownership rate in Canada was 67.8% in 2013. The province with highest rate was Newfoundland and Labrador (76.0%), while the lowest rate was in Quebec (62.5%). These differences are caused by many factors, like different taxes. In my study, I aim to find out if individuals living in different provinces in Canada have different probabilities of owning a home after controlling for other factors. The geographical variable in the data set, *PROVINCE*, describes where individuals live in Canada. There are 329 masked records in the data set, so I delete them and generate eleven dummy

variables to indicate the province/territory of residence.

Hood (1999) finds that the size of the household does not affect homeownership significantly, but Li (1977) finds that it does. In my study, I use the variable *SIZE* that summarizes the household size. There are six possible household sizes in the data set: one person, two people, three people, four people, five people and more than five people. I generate six dummy variables to test if the size of household affects the probability of owning a home for households. I expect a positive relationship between them, or that a household with a larger size is more likely to own a home than one with smaller size.

3.3 Summary Statistics

The summary statistics for all variables are shown in table 3.2. The mean of *OWN* in my sample is 0.6658, which implies that 66.58% of households own their home with or without mortgages, while 33.42% of them are renting a dwelling. As mentioned in the introduction, data from Statistics Canada in 2013 show that 67.8% of Canadian owned their home in that year. The homeownership rate in my sample is similar to that from Statistics Canada for 2013. Homeownership also differs among provinces in Canada. I compare the provincial homeownership rates in my sample data and those in table 1.3. In my sample, the highest homeownership rate is in Newfoundland and Labrador, 76.9%, while the second highest rate in New Brunswick (76.8%) is pretty similar to that in Newfoundland and Labrador. Ontario has the largest population in Canada and its homeownership rate is 67.4%. The lowest homeownership rate, in Quebec, is only 56.1% in my sample. I find that the homeownership rate in my sample differs from those of 2013. The rate in Newfoundland and Labrador is

similar, as it only differs by 0.9%. There is a difference of 1.2% for Ontario and 1.9% for New Brunswick. The largest difference is for Prince Edward Island, 6.7%, while the differences for Quebec, 6.4%, Saskatchewan, 4.7%, and British Columbia, 4.6%, are also large. There are two possible reasons why these differences exist. First, some observations were deleted from my sample due to missing data. Second, homeownership rates may have changed between 2009 and 2013.

Table 3.3 Homeownership in Canada

Province	Homeownership rate in my data set	Homeownership rate of Canada in 2013	Difference
Newfoundland and Labrador	76.9%	76.0%	+0.9%
Prince Edward Island	67.9%	74.6%	-6.7%
Nova Scotia	66.9%	69.8%	-2.9%
New Brunswick	76.8%	74.9%	+1.9%
Quebec	56.1%	62.5%	-6.4%
Ontario	67.4%	68.6%	-1.2%
Manitoba	65.5%	67.0%	-1.5%
Saskatchewan	74.9%	70.2%	+4.7%
Alberta	69.4%	72.8%	-3.4%
British Columbia	63.6%	68.2%	-4.6%

Source: Statistics Canada (2015), Table 203-0027

Table 3.2 also shows the distribution of income groups. Households with income between $60,000 and $90,000 constitute the largest proportion (29.47%) in my sample. About 24.81% of households earn less than $30,000 and 20.65% of households earn between $60,000 and $90,000 in my sample. The smallest income group is *INCOME5*, which has

household income before taxes greater than $120,000, it accounts for only 12.26%. One potential advantage of using income groups rather than actual income in my study is that the actual income lies between 0 and $680,000, and households with very low or very high incomes do not account for a large proportion of the sample. To avoid the effects of outliers, I use income groups.

Turning to the age of the respondent, *AGE4* (45-54 years of age) accounts for the largest share of the sample (21.62%). About 18.12% of respondents are 35-45 years old, which is similar to the 18.74% of respondents who are 55-64 years old. The lowest proportion is above 85, only 2.50%. The share of respondent under 25 years of age is also low at 3.83%. Thus the distribution of age groups in this sample is hill-shaped; the proportion of middle age individuals is high, while the proportions of young and old age are low.

The summary statistics for the highest level of education attained by the respondent are also shown in table 3.2. Respondents with no degrees, certificates or diplomas (*EDU0*) account for 21.83% of the observations. Respondents with a university degree, certificate or diploma above a Bachelor's account for 7.78%. The largest proportion 24.27%, is in *EDU1* (secondary or high school diploma or equivalent). *EDU3* has the lowest proportion in this sample; only 1.13% of respondents have an apprenticeship certificate as their highest level of education. The proportion of respondents with a community college, CEGEP or nursing school diploma (16.53%) is similar to that with Bachelor's degree, 13.40%.

About 57.96% of respondents are married or in a common law relationship, while 42.04% of respondent are single. The proportion of married respondents is over 15 percentage points larger than that of unmarried respondent. Over 43% of households owned one vehicle in 2009.

The second largest group is households that own two vehicles, who account for 27.78% of the sample. Households that own one or two vehicles are the most common, together constituting 70.83%. About 21% of households did not own a car, while almost 80% of households in my sample owned at least one car in 2009.

About 74% of households in the sample included at least one wage earner, and 25.54% of households did not have a part-time or full-time job in 2009. The proportion of employed households is also much larger than that of unemployed households.

The summary statistics for size of household are also shown in table 3.2. SIZE2 (two people in a household) accounts for the largest proportion (37.74%), in other words, households with two people are the most common. The second largest group is one person (27.89%). The sum of these two groups proportion is 65.63%, which indicates that household with one or two people are the most common. The least common household size is six or more people.

