

Syed, Hussaun A.

**Article**

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## Happiness and House Prices in Canada: 2009-2013

Hussaun A. Syed

Wilfrid Laurier University, Canada

The purpose of this study was to understand the relationship between happiness and housing prices in Canada. The happiness data were obtained from the General Social Survey between 2009 and 2013, asking respondents to report overall happiness level by using scale ranging between 1 to 10 points. House Price Indexes at the provincial level were constructed to cover the same period. The relationship between average house price change and average happiness was estimated using Ordinary Least Square and Logistic Regression techniques. Individual's characteristics were used as control variables. The study found that average happiness level is positively and significantly related to the change in housing prices for one group and not for another - for homeowners but not for renters. In addition, individuals with better health are much happier than individuals with poor health. Similarly, individuals with higher income are happier than individuals with less income. The implication of this study is that the government should design attractive policies to encourage homeownerships.

*Keywords:* House prices, happiness, well-being, life satisfaction, homeowners

*JEL:* R31, O51

The economics of happiness is the study of relationships between human well-being and various factors that seem to affect their happiness level. There are many factors that affect the happiness of an individual in economics, including income, employment, social capital and health (Stutzer and Frey, 2012). In addition to the above-mentioned factors, wealth is considered to be an important aspect found in happiness literature. Frequent fluctuations in wealth occur when housing prices fluctuate. When housing prices fluctuate an individual may feel himself happy or unhappy due to fluctuation in the overall wealth. This paper investigates the hypothesis that homeowners feel happier because of the increase in house prices

in Canada. Hence, the research question is the following one: Do changes in housing prices can affect the measured happiness of Canadians in a different way between homeowners and non-homeowners?

It may also be helpful in our interpretation of measures of happiness if we observe responses to happiness from changes in wealth. There should be enough variation among Canadian provinces in house price change to detect this effect. In last 10 years Canada has observed tremendous growth in housing prices across the country (MLS Home Price Index, 2015). Within the large national variation there is a substantial regional variation as shown in Figure 1.

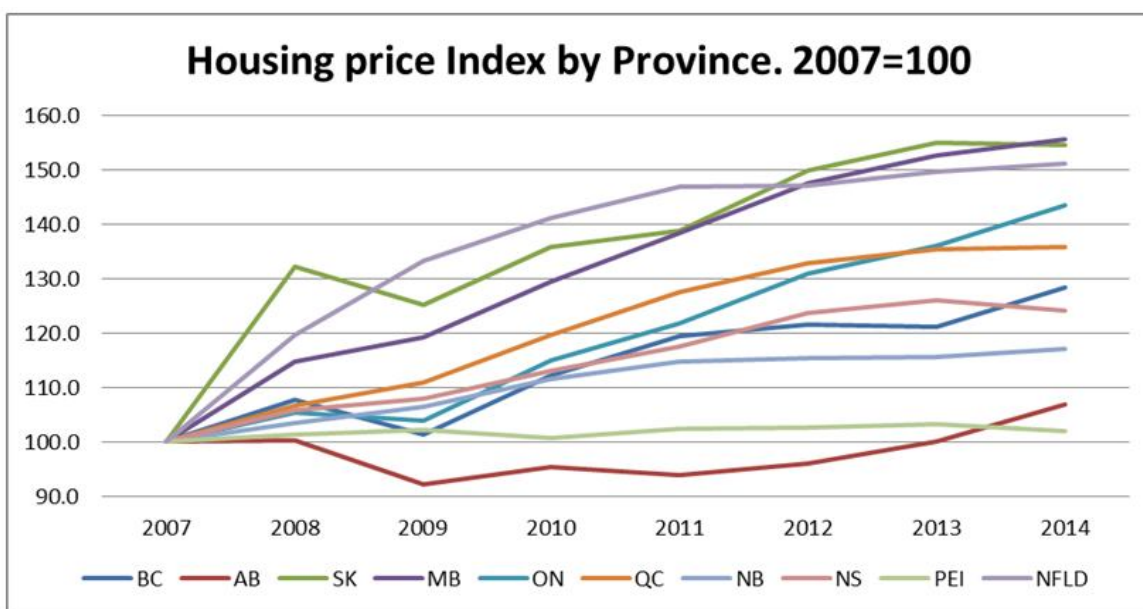
Figure 1 shows that as compared to base year of 2007, growth in housing prices across all Canadian provinces is significant. Saskatchewan, Manitoba and Newfoundland observed growth of

more than 50 percent in these last 8 years. Ontario, British Columbia and Quebec experienced fast growth of more than 30 percent. New Brunswick and Nova Scotia experienced growth of close to 20 percent from 2007 to 2014. Hence, except for Alberta and Prince Edward Island, all provinces experienced tremendous growth in housing prices from 2007 to 2014 (MLS Home Price Index, 2015).

This consistent growth in housing prices

This paper is structured as follow. Section 2 briefly introduces the theoretical background of the study and discusses previous studies about happiness literature. Section 3 discusses the methodology and econometric techniques used in this research. Section 4 presents the main results and findings followed by section 5 which provides the conclusion. Section 6 discusses the limitations.

## LITERATURE REVIEW



Source: Designed by Author. Data obtained from MLS Housing Price Index

**Figure 1: Housing Price Index**

over the last few years motivated us to explore the relationship between housing prices and happiness. As expected, the results and findings show that there is a positive relationship between happiness and increase in housing prices in Canada for homeowners. In addition, there is negative relationship between happiness and increase in housing prices for non-homeowners. The results are statistically significant. It is difficult to have a simple interpretation of the magnitude of the effect.

Economics of happiness is a relatively new topic in research and applied economics. In most of the previous literature authors have conducted research on relationship between happiness and economic factors. The research linking happiness to housing prices is much more limited. This study is of its first kind to understand the relationship between housing prices and happiness in Canada. The next few sections are designed to shed light on previous research on happiness literature.

### The Measurement of Well-being or Happiness

Although economists often use an objective measure of economic well-being, perhaps income, the subjective measurement of well-being uses survey based questions about how individuals feel about their happiness. Subjective measures gained their popularity in modern economics due to their multidimensional aspect (Bandura and Conceicao, 2008). A subjective measure captures all aspects of life including health, employment status, education, income, social capital, environment and more.

In measuring subjective happiness, there are further two broad categories of survey designs. The first one focuses on questions related to happiness, as an example "How happy are you?" The answer to select from "Not happy", "Happy" or "Very Happy". Alternatively, the question asked the respondent to rank their happiness level on a scale of 1 to 10 with "1" being very dissatisfied and "10" being very satisfied. Bandura and Conceicao (2008) argue that the ranking method from 1 to 10 with multidimensional questionnaire produces the most reliable indication of happiness as it captures several aspects of individual's happiness. In addition, many authors have used such indices to infer happiness levels of individuals.

Wolverson (2011) uses a "Better Life Index" that includes many of the economic indicators that are not included in GDP per capita. Items such as housing, education, environment, governance, life satisfaction, and work-life balance are combined. This index is not in common use. According to "Better Life Index" there are other measures of well-being. Bergheim

(2006) prefers the Human Development Index (HDI), which seems to be much better measure of well-being. The index includes life expectancy at birth, education and GDP. However, the limitation of HDI is its narrowness and correlation with gross domestic product (GDP). Bergheim (2006) discusses a more comprehensive measure, Weighted Index of Social Progress, which includes such an important aspects of well-being, as education, health, income, role of women, environment and even social capital. Bergheim (2006) also discusses the Happy Planet Index (HPI) as a measure of well-being. The HPI focuses on life expectancy and happiness. HPI includes life satisfaction and consumption of natural resources. All these indices are alternative means of measuring happiness and may give a better picture of human well-being in comparison to GDP per capita. Current GDP per capita simply captures the output per person in a given country, but fails to capture another aspects like education, health and life expectancy at birth.

The above mentioned indices have different weights for different economic factors. Index of well-being then can be calculated based on weighted average. As an example if we have 50 percent weight on GDP per capita and 50 percent on life expectancy the index can be measured using the following equation:

$$INDEX = 0.5 * Life Expectancy + 0.5 * GDP Per Capita$$

This places weights on the relative importance of other factors that can influence happiness level. Hence, the happiness allows people to choose their own weights.

Therefore, authors use several different techniques and methods to measure the happiness level. There is no single universal measure of happiness. However, in choosing between methods of measurement of happiness between subjective survey questionnaires and economic indicators such as GDP per capita or certain indices, authors have found that survey questions produce the most compelling results.

### **Sample across Countries**

This section of the study is designed to give its reader, in a concise manner, an overview of previous literature on happiness and various factors affecting happiness level in across country studies.