3.4. Econometric Model

In my paper, my aim is to find out which factors affect the probability of homeownership for households in Canada. The dependent variable in my study, *OWN*, is a binary variable. It is equal to one if households own a dwelling and equal to zero if households rent a dwelling. There are two models that are frequently used with this type of dependent variable, the probit and logit models. As Cameron and Trivedi (2009, 456-457) point out, the log-likelihood values of probit and logit models tend to be very similar, so it is hard to choose between them on econometric grounds. In my paper, I follow Li's (1977) work and I use the binary logit

model to analyze the effects on the probability of homeownership of the explanatory variables. The probability of homeownership is given by equation,

$$\Pr(y_i = 1|X_i) = \frac{\exp(X_i'\beta)}{1+\exp(X_i'\beta)}$$

where $\Pr(y_i = 1|X_i)$ is the probability that household *i* owns its dwelling, X_i is a vector of explanatory variables, and β is a vector of coefficients to be estimated. In my study, the vector X_i includes household income before taxes, age, marital status, education level of the respondent, number of vehicles, employment status, size of the household, and province of residence. All estimation was carried out using STATA. To avoid the problem of collinearity, I excluded the variable *INCOME2* ($30,000 < household income before taxes ≤ $60,000), *AGE4* (respondent 46-55 years old), *EDU1* (Secondary school diploma or equivalent attained by respondent), *CAR1* (One owned vehicle), *SIZE2* (two members in a household), and *QC* (household live in Quebec) in my logit regression.

Somewhat surprisingly, the provincial distribution in my data set does not correspond to the actual distribution of the Canadian population. For example, in 2009, the population of Ontario was more than twelve million, while the population of Prince Edward Island was less than fifteen thousand. However, in the SHS 2009, there are 1,486 households from Ontario and 492 households from Prince Edward Island. In other words, approximately 0.34% of the population of Prince Edward Island participated in this survey, but only 0.011% of the population of Ontario was interviewed. Thus one observation from Prince Edward Island represents about 300 persons, while one interviewed in Ontario represents more than 9,000 persons. In order to take this into account, I use probability weights in estimation, which means that the observations have a different probability of being sampled.

4. Empirical Results

After doing weighted estimation of a logit model of a household's probability of owning a home, I check the summary statistics of the model.[1] The Likelihood Ratio statistic for testing whether all the predictors' coefficients in the model are zero is 1,211.70, with a p-value of 0.0000. McFadden's pseudo R^2 is 0.3116, which is a reasonably good value for this type of model. Thus my model fits fairly well and has good explanatory power.

In linear models, the coefficient estimates measure the change in the dependent variable when the independent variables change. However, in a logit model, the estimated coefficients do not have this interpretation, so I examine instead the marginal effects on the probability of owning a home of each of the independent variable. I calculate marginal effects for a representative household. The reference household for the estimated model has the following characteristics: income before taxes of between $30,000 and $60,000; a respondent aged between 45 and 54 years old who is single with a secondary school diploma or equivalent; owns one vehicle, has no employed family members; consists of two people; and lives in Quebec.

In a logit model, household marginal effects can vary across households. Therefore, because I am particularly interested in the effects for different age groups, levels of income and numbers of owned vehicles, keeping other household's characteristics the same, table 4.1 shows marginal effects for several different age groups, while table 4.2 shows marginal effects for different income classes. Table 4.3 shows marginal effects for different numbers of vehicles owned by the household in 2009.

[1] The value of the unrestricted log-likelihood is -5814454.8

First, I will analyze the marginal effects for different age groups, which are shown in table 4.1. The effect of income is significant at the 1% level for all income groups, which implies that income is a factor which affects the probability of owning a home. For an individual under 25 years of age with household income before taxes between $30,000 and $60,000, the probability of owning a home is 9.82%. If the household income is lower than $30,000, the probability for this individual to own a home drops to 4.47%, which is a 54.48%decrease, if this individual's income increases to over $120,000, the probability of owning a home rises to 49.92%, which is an increase of 408.35%. For a 45-54 year-old individual with $30,000-60,000 in annual household income, the probability of owning a dwelling is 50.89%. If this individual's income is less than $30,000, the probability of owning a home turns to be 30.79%, which is a decrease of 39.50%. If this individual's income increases to $90,000-120,000, the probability of owning a home for him/her will be 82.29%, which constitutes an increase of 61.70%. These results indicate that individuals in the same age group will have different probabilities of owning a home when their household income before taxes changes. The higher their household income is, the more likely that they will own a home.

Marital status is another factor that has a significant effect on the probability of owning a home. For respondents in all age groups, the effect is significant at the 1% level. A person under 25 years old has a probability 9.82% of owning a home, if he/she is married, an increase of 4.59 percent points, or 46.74%. For a married individual who is between 45-54 years old, if he or she becomes single, the probability of owning a home decreases from 61.59% to 50.89%, or by 17.37%. For older people, this effect is still significant. A single

individual between 75 and 84 years old has a probability of 75.19% of owning a home. If this individual gets married, the probability of owning a dwelling increases to 82.41%. These results indicate that marital status is a factor which affects the probability of owning a home. After a single person gets married, the probability for him/her to own a home increases significantly, which follows my expectation and the results in Hood's study (1999).

The number of vehicles owned by a household also affects the probability of owning a home. For each age group, the representative household is assumed to have one car. As shown in table 4.1, the probability of owning a home increases with the number of cars, up to three. Households with four or more owned vehicles are less likely to own a home than households that own three vehicles. An individual under 25 whose household owned one car in 2009 has a probability of owning a home that is 195.78% higher than that of a household who did not own any vehicles in the reference year, but was otherwise identical. For a person who is between 45 and 54 years old with no car, if he/she owned a car, the probability for him/her to own a home increases from 24.69% to 50.89%, or 106.12 %. The positive effect of car ownership is also significant for older people. An individual who is 75-84 years old has a 48.89% of probability to own a home when he/she has no car.[2] If this individual owned a car, the probability of owning a dwelling will be 75.19%, which is pretty high. These results indicate that the ownership of car is also a significant factor which can affect the probability of owning a home for household positively. This result supports Suttor's (2009) hypothesis.