In the past, GDP has been used as a measure of human well-being. GDP measures the market value of final goods and services produced in an economy. Indeed, much research tries to find better measures of happiness than GDP per capita. Costanza et al. (2009) consider GDP per capita to be less than ideal indicator of human well-being. It fails to capture many aspects of quality of life such as health, education and social capital. There is an important attempt in the literature to link per capita GDP to the survey measures of well-being.

Easterlin and Angelescu (2009) gathered data from World Values Survey, Euro-Barometer and Latino-Barometer to try to understand the relationship between per capita GDP growth and happiness among the 37 countries. Authors used ordinary least square (OLS) technique to understand this relationship for 1975– 2008 period. Happiness is measured using different scales in different surveys, however, author

decided to convert different point scales into one scale of 1 to 10 where “1” means “very dissatisfied” and “10” means “very satisfied” with life as a whole. GDP per capita and happiness seemed to have short term positive relationship; however, there was no significant long term relationship in his sample between the variables. Easterlin and Angelescu (2009) concluded that the short term positive relationship between happiness and per capita GDP growth was associated with other macroeconomic factors such as low unemployment and inflation. Easterlin and Angelescu’s findings and hypotheses encouraged several other authors to conduct research on happiness literature.

According to Oulton (2012), desires and preferences of people are directly linked to GDP per capita and hence an increase in GDP per capita would lead to higher well-being. Oulton (2012) argues that GDP per capita is a good indicator of happiness in cross countries data due to its high correlation with other human welfare factors such as life expectancy and inequality. Helliwell et al. (2012) in the World Happiness Report estimated the relationship between happiness and GDP per capita across 153 countries for the period of 1981 to 2009. Authors used survey method to measure happiness and included various control variables including age, health, religion and gender. Happiness is measured by using 3 different types of scales for different surveys from around the globe. Scales varied from “1 to 10”, “0 to 10” and “1 to 7” response format where the minimum value being is “very dissatisfied” and maximum one is “very satisfied”. By using OLS technique authors found

a positive significant relationship between happiness and GDP per capita.

Sivak (2013) estimated the relationship between happiness and GDP per capita across European Union (EU) Countries for the period of 1973 to 2012. To measure happiness individuals were asked about their happiness level on scale ranging from 1 to 4 where “1” means “Not at all satisfied” and “4” means “Very satisfied”. Data were obtained using Euro-Barometer with sample size of 519 observations. This was a study using country-year as the unit of observation. Sivak (2013) used OLS regression technique with country fixed effects. The main dependent variable was happiness variable and several control variables were concerned with inflation, unemployment, institutional quality and life expectancy. The author found that GDP per capita plays an important role in the overall well-being of individuals; however, the results vary across countries. Increase in GDP per capita in EU countries was associated with an increase in happiness level. According to Sivak (2013) unemployment has significant negative relationship with happiness. As an unemployment rate increases in a given country, happiness level decreases significantly. Inflation also has negative relationship; however, it is not as significant as unemployment. Similarly, life expectancy has negative relationship with happiness and is significant at 10 percent. On the other hand, institution quality has positive significant relationship with happiness. As the quality of institutions improves, the happiness level of individuals seems to increase (Sivak, 2013).

One limitation of Sivak (2013) was the sample size. The sample size was small to observe the relationship across EU countries. Tella et al. (2001) obtained much larger sample across EU countries to obtain relationship between happiness and macroeconomic factors such as unemployment and inflation. Total sample size was 264,710 for 12 EU countries from period of 1975 to 1991. The data were obtained from Euro-Barometer. Using OLS technique they found that relationship between inflation and happiness and between unemployment and happiness were negative and significant. Tella et al. (2001) went one step further and shed light on which of these two economic indicators were more significant. Unemployment was more significantly related to happiness in comparison to inflation. Authors found that people are willing to trade 1.7 percentage-point increases in inflation for 1 percentage-point increase in unemployment.

Hence, many authors have conducted research on happiness and macroeconomic factors such as GDP per capita, inflation and unemployment using across country samples and found that there is positive relationship between happiness and GDP per capita and negative relationship between unemployment and happiness.

### **Samples from within Countries**

In this section happiness and macroeconomic factors are examined based on sample within countries. Some of the papers mentioned above are revisited to understand their research on within country samples.