The results shown in table 4.1 also indicates that there are provincial differences in the probability of homeownership that and not captured by the other variables. In other provinces,

[2] As Professor Rose Anne Devlin pointed out, individuals in this age group may no longer drive, but may still own a home.

geographical factor can affect the probability of owning a home for household living in those provinces, except for British Columbia. For respondents under 25 year-old, the probability of owning a home in Quebec is 9.82%. If he or she lives in Nova Scotia, the probability of owning a dwelling increases to 14.68%, which is an increase of 49.49%. Individuals living in most of provinces are more likely to own a home than that living in Quebec, expect for Yukon, Territories, and Nunavut. The probability for an individual under 25 years of age to own a home decreases to 4.46% if he/she lives in Yukon, Territories, and Nunavut. The probability for individuals living in one province also increases as they become older. A respondent living in Ontario who is under 25 year-old has 12.11% probability to own a home. If this individual is 45-54 years old, the probability for him/her to own a home in Ontario increases to 56.73%, which is an increase of 368.46%. If a person is between 75-84 years old, the probability for him/her to own a home in Ontario increases to 79.31%. These results indicate that geographical factor, province, can affect the probability of owning a home for household significantly. The probability of owning a home in different provinces differs. For all age groups, household living in Newfoundland and Labrador are most likely to own a home, while those living in Yukon, Territories and Nunavut are less likely to own a dwelling. A possible reason for this is that income taxes differ in different provinces. The provincial rate in British Columbia is 7%, while that in Quebec is 9.975%. Quebec has a 24.80% higher total tax than that in British Columbia. Provincial differences in housing prices can also lead to different probabilities of home owning.

I mentioned earlier that I expect the level of education attained by the respondent to affect the probability of owning a home positively; in other words, the probability of

homeownership increases as the educational level increases. The results in table 4.1 indicate that the level of education attained by respondent is generally not a significant factor affecting the probability of owning a dwelling. However, some of the educational levels affect the probability of owning a home. Respondent under age of 25 years with Trade cert. are more likely to own a home than that with high school diploma, and this effect is significant at the 10% level. For other age groups, this effect is significant at the level of 5%. A respondent between 45 and 54 years old has a 58.89% probability of owning a home with a trade cert., 15.72% more likely than that with high school diploma while a respondent between 75 and 84 years old with a trade cert. is 7.37% more likely to own a home than that with high school diploma. This effect decreases as respondents being older. A respondent with apprenticeship is less likely to own a home than that with high school diploma, and this effect is significant at the 5% level for age under 25, between 45 and 54, and between 55 and 64. It is significant at the 10% level for age between 75 and 84. A respondent between 45 and 54 years old with apprenticeship has a 32.49% probability of owning a home, 36.16% less likely than that with a high school diploma. This effect also decreases as respondents getting older. Respondents with Bachelor's degree are more likely to own a home than those with high school degree, but this effect is not huge, while significant at the 10% level. A respondent between 55 and 64 years old with Bachelor's degree has 8.87% more probability to own a home than that with high school diploma. Respondents with Bachelor's degree are also less likely to own a home than those with apprenticeship for all age groups.

These marginal effects of the level of education do not support my expectation that individuals with higher education are more likely to own a home. To see if collinearity

between income and education is the explanation for this result, I checked the correlation between respondents' educational level and household income, using the original variables rather than the dummy variables for different categories. The results of these calculations indicate that the respondents' educational level and household income are not highly correlated.[3] Therefore, there is no strong multicollinearity between the level of education and income.

In addition, I regressed the original household income variable on respondents' educational level and the other variables of my model and find that as respondents' educational level increases, the household income before taxes increases. In this equation the coefficients of the educational dummy variables are statistically significant. It is thus possible that educational level does not affect homeownership directly, but affects household income, then, household income affects homeownership significantly. Another possibility is that these respondents are not the principal earners in a household and their level of education is not closely related to the household's purchasing power.

The employment status variable measures whether there is at least one earner in a household in 2009 or not. I expect that a household is more likely to own a home with one or more earners than with no earner. However, the marginal effects show that there is no relationship between employment status and homeownership in my sample because the estimated marginal effects are not significant at the 10% level. Oswald (1999) argues that the rise of unemployment is explained by the rise of ownership in Europe since 1960, but I do not find any evidence that homeownership is related to employment.

[3] The VIF is 1.01, Tolerance is 0.9886, and $R^2 = 0.0114$.

Hood (1999) finds that the size of the household does not affect homeownership significantly. In contrast, I expected that a household with more members would be more likely to own a dwelling, because there may be more income earners in that household. However, the results in table 4.1 indicate that none of the marginal effects with respect to household size are significant at the 10% level. Therefore, there is no relationship between the size of the household and homeownership. One possible reason for this is that even though there may be more earners in a large household, a dwelling with more rooms and equipment may not be more affordable for this household.

Next I discuss the results in table 4.2, which presents the marginal effects for different income groups. The significance of estimates in the marginal effects for different income groups is similar to that in different age groups. First, for age of respondent, all the estimated marginal effect, with respect to age, are significant at the 1% level. Looking at the row for age 55 to 64, the probability of owning a home is 40.56% if his/her household income is under $30,000. If this individual's household income increases to $30,000 to $60,000, the probability of owning a home increases to 61.29%, which is a 51.11% increase. If this individual's household income is over $120,000, the probability of owning a home becomes 93.56%, which is the highest among all income groups.

Turning now to the row for 85 years and older, such individual has a 55.03% probability of owning a home if their income is less than $30,000. If their household income increases to $90,000-$120,000, the probability that the household owns a home is 92.70%, or 68.45% higher. Within each income class, the probability of owning a home rises as age increases, until after age 85.

Like table 4.1, table 4.2 indicates that married individuals are more likely to own a home than those who are single. A married individual whose household income is less than $30,000 has a probability of 40.79% of owning a home. If this person's household income is between $30,000 and $60,000, the probability of owning a home becomes 61.59%, or 50.99% higher. If the household income for this individual keeps increasing, until it is above $120,000, the probability of owning a home becomes 93.62%, which is a 129.52% increase compared to a household with income less than $30,000. These results indicate that household income before taxes is a significant factor which affects the probability of owning a home positively.

Households that own a car also have a higher probability of owning a home than those with no car. The probability of a household with cars owning a home also increases with household's annual income increases. A household with one owned car in 2009 has a probability of 30.83% of owning a home when its income is less than $30,000. This probability increases to 68.96% if this household's annual household income is between $60,000 and $90,000. If the household's income increases to more than $120,000, the probability of owning a home becomes 90.47%, which is 193.45% higher. However, the marginal effect of owning a home decreases with income if the number of cars is held constant, with more vehicles.

The marginal effects in table 4.1 show that within most provinces, the marginal effect of age increases and then decreases. Similarly, although the overall probability of owning a home increases with income within each province, the marginal effect of moving to a higher income class decreases after income reaches $60,000

In the case of the marginal effect for different age groups, being employed does not have

a significant impact on the probability of homeownership for any income group. However, having a Bachelor's degree increases the probability of homeownership for all income classes, by 5.3 percentage points for those with income below $30,000, and by only 1.9 percentage points for those within income above $120,000.

Finally, I discuss the marginal effects in table 4.3, which are computed for different numbers of vehicles owned. Looking at the probabilities in the first row of the table, one can see that the reference household, a household with one car, is 106.45% more likely to own a home than that with no car. A household with two cars is 192.45% more likely to own a home than one that did not own any vehicles in 2009, and 41.66% more likely to own a home than a household with only one car. However, the probability of owning a home is much the same for households with two or more cars.

Similarly, the marginal effects of different income classes and age groups are very similar for households with two or more cars. The marginal effect of being married increases from 0.0893 for a household with no cars to 0.107 for a household with one vehicle, but remains between 0.768 and 0.788 for additional vehicles. Thus increasing the number of cars beyond one does not seem to have much effect on the probability of homeownership.

5. Conclusions

In this paper, I use data from Survey of Household Spending in 2009, estimate a logit model and check the marginal effects of various factors. I have investigated the factors which affect the probability of owning a home. Then I draw some conclusions about the factors correlated with homeownership in Canada.

First, I find that income is a significant factor that positively affects the probability of owning a home. I find that keeping other factors constant, households whose income is less than $30,000 have the smallest probability of owning a home. As the household's income goes up, the probability of owning a home increases significantly. Households with income above $120,000 have the highest probability of owning a home. This result is consistent with my expectation, and implies that homeownership is a normal good. Married respondents are also more likely to own a dwelling than those who are not married, and this effect is significant.

Second, the age of the respondent is also a significant factor affecting a household's homeownership. Compared to other age groups, respondents under 25 years old are the least likely to own a home. The probability that the household owns a home increases as the respondent gets older; it peaks when the respondent is between 75 and 84. After 85 years of age, households are less likely to own a home than are people between 75 and 84, but they are still more likely to do so than people under 25.

Third, the province of residence also affects the probability of owning a dwelling. People living in different provinces in Canada have different probabilities of owning a dwelling and this effect is significant. Even after other factors, such as income, are held constant, households in Newfoundland and Labrador are the most likely to own a dwelling. Households in New Brunswick are the next most likely to own a home. However, there is no significant difference in homeownership probability in British Columbia and Quebec.

I also test if car ownership affects homeownership. I find that the ownership of vehicles has a positive effect on the probability of homeownership. Household that owned vehicles in

2009 are significantly more likely to own a dwelling than those who did not. This result is logical because many homes for sale are far from the downtown core.

In my study, the probability of owning a dwelling is not strongly related to the highest level of education of the respondent. Only respondents with a trade certificate or a Bachelor's degree are more likely to own a home than those with a high school diploma. An individual with an apprenticeship is less likely to own a home than one with a high school diploma.

The employment status of the respondent also does not affect the probability of owning a dwelling. Some households own their dwelling although there is no earner in the family. This may happen in families whose members are all retired. People may have bought a house when they were young, and enjoy retired life in the same house. The size of the household does not affect the probability of homeownership, either. This means that a family with more members is not more likely to own a dwelling than one with fewer members in my study.

To summarize, income, age, marital status, and the ownership of vehicles can have a positive effect on the probability of homeownership for households. People in different provinces have different probabilities to own a dwelling, and this effect is also significant. The employment status of members of a family and the size of household do not affect the probability of homeownership.

As table 1.2 shows, homeownership in Canada kept increasing from 1971 to 2006. As found in this paper, income affects the probability of owning a home positively. In 2013, 67.8% of Canadian households owned a home. I predict that as average household income increases in the future, the homeownership rate in Canada is likely to rise. Also, as motor vehicle registrations increase in Canada, the homeownership rate may rise further, because the

probability of owning a dwelling also depends on whether or not a household owns a car.

One limitation of my study is that I used household income before taxes, because in the 2009 Survey of Household Spending there is no data on household income after taxes. In the future, I will search for household income after taxes instead of before taxes because provincial tax rates differ in Canada. In future studies of homeownership, I would also like to use a larger sample, rather than just the 10,432 observations used in this paper.

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Table 3.1 Definition of all variables

Dependent variable	Description
OWN	OWN= 1 if a household own a dwelling with or without mortgages, OWN =0 if a household rent a dwelling
Independent variables	
Income before taxes	
INCOME1	Equals 1 if income before taxes ≤30,000, 0 otherwise
INCOME2	Equals 1 if 30,000<income before taxes ≤60,000, 0 otherwise
INCOME3	Equals 1 if 60,000<income before taxes ≤90,000, 0 otherwise
INCOME4	Equals 1 if 90,000<income before taxes ≤120,000, 0 otherwise
INCOME5	Equals 1 if income before taxes>120,000, 0 otherwise
Marital status	
MARRY	Equals 1 if married, 0 if not
Age	
AGE1	Equals 1 if age ≤25, 0 if not
AGE2	Equals 1 if 25 ≤age ≤34, 0 if not
AGE3	Equals 1 if 35 ≤age ≤44, 0 if not
AGE4	Equals 1 if 45 ≤age ≤54, 0 if not
AGE5	Equals 1 if 55 ≤age ≤64, 0 if not
AGE6	Equals 1 if 65 ≤age ≤74, 0 if not
AGE7	Equals 1 if 75 ≤age ≤85, 0 if not
AGE8	Equals 1 if age >85, 0 if not
Level of education	
EDU0	Equals 1 if no degrees, certificates or diplomas, 0 otherwise
EDU1	Equals 1 if secondary (high) school diploma or equivalent, 0 otherwise
EDU2	Equals 1 if trade/vocational certificate, 0 otherwise
EDU3	Equals 1 if apprenticeship certificate, 0 otherwise
EDU4	Equals 1 if community college, CEGEP or nursing school diploma, 0 otherwise