Sivak (2013) was discussed earlier in across sample studies; he also estimated the

relationship between well-being and GDP per capita within the US. He collected happiness data from General Social Survey (GSS) and GDP data from World Bank for the period of 1972 to 2012. The total numbers of observations were 29. Sivak (2013) found that an increase in GDP per capita has no significant relationship with well-being in America. He added other macroeconomic factors such as unemployment to the American part of the study and found more significant relationship with well-being. Relationship between unemployment and happiness was found to be negative and significant.

Guo and Hu (2011) estimated the relationship between happiness and economic factors such as inflation, unemployment and GDP per capita in the USA. Individual data was obtained from General Social Survey (GSS) and national data from World Bank Data Bank. Happiness was measured based on self-reported survey from GSS. Individuals are asked about their happiness level from scale ranging 1 to 3 points where "1" means "Not too Happy" and "3" means "Very Happy". They used 32,701 individual observations for the period of 1972 to 2011. Guo and Hu (2011) used OLS technique to understand this relationship. They also used several control and dummy variables including age, sex, race, marital status, work status, health and education. They found that increase in GDP per capita does not necessarily reflect that all individuals are richer. An unequal increase in wealth can have a negative effect on level of well-being of poor individuals. They found no significant relationship between well-being and GDP per capita. In within countries studies, Guo and Hu (2011) found that

household income has significant positive relation with happiness. As the household income goes up, individuals feel themselves happier. According to them, this contradicting relationship between GDP per capita and happiness and income and happiness leads to further discussion on policy implications. In terms of control variables they found that health is the most significant variable and an improvement in health increases individual's happiness level by 20 percent as compare to base level of fair health. Married people are happier than people who never married. Finally, an increase in age causes happiness level to go up to a certain age level of 45 years. Guo and Hu (2011) also found that unemployment and inflation are negatively related to happiness and are statistically significant at 5 percent level.

Easterlin (2001), using the GSS of the US mentioned that on average people with higher income responded to having higher subjective well-being. Author used survey question from GSS to gather happiness. Happiness was measured by asking individuals question about how does an individual feels about his or her life from the scale of 1 to 4 where "1" means "Not Happy" and "4" means "Very Happy". Among people with low income only 16 percent responded "very happy". In comparison, 44 percent of all interviewees whose income was above average, range of 75,000 and over per year responded "very happy". According to Easterlin (2001), over the life cycle of an individual, personal income and happiness do not move together due to the individual's aspirations. He argued that as the time moves on, individual's

aspirations grow and offset the increase in happiness caused by an increase in income. Hence, in the long run there is no significant relationship between income and happiness due to personal preferences and aspirations.

Similar to above findings, Bayer and Juessen (2012) found that income and happiness are positively correlated. They collected the data from German Annual Socio-Economic Panel (SOEP) for the period from 1984 to 2010. The total number of observations in the sample was 224,127. Happiness is measured by using survey design questionnaire. Individuals were asked about their satisfaction level from scale of 0 to 10 where "0" means "Completely Dissatisfied" and 10 means "Completely Satisfied". Authors also included several control variables such as age, marital status, health status and employment. Using probit model, authors also estimated permanent and temporary income shocks on happiness. Persistent income shocks found to be significantly related to happiness. Persistent income shocks cause happiness level to go up; however, transitory income shocks were not significant (Bayer and Juessen, 2012).

We may conclude from above mentioned studies that there is positive relationship between income and happiness. However, there seems to be no significant relationship between happiness and GDP per capita in within country samples. On the contrary, economic factors such as unemployment have negative significant relationship with happiness. The question then arises, what about the other individual factors such as housing wealth? Is there any significant

relationship between change in housing prices and happiness levels?

### **House Prices and Happiness**

This section of the study will enlighten its readers about the relationship between happiness and housing prices. Authors have used samples within and sample across countries to understand relationship between happiness and housing with different techniques. These papers are examined below.

Owning a house in Latin America makes people happier and more satisfied (Ruprah, 2010). The data was collected using Latino-Barometer, a public survey in Latin America consisting of 18 countries and more than 19,000 households. Ruprah (2010) used logit model to estimate relationship between happiness and home ownership across Latin American countries and also within USA. Happiness is measured by asking individuals about their happiness level from scale of 1 to 4, where "1" means "Not Happy" and "4" means "Very Happy". The control variables included in the regression were marital status, education, age, employment and gender. The result was both significant and positive. In other words, people who own their home are happier as compare to people who do not own homes in Latin America and the US.