EDU5	Equals 1 if university certificate or diploma below Bachelor's, 0 otherwise
EDU6	Equals 1 if bachelor's degree (B.A., B.Sc., B.Ed.) , 0 otherwise
EDU7	Equals 1 if university degree, certificate or diploma above a Bachelor's, 0 otherwise
Employment status	
EMPLOY	Equals 1 if the sum of number of full-time earners and part-time earners in a family > 0, 0 if not
Number of vehicles owned by household	
CAR0	Equals 1 if no vehicle is owned, 0 otherwise
CAR1	Equals 1 if one vehicle is owned, 0 otherwise
CAR2	Equals 1 if two vehicles are owned, 0 otherwise
CAR3	Equals 1 if three vehicles are owned, 0 otherwise
CAR4	Equals 1 if four vehicles or more are owned, 0 otherwise
Province	
NL	Equals 1 if household live in Newfoundland and Labrador, 0 otherwise
PE	Equals 1 if household live in Prince Edward Island, 0 otherwise
NS	Equals 1 if household live in Nova Scotia, 0 otherwise
NB	Equals 1 if household live in New Brunswick, 0 otherwise
QC	Equals 1 if household live in Quebec, 0 otherwise
ON	Equals 1 if household live in Ontario, 0 otherwise
MB	Equals 1 if household live in Manitoba, 0 otherwise
SK	Equals 1 if household live in Saskatchewan, 0 otherwise
AB	Equals 1 if household live in Alberta, 0 otherwise
BC	Equals 1 if household live in British Columbia, 0 otherwise
YTN	Equals 1 if household live in Yukon, Territories, Nunavut, 0 otherwise
Total household size	
SIZE1	Equals 1 if one member in a household, 0 otherwise
SIZE2	Equals 1 if two members in a household, 0 otherwise

SIZE3	Equals 1 if three members in a household, 0 otherwise
SIZE4	Equals 1 if four members in a household, 0 otherwise
SIZE5	Equals 1 if five members in a household, 0 otherwise
SIZE6	Equals 1 if six or more members in a household, 0 otherwise

Table 3.2 Summary statistics for all variables

Variables	mean	sd
Homeownership		
OWN	.6658359	.47172
Household income before taxes		
$30,000 or less	.2480828	.4319208
$30,001-$60,000	.2946702	.4559162
$60,001-$90,000	.2064801	.4047984
$90,001-$120,000	.1281633	.3342876
More than $120,000	.1226035	.3279973
Marital status		
Married	.5795629	.4936528
Age of respondent		
Less than 25	.0383436	.1920335
Between 25 and 34	.1486771	.355787
Between 35and 44	.1811733	.3851802
Between 45and 54	.2161618	.4116456
Between 55 and 64	.1874041	.3902543
Between 65 and 74	.126342	.3322504
Between 75 and 84	.0768788	.2664119
Above 85 year-old	.0250192	.1561908
Level of education attained by respondent		
No high school diploma	.2182707	.413092
High school diploma	.2427147	.4287446
Trade cert.	.099885	.2998609
Apprenticeship	.0113113	.1057567
College	.1652607	.3714335
University cert. or diploma	.0508052	.2196103
Bachelor’s degree	.1340107	.3406802
Above Bachelor’s	.0777416	.2677773
Number of vehicles owned by household		
No vehicle owned	.2074387	.4054918
One vehicle owned	.4305982	.4951837
Two vehicles owned	.2777032	.4478877
Three vehicles owned	.064513	.2456764
Four or more vehicles owned	.0197469	.1391361
Employment status		
Employed	.7446319	.4360888
Province		
Newfoundland and Labrador	.0934624	.2910933
Prince Edward Island	.046875	.2113812
Nova Scotia	.0855061	.2796468
New Brunswick	.0885736	.2841409
Quebec	.1218367	.3271127

Ontario	.1422546	.3493278
Manitoba	.0791794	.2700316
Saskatchewan	.0892446	.2851102
Alberta	.088286	.283724
British Columbia	.1021856	.3029067
Yukon, Territories, Nunavut	.0625959	.2422462
Size of household		
One person	.2788535	.4484568
Two people	.3773965	.4847586
Three people	.1455138	.352635
Four people	.1279716	.3340742
Five people	.0470667	.2117917
6 people or more	.0231979	.1505386
N	10432	

Table 4.1 Marginal effects for different age groups

	(1)	(2)	(3)	(4)
Age of respondent	25 year-old or less	45-54 year-old	55-64 year-old	75-84 year-old
Probability of owning a home for reference household	9.82%	50.89%	61.34%	75.19%
Household income before taxes				
$30,000 or less	-0.0535***	-0.201***	-0.208***	-0.186***
	(-3.57)	(-7.87)	(-8.30)	(-7.45)
$60,001-$90,000	0.0911***	0.181***	0.159***	0.115***
	(3.79)	(6.80)	(6.39)	(5.49)
$90,001-$120,000	0.230***	0.314***	0.263***	0.180***
	(4.64)	(9.54)	(8.32)	(6.43)
More than $120,000	0.401***	0.396***	0.322***	0.213***
	(5.86)	(10.21)	(8.48)	(6.50)
Marital status of respondent				
Married	0.0459***	0.107***	0.0969***	0.0722***
	(2.85)	(3.59)	(3.41)	(3.16)
Level of education attained by respondent				
No high school diploma	-0.0135	-0.0408	-0.0394	-0.0317
	(-1.34)	(-1.40)	(-1.40)	(-1.40)
Trade cert.	0.0326*	0.0800**	0.0734**	0.0554**
	(1.84)	(2.18)	(2.20)	(2.20)
Apprenticeship	-0.0500**	-0.184**	-0.189**	-0.167*
	(-2.41)	(-2.27)	(-2.12)	(-1.89)
College	0.0160	0.0420	0.0392	0.0301
	(1.24)	(1.31)	(1.31)	(1.31)
University cert. or diploma	0.0101	0.0274	0.0257	0.0199
	(0.57)	(0.59)	(0.59)	(0.60)
Bachelor's degree	0.0231	0.0588*	0.0544*	0.0415*
	(1.56)	(1.76)	(1.78)	(1.78)

Above Bachelor's	-0.00427	-0.0123	-0.0117	-0.00929
	(-0.31)	(-0.30)	(-0.30)	(-0.30)
Number of vehicles owned				
No owned vehicle	-0.0650***	-0.262***	-0.280***	-0.263***
	(-3.79)	(-10.67)	(-12.28)	(-9.95)
Two owned vehicles	0.115***	0.212***	0.185***	0.131***
	(4.17)	(8.43)	(7.48)	(6.11)
Three owned vehicles	0.124***	0.222***	0.193***	0.136***
	(2.85)	(4.92)	(4.96)	(4.73)
Four or more owned vehicles	0.116*	0.213***	0.186***	0.132***
	(1.76)	(2.78)	(2.97)	(3.08)
Employment status				
Employed	-0.00973	-0.0287	-0.0276	-0.0221
	(-0.82)	(-0.87)	(-0.88)	(-0.86)
Province household living in				
Newfoundland and Labrador	0.172***	0.270***	0.230***	0.160***
	(4.65)	(8.93)	(7.67)	(6.09)
Prince Edward Island	0.0562***	0.126***	0.113***	0.0837***
	(2.63)	(3.58)	(3.58)	(3.42)
Nova Scotia	0.0486***	0.112***	0.101***	0.0753***
	(2.88)	(3.85)	(3.79)	(3.56)
New Brunswick	0.127***	0.225***	0.195***	0.138***
	(4.28)	(7.61)	(6.87)	(5.67)
Ontario	0.0229*	0.0584**	0.0541**	0.0412**
	(1.96)	(2.16)	(2.15)	(2.07)
Manitoba	0.0295**	0.0733**	0.0675**	0.0511**
	(1.98)	(2.30)	(2.31)	(2.27)
Saskatchewan	0.0683***	0.146***	0.131***	0.0956***
	(3.46)	(5.01)	(4.86)	(4.33)

Alberta	0.0274*	0.0687**	0.0633**	0.0480**
	(1.93)	(2.15)	(2.16)	(2.12)
British Columbia	0.00971	0.0262	0.0246	0.0191
	(0.89)	(0.91)	(0.91)	(0.91)
Yukon, Territories, Nunavut	-0.0536***	-0.201***	-0.209***	-0.187***
	(-3.50)	(-5.87)	(-5.72)	(-5.00)
Size of household				
One person	-0.00197	-0.00561	-0.00533	-0.00421
	(-0.17)	(-0.17)	(-0.17)	(-0.17)
Three people	-0.00446	-0.0129	-0.0123	-0.00972
	(-0.38)	(-0.38)	(-0.38)	(-0.37)
Four people	0.0192	0.0497	0.0462	0.0354
	(1.20)	(1.36)	(1.38)	(1.40)
Five people	-0.0243	-0.0774	-0.0759	-0.0625
	(-1.60)	(-1.53)	(-1.48)	(-1.40)
6 people or more	-0.0000598	-0.000169	-0.000160	-0.000126
	(-0.00)	(-0.00)	(-0.00)	(-0.00)
Observations	10432	10432	10432	10432

Notes: The values in parentheses are t-statistics. * indicates significance at the 10% level, ** significance at the 5% level, and *** significance at the 1% level. Marginal effects with respect to age can be found in tables 4.2 and 4.3. The reference household for each column differs only with respect to the age of the respondent, and has the following characteristics: household income of $30,001-$60,000 before taxes, unmarried, high school diploma, one owned vehicle, unemployed, living in Quebec, two people in a household.

Table 4.2 Marginal effects for different income groups

	(1)	(2)	(3)	(4)	(5)
Household income before taxes	$30,000 or less	$30,001-$60,000	$60,001-$90,000	$90,001-$120,000	More than $120,000
Probability of owning a home for reference household	30.83%	50.89%	68.96%	82.30%	90.47%
Marital status of respondent					
Married	0.0996***	0.107***	0.0848***	0.0549**	0.0315***
	(3.61)	(3.59)	(3.30)	(2.90)	(2.60)
Age of respondent					
Less than 25 years old	-0.264***	-0.411***	-0.500***	-0.495***	-0.405***
	(-6.86)	(-9.67)	(-12.18)	(-9.38)	(-5.70)
Between 25 and 34	-0.190***	-0.271***	-0.289***	-0.240***	-0.164***
	(-6.52)	(-8.80)	(-9.14)	(-6.47)	(-4.40)
Between 35 and 44	-0.111***	-0.145***	-0.138***	-0.103***	-0.0648***
	(-4.21)	(-4.48)	(-4.23)	(-3.62)	(-3.10)
Between 55 and 64	0.0973***	0.104***	0.0832***	0.0538***	0.0309***
	(3.13)	(3.13)	(2.97)	(2.78)	(2.50)
Between 65 and 74	0.218***	0.212***	0.157***	0.0976***	0.0548***
	(5.75)	(5.44)	(4.63)	(3.87)	(3.23)
Between 75 and 84	0.258***	0.243***	0.177***	0.109***	0.0605***
	(6.05)	(5.79)	(4.86)	(4.03)	(3.32)
85 years old and above	0.242***	0.231***	0.170***	0.104***	0.0584***
	(3.92)	(4.22)	(4.00)	(3.55)	(3.06)
Level of education attained by respondent					
No high school diploma	-0.0337	-0.0408	-0.0360	-0.0251	-0.0150
	(-1.39)	(-1.40)	(-1.38)	(-1.36)	(-1.32)
Trade cert.	0.0729**	0.0800**	0.0647**	0.0424**	0.0245**
	(2.08)	(2.18)	(2.19)	(2.14)	(2.05)
Apprenticeship	-0.137**	-0.184**	-0.182**	-0.139**	-0.0895**