Headey et al. (2004) argue that wealth effects are positively and significantly correlated with happiness in Australia, Germany, Hungary, Netherland and UK. Happiness data was collected from social surveys from each of the above mentioned country. Happiness was measured by asking individuals to rank from 0 to 10 about their overall life satisfaction level, where



“0” means “Totally Dissatisfied” and “10” means “Totally Satisfied”. From the household data for these five countries, authors found that income is not significantly related to happiness within countries; however, wealth is, after controlling for age, health, education and gender. Wealth data is collected based on total assets after subtracting all liabilities. Wealth includes private dwellings, commercial properties, investments and bank accounts. Headey et al. (2004) discuss that due to the wealth effect people seem to increase their consumption. As consumption increases, happiness level increases too.

In past, many authors had researched on whether owning a house makes an individual happier as compared to renters, however, little research has been done on how the owner feels when house prices fluctuate. Researchers have found contradicting evidence in terms of the home ownership and happiness relationship. Rossi and Weber (1996) collected subjective well-being responses of American people using GSS and National Survey of Families and Household. To measure happiness, individuals were asked about how does an individual feel about life on scale ranging from 1 to 10. The total number of observations obtained from two surveys in their study were 14,500 individuals. Rossi and Weber (1996) found that owners seem to be happier than renters. Owners are happier and more satisfied and feel that their life planning will turn out as they planned in comparison to renters.

Similarly, Ratcliffe (2010) has done a thorough research in her paper entitled “Housing wealth or economic climate: Why do house prices matter

for well-being?” regarding changes in housing prices in the UK and level of happiness. The data was obtained from British Household Panel Survey (BHPS) and General Health Questionnaire (GHQ) with the sample size of 82,603 individuals for the period of 1991 to 2006. Happiness was measured using responses of individuals on life and health satisfaction level by using twelve different survey questions. Author then created 36 point index of happiness from the above responses and identified individual as happier if higher point. The data were obtained from individuals over time, therefore, Fixed Effect (FE) estimation is used to control for time effects. Controlled variables included in the analysis are marital status, age, household size, employment and gender. The estimation was obtained for four different categories fully homeowners, mortgaged homeowners, renters, and social renters. Four categories were included in estimation to understand the wealth effects of housing prices, in other words, causal relationship between happiness and increase in housing prices. Ratcliffe (2010) found that the relationship between increase in housing prices and level of happiness is positive and significant. People feel happier as the price of their house goes up. Relationship is positive and significant for both fully owned and mortgaged owned homeowners. In addition, non-homeowners also feel happier as the price of houses goes up. The question arises, why non-homeowners or in other words, renters, feel happier when house prices increase? Author argued that it can be due to macroeconomic factors. As the house prices are going up, overall economy might be doing well, an unemployment

rate might be falling and income levels might be increasing, hence, everyone in the economy feels happier. This lack of causal relationship between increase in housing prices and happiness confirms that there seems to be a little or no wealth effect due to increase in housing prices in UK. As home owners and renters both feel happier about increase in housing prices (Ratcliffe, 2010).

Hence, above mentioned authors found that people do feel happier if they own home due to wealth effect. However, changes in home prices may not have causal relationship with happiness.

### METHODOLOGY

The purpose of this paper is to understand the relationship between increase in housing prices and level of happiness in Canada. This paper is an attempt to test Ratcliffe (2010) research in Canadian context. It is important to understand this relationship as house prices have increased significantly in Canada over the last 10 years (MLS Home Price Index, 2015).

The techniques used in this paper to capture effect of changes in housing prices on happiness level are ordinary least square (OLS) and logistic regression. OLS is a relevant method as it captures the relationship between X and Y variables and determine best fitted line, where Y is a dependent variable and X is a categorical and dummy independent variable. OLS technique is executed using linear probability model (LPM). LPM is appropriate in this research as dependent variable is a binary variable. However, one of the limitations of LPM model is that it does not satisfy the law of probability. In other words, in LPM model probability values can fall below "0" and

above "1" which are difficult to interpret as probability values should fall between "0" and "1". In order to overcome this limitation an alternative technique of logistic regression was used. Logistic regression is interpreted in terms of odds ratio. Logistic regression is also appropriate in this research as logistic regression is used in binary dependent variable models. As logistic regression is nonlinear, the probabilities do not fall below or above "0" and "1". Therefore, logistic regression provides better outcome (See Appendix-I).<sup>1</sup>

At the initial stage, dependent variable was estimated with only one independent variable. The basic regression model is the following one:

$$HAPPY\ 7\ or\ HAPPY\ 8 = \beta_0 + \beta_1 PCHANGE * HOMEOWN + \varepsilon \dots (1)$$

The dependent variable "HAPPY" is actually either "HAPPY7" or "HAPPY8." Both are binary measures of happiness derived from the General Social Survey. In the GSS happiness was measured using a 1 to 10 scale. Individuals were asked about life satisfaction in general social survey (GSS) "how do they feel about their life as a whole" where "0" means "Very Dissatisfied" and "10" means "Very Satisfied" (Lu et al. 2015). HAPPY7 is a transformation from the responses to the life satisfaction variable of GSS. It is defined as "0" and "1" where "0" means "Not Happy" and "1" means "Happy". Individuals whose response is from "0" to "6" were considered "Not Happy" and individuals whose

<sup>1</sup> The graphs of fitted values for both models are included in the appendix-I.

response is from “7” to “10” were considered “Happy”.

In a similar way HAPPY8 is also transformed from life satisfaction variable of GSS. In HAPPY8 individuals whose response is from “0” to “7” were considered to be “Not Happy” and individuals whose response was from “8” to “10” were considered to be “Happy”. Purpose of redefining happy variable from “HAPPY7” to “HAPPY8” was to observe any sensitivity of our results to the exact choice of the happy-unhappy cut off. As happy variable is a binary variable it is measured in terms of probability in OLS method and as odds ratio in logistic method. When there is a change in independent variable the probability or odds of being happy changes. The most important independent variable in this regression is the interaction of PCHANGE and HOMEOWN where PCHANGE is the change in housing prices and HOMEOWN is dummy variable with “1” being member of household owns the home. Regression equation (1) does not include any control variables. Control variables are added to improve significance and standard errors, as these variables have significance on happiness. Equation (2) is as follows:

$$\begin{aligned} \text{HAPPY7 or HAPPY8} = & \beta_0 + \beta_1 \text{PCHANGE} * \text{HOMEOWN} + \\ & \beta_2 \text{Male} + \beta_3 \text{Age} + \beta_4 \text{Employment} + \beta_5 \text{MaritalStatus} + \\ & \beta_6 \text{Province} + \beta_7 \text{Education} + \beta_8 \text{Income} + \beta_9 \text{Health} + \varepsilon \end{aligned} \quad \dots(2)$$

Control variables in the above regression are divided into two categories, dummy variables and categorical variables. Male is a gender variable where “1” means male and “0” means female. Similarly, employment is a dummy variable with “1” means individual has employment and “0”

means individuals with no employment. Remaining variables are categorical variables and are defined below:

**–Age:** This variable was divided into seven different categories of 20, 30, 40, 50, 60, 70, and 80. Individuals with the mean age of 20 years are categorized into group 20. Similarly, individuals with the means age of 30 are categorized into group 30 and so on.

**–Marital Status:** There were six different categories of marital status including single, married, widowed, separated, common law and divorced.

**–Household Income:** Household income variable was divided into nine different categories. Minimum income category was 15,000 per year and maximum was 160,000 per year income.

**–Education:** There were four different categories of education including, less than high school, high school, college and university. College category contains individuals with 1, 2 or 3 years of college diploma. University category includes individuals with 4 or above years of post-education.

**–Province:** Province variable was divided into ten categories. All ten Canadian provinces are included in this study.

**–Health:** There were five different categories of health. Individuals with poor health condition were grouped in “Poor Health” category and individuals with best health category were grouped in “Excellent Health” category.<sup>2</sup>

<sup>2</sup> The histogram of Age, Education, Happiness, House prices change, Income, Marital Status and Province are included in Appendix-II. Happiness variable histogram is the original life satisfaction from GSS. It shows total percentage of individuals with each level of happiness.

The data used in this research was obtained from the General Social Survey (GSS) and House Price Index (HPI). GSS data was gathered to collect life satisfaction measure which is the representative of happiness measure as mentioned above in methodology part of the study. The main objective of GSS is to gather data to understand well-being levels and overall living condition of Canadians. GSS is a household survey and is conducted each year. Average time frame to conduct this survey and gather data is from 6 to 12 months. GSS data used in this study is from 2009 to 2013. GSS is an appropriate data tool for this research as it contains detailed information about many characteristics of individuals such as income, age, education, gender, household size, province of residence and so on. It contains information about individual's health status and life satisfaction levels which is the main research area of this study.

To understand the relationship between happiness and housing prices in Canada, housing prices data was obtained from House Price Index (HPI), as GSS does not contain data on changes in housing prices in Canada. HPI collected and presented data as monthly price index. In this research happiness data was collected from 2009, hence housing data was transformed as an index with base of 2007. Changes in housing prices are observed from 2007 to 2014. One limitation of HPI data is that it is obtained on a city level and not on provincial level. For some provinces HPI data is available for more than one city and for others it is only one city. Hence, in order to have multiple cities representative of one

province, data was transformed into weighted by population. As an example Alberta has housing index for Edmonton and Calgary. Weighted by population formula was used to combine these two indices as an index for Alberta. As mentioned earlier, HPI is a monthly index, however, GSS data is yearly; therefore, HPI data was converted into yearly data by using average of each month. Lastly, percentage change formula was used to obtain yearly change in housing prices in each province to capture the change in housing prices. Once the housing data was transformed, both data sets were merged by year and province to combine the datasets.

The total number of observation in this study were 107,874. Table 1 (see Appendix-III) shows the summary statistics of dependent and independent variables along with dummy variables. As HAPPY7 is a binary variable, represents the percentage of individuals in the province who consider themselves to be happy. Table 1 shows percentage of happier in HAPPY7 variable are 85 percent and for HAPPY8 variable percentage is 69 percent. Mean percentage increase in housing prices is given by mean of PCHANGE, 3.63 percent. Gender variable is represented by MALE. It shows us that 49 percent of sample is male and 51 percent are female. Similar to gender variable, homeownership variable is also a dummy variable. The mean of HOMEOWN 0.79 tells us that 79 percent of individuals own the home. In terms of employment, 59 percent has either part time or full time employment status.

Remaining variables in the table are categorical variables. Each categorical variable

has base group. In regression analysis base group was used to interpret findings of remaining groups in comparison to base group within the same category. As mean and standard deviation of categorical variables are not that informative, percentages are presented in some cases. Age variable has base group of 30 years and percentage of individuals with average age of 30 years is 16.7 percent. The base group of marital status category is SINGLE. 26.2 percent of individuals in the sample were single. Married is the biggest group in marital status category with percentage of 51.2 percent. The base group of the health status is POOR health. Percentage of individuals in poor health group was 2.6 percent. The data contains individuals from all ten provinces. The base group for provincial category is ON (Ontario). Percentage of individuals from Ontario was 38.8 percent. The base group of education category is LESS THAN HIGH SCHOOL, with the percentage of 16.9 percent. In other words 16.9 percent of individuals have no or less than high school education. Annual household income of 15,000 was considered as base group for income category. Percentage of individuals with household income of 15,000 is 6.3 percent. Lastly, household size of one person is base group of household size category. People with children were included in EXTRAPEOPLE variable. The percentage of individuals in EXTRAPEOPLE was 39.6 percent. The Data section contained information about variables used in this study and summary statistics of the variables. In the following section, main results and findings of the study are interpreted and presented.

## RESULTS AND DISCUSSION

In this section of the study the main findings and results are interpreted and discussed. Table 2 (see Appendix-IV) and 3 (see Appendix-V) present the critical regression results for HAPPY7 and HAPPY8 as dependent variables respectively. As mentioned above, categorical variables have several different groups depending on the category. The table contains only two variables from each category. Full regression tables are included in Appendix-VI.

Three different regression outcomes are presented in Table 2. Column one is regression outcome using OLS technique without any control variable. Column two presents regression outcome with OLS technique including control variables and column three presents logistic regression including control variables. The key coefficients of column two and three are discussed below. All the coefficients discussed below are statistically significant at 1 percent level.

The coefficient of 0.0249 for HOMEOWN in column two tells us that if an individual owns the home, his or her probability of being happier is 2.5 percentage points higher than someone who does not own home. The coefficient for PCHANGE is  $-0.0056$ . It means that as compare to base group, non-homeowners, rising home prices make non-homeowners less happy. Each percentage point increase reduces the probability of being happy in the HAPPY7 category by almost half a percentage point. On the other hand, the coefficient of interaction of HOMEOWN and PCHANGE is 0.0024, it means that if an individual owns the home and there is percentage

point increase in housing prices, the probability of being happier in that province increases by 0.24 percentage points. The coefficient of MALE is  $-0.0114$ . It tells us that if an individual is male, his probability of being happier is 1.14 percentage points less than female. In the categorical variables, the variable of FAIR HEALTH tells us that as compare to POOR HEALTH, an individual with fair health status is much happier. His or her probability of being happier is 14.6 percentage points higher as compare to someone whose health is poor. Individuals with health status of excellent, their probability of being happier are 41.2 percentage points higher than individuals with poor health. As compared to age of 30 years, an individual with average age of 50 years is less happy. His or her probability of being happy reduces by 2.3 percentage point. However, as compare to age of 30 years, an individual with age of 60 years is happier. His or her probability of being happy increases by 4.4 percentage points. It seems that as an individual become older, his or her probability of being happy reduces. However, as an individual's age moves towards retirement, his or her probability of being happy increases. The interaction of age and employment reveals interesting results. The coefficient of  $-0.0032$  tells us that as compared to age of 30, if an individual has employment and his or her age increases to 50 years, his or her probability of being happy reduces by 0.32 percentage point. However, as the age moves to 60 years and an individual has employment, his or her probability of being happy reduces by 6.75 percentage point as compare to age of 30 years. In other words, when age increases people feel

happier as they are close to retirement, however, if an individual has to continue the work, an increase in age does not lead to happiness. Province dummy variable of Quebec shows that, an individual is happier in QC as compared to Ontario. If an individual resides in QC his or her probability of being happier is 3.5 percentage points higher as compare to someone who resides in ON. Similarly, people in Saskatchewan seem to be happier than people in Ontario. If an individual resides in SK, his or her probability of being happy is 4.17 percentage points higher than someone from ON. The marital status variable shows that married individuals are happier than singles. The coefficient of 0.095 tells us that the probability of being happy is 9.50 percentage points higher for married individuals as compare to single individuals. Income variable shows trend of increase in happiness due to an increase in income. The coefficients of 0.0718 tells us that an individual with household income of 55,000 is happier than individual with household income of 15,000. His or her probability of being happier is 7.18 percentage points higher. As income increases to 90,000 his or her probability of being happy increases by 9.55 percentage point as compare to someone with 15,000 income. Lastly, education variable reveals surprising results. Regression tells us that as education level increases people become less happy. The coefficient of college variable is  $-0.0022$ . It tells us that as compare to people with less than high school education, people with college diploma are less happy. The probability of being happy reduces by 0.22 percentage point for individuals with college diploma as compare

to individuals with less than high school education.

Probabilities in LPM model can fall below "0" and "1". Hence logistic regression was performed to force probabilities falling below "0" or above "1" to be below or equal to "1" or above or equal to "0". Coefficients of logistic regression were interpreted in terms of odds ratio rather than probability in OLS model. The odds ratio of 1.237 tells us that the odds of being happier are 1.237 times higher for homeowner than non-homeowner. Similarly, when there is an increase in house price, the odds of being happy for non-homeowners are 0.974 times less than for homeowners. When there is 1 percentage increase in house price the odds of happiness for homeowners increase by 1.002 times as compare to non-homeowners. Gender variable represented by MALE tells us that the odds of male being happier are 0.901 times less than for female. Odds ratio of 1.794 times tells us that as compare to individuals with poor health, the odds of being happy for an individual with fair health is 1.794 times higher. And for individuals with excellent health the odds of being happy are 15.03 times higher.

In terms of AGE category, the odds of 50 years old individual being happier is 0.94 times less than as compare to someone of 30 years of age. However, as an individual reaches 60 years of age his or her odds of being happy increases. His or her odds of being happy are 1.407 times higher than an individual with age of 30 years. The odds of being happy decreases if an individual has employment and his or her age increase to 50 or 60 years as compare to base of

30 years. If an individual is 60 years of age and working, his or her odd of being happy decreases by 0.574 times as compare to if an individual is 30 years old and working. The odds of 1.413 for Quebec tells us that, the odds of being happy for an individual living in Quebec is 1.413 times higher than an individual living in Ontario. If an individual is married his or her odds of being happy is 2.27 times higher than if an individual is single. In terms of income category as individuals household income increases his or her odds of being happy increases. The odds ratio of 1.834 tells us that if an individual has household income of 90,000 his or her odds of being happy are 1.834 times higher than as compare to individual with household income of 15,000. Lastly, the odds of being happy for individuals with college diploma are 1.007 times higher as compare to someone with less than high school diploma