	(-2.49)	(-2.27)	(-1.99)	(-1.75)	(-1.55)
College	0.0371	0.0420	0.0349	0.0233	0.0136
	(1.29)	(1.31)	(1.30)	(1.29)	(1.25)
University cert. or diploma	0.0239	0.0274	0.0230	0.0154	0.00904
	(0.58)	(0.59)	(0.60)	(0.60)	(0.60)
Bachelor's degree	0.0526*	0.0588*	0.0483*	0.0319*	0.0186*
	(1.70)	(1.76)	(1.76)	(1.72)	(1.65)
Above Bachelor's	-0.0104	-0.0123	-0.0106	-0.00728	-0.00433
	(-0.31)	(-0.30)	(-0.30)	(-0.30)	(-0.30)
Number of vehicles owned					
No owned vehicle	-0.185***	-0.262***	-0.277***	-0.228***	-0.155***
	(-7.03)	(-10.67)	(-11.57)	(-7.21)	(-4.87)
Two owned vehicles	0.218***	0.212***	0.157***	0.0976***	0.0547***
	(7.67)	(8.43)	(6.34)	(4.80)	(3.72)
Three owned vehicles	0.230***	0.222***	0.164***	0.101***	0.0566***
	(4.17)	(4.92)	(4.68)	(4.02)	(3.40)
Four or more owned vehicles	0.219**	0.213***	0.158***	0.0980***	0.0550***
	(2.36)	(2.78)	(2.93)	(2.80)	(2.58)
Employment status					
Employed	-0.0240	-0.0287	-0.0251	-0.0174	-0.0104
	(-0.86)	(-0.87)	(-0.89)	(-0.90)	(-0.90)
Province household living in					
Newfoundland and Labrador	0.294***	0.270***	0.194***	0.118***	0.0653***
	(9.63)	(8.93)	(6.34)	(4.78)	(3.74)
Prince Edward Island	0.119***	0.126***	0.0988***	0.0634***	0.0362***
	(3.37)	(3.58)	(3.49)	(3.22)	(2.86)
Nova Scotia	0.105***	0.112***	0.0887***	0.0572***	0.0328***
	(3.70)	(3.85)	(3.64)	(3.29)	(2.88)

New Brunswick	0.235***	0.225***	0.166***	0.102***	0.0573***
	(7.58)	(7.61)	(5.93)	(4.61)	(3.65)
Ontario	0.0523**	0.0584**	0.0480**	0.0317**	0.0184**
	(2.14)	(2.16)	(2.12)	(2.04)	(1.90)
Manitoba	0.0665**	0.0733**	0.0596**	0.0391**	0.0227**
	(2.24)	(2.30)	(2.28)	(2.21)	(2.07)
Saskatchewan	0.142***	0.146***	0.113***	0.0721***	0.0410***
	(4.73)	(5.01)	(4.52)	(3.86)	(3.23)
Alberta	0.0620**	0.0687**	0.0560**	0.0368**	0.0214**
	(2.08)	(2.15)	(2.13)	(2.06)	(1.93)
British Columbia	0.0229	0.0262	0.0220	0.0148	0.00868
	(0.91)	(0.91)	(0.91)	(0.91)	(0.90)
Yukon, Territories, Nunavut	-0.148***	-0.201***	-0.202***	-0.157***	-0.102***
	(-5.33)	(-5.87)	(-5.41)	(-4.47)	(-3.68)
Size of household					
One person	-0.00476	-0.00561	-0.00482	-0.00329	-0.00195
	(-0.17)	(-0.17)	(-0.17)	(-0.17)	(-0.17)
Three people	-0.0109	-0.0129	-0.0111	-0.00762	-0.00453
	(-0.38)	(-0.38)	(-0.37)	(-0.37)	(-0.37)
Four people	0.0441	0.0497	0.0410	0.0272	0.0159
	(1.31)	(1.36)	(1.37)	(1.36)	(1.34)
Five people	-0.0622	-0.0774	-0.0702	-0.0500	-0.0304
	(-1.58)	(-1.53)	(-1.45)	(-1.37)	(-1.35)
6 people or more	-0.000144	-0.000169	-0.000145	-0.0000984	-0.0000582
	(-0.00)	(-0.00)	(-0.00)	(-0.00)	(-0.00)
Observations	10432	10432	10432	10432	10432

Notes: The values in parentheses are t-statistics. * indicates significance at the 10% level, ** significance at the 5% level, and *** significance at the 1% level. The reference household for each column differs only with respect to the household income before taxes, and has the following characteristics: unmarried, between 45 and 55, high school diploma, one owned vehicle, unemployed, living in Quebec, two people in a household.

Table 4.3 Marginal effects for different numbers of vehicles owned groups

	(1)	(2)	(3)	(4)	(5)
Number of vehicles owned	No vehicle owned	One vehicle owned	Two vehicles owned	Three vehicles owned	Four or more vehicles owned
Probability of owning a home for reference household	24.65%	50.89%	72.09%	73.07%	72.21%
Household income before taxes					
Less than $30,000	-0.123***	-0.201***	-0.195***	-0.192***	-0.194***
	(-5.37)	(-7.87)	(-7.52)	(-6.92)	(-6.41)
$60,001-$90,000	0.166***	0.181***	0.126***	0.123***	0.126***
	(5.68)	(6.80)	(5.33)	(4.47)	(3.59)
$90,001-$120,000	0.348***	0.314***	0.200***	0.193***	0.199***
	(8.90)	(9.54)	(6.14)	(4.75)	(3.55)
More than $120,000	0.503***	0.396***	0.239***	0.231***	0.238***
	(13.12)	(10.21)	(6.17)	(4.72)	(3.47)
Marital status of respondent					
Married	0.0893***	0.107***	0.0788***	0.0768***	0.0785***
	(3.57)	(3.59)	(3.17)	(3.01)	(2.79)
Age of respondent					
Less than 25 years old	-0.213***	-0.411***	-0.507***	-0.509***	-0.508***
	(-6.05)	(-9.67)	(-12.08)	(-11.88)	(-11.80)
Between 25 and 34	-0.157***	-0.271***	-0.283***	-0.281***	-0.283***
	(-5.83)	(-8.80)	(-8.70)	(-8.10)	(-7.44)
Between 35 and 44	-0.0934***	-0.145***	-0.133***	-0.131***	-0.133***
	(-4.04)	(-4.48)	(-4.12)	(-3.91)	(-3.55)
Between 55 and 64	0.0872***	0.104***	0.0772***	0.0753***	0.0770***
	(3.05)	(3.13)	(2.90)	(2.76)	(2.64)
Between 65 and 74	0.203***	0.212***	0.145***	0.141***	0.144***
	(5.50)	(5.44)	(4.40)	(3.88)	(3.36)
Between 75 and 84	0.242***	0.243***	0.162***	0.157***	0.162***

	(5.74)	(5.79)	(4.64)	(4.03)	(3.39)
85 years old and above	0.227***	0.231***	0.156***	0.151***	0.155***
	(3.71)	(4.22)	(3.89)	(3.51)	(3.08)
Level of education attained by respondent					
No high school diploma	-0.0291	-0.0408	-0.0340	-0.0333	-0.0339
	(-1.38)	(-1.40)	(-1.38)	(-1.38)	(-1.35)
Trade cert.	0.0649**	0.0800**	0.0603**	0.0588**	0.0601**
	(2.03)	(2.18)	(2.20)	(2.12)	(2.04)
Apprenticeship	-0.115**	-0.184**	-0.175*	-0.173*	-0.175*
	(-2.52)	(-2.27)	(-1.94)	(-1.91)	(-1.91)
College	0.0326	0.0420	0.0326	0.0319	0.0326
	(1.28)	(1.31)	(1.31)	(1.30)	(1.29)
University cert. or diploma	0.0209	0.0274	0.0215	0.0210	0.0215
	(0.58)	(0.59)	(0.60)	(0.60)	(0.60)
Bachelor's degree	0.0466*	0.0588*	0.0451*	0.0440*	0.0449*
	(1.68)	(1.76)	(1.78)	(1.77)	(1.73)
Above Bachelor's	-0.00902	-0.0123	-0.0100	-0.00979	-0.00998
	(-0.31)	(-0.30)	(-0.30)	(-0.30)	(-0.30)
Employment status					
Employed	-0.0207	-0.0287	-0.0237	-0.0232	-0.0237
	(-0.85)	(-0.87)	(-0.89)	(-0.89)	(-0.88)
Province household living in					
Newfoundland and Labrador	0.280***	0.270***	0.177***	0.172***	0.176***
	(8.61)	(8.93)	(5.97)	(4.81)	(3.69)
Prince Edward Island	0.108***	0.126***	0.0916***	0.0892***	0.0913***
	(3.20)	(3.58)	(3.42)	(3.20)	(2.89)
Nova Scotia	0.0942***	0.112***	0.0823***	0.0802***	0.0820***
	(3.55)	(3.85)	(3.57)	(3.35)	(3.00)
New Brunswick	0.219***	0.225***	0.152***	0.148***	0.152***

	(6.79)	(7.61)	(5.57)	(4.64)	(3.67)
Ontario	0.0462**	0.0584**	0.0448**	0.0437**	0.0447**
	(2.10)	(2.16)	(2.10)	(2.07)	(1.99)
Manitoba	0.0590**	0.0733**	0.0556**	0.0542**	0.0554**
	(2.18)	(2.30)	(2.27)	(2.20)	(2.11)
Saskatchewan	0.129***	0.146***	0.105***	0.102***	0.105***
	(4.41)	(5.01)	(4.38)	(3.91)	(3.35)
Alberta	0.0550**	0.0687**	0.0522**	0.0510**	0.0521**
	(2.04)	(2.15)	(2.13)	(2.09)	(2.00)
British Columbia	0.0200	0.0262	0.0207	0.0202	0.0206
	(0.90)	(0.91)	(0.91)	(0.91)	(0.90)
Yukon, Territories, Nunavut	-0.124***	-0.201***	-0.196***	-0.193***	-0.195***
	(-4.92)	(-5.87)	(-5.13)	(-4.88)	(-4.63)
Size of household					
One person	-0.00414	-0.00561	-0.00454	-0.00444	-0.00453
	(-0.17)	(-0.17)	(-0.17)	(-0.17)	(-0.17)
Three people	-0.00943	-0.0129	-0.0105	-0.0102	-0.0104
	(-0.38)	(-0.38)	(-0.37)	(-0.37)	(-0.37)
Four people	0.0389	0.0497	0.0384	0.0374	0.0382
	(1.29)	(1.36)	(1.37)	(1.35)	(1.33)
Five people	-0.0532	-0.0774	-0.0667	-0.0654	-0.0665
	(-1.60)	(-1.53)	(-1.43)	(-1.43)	(-1.39)
6 people or more	-0.000125	-0.000169	-0.000136	-0.000133	-0.000135
	(-0.00)	(-0.00)	(-0.00)	(-0.00)	(-0.00)
Observations	10432	10432	10432	10432	10432

Notes: The values in parentheses are t-statistics. * indicates significance at the 10% level, ** significance at the 5% level, and *** significance at the 1% level. The reference household for each column differs only with respect to the number of vehicles owned, and has the following characteristics: household income of $30,000-$60,000 before taxes, unmarried, between 45 and 55, high school diploma, unemployed, living in Quebec, two people in a household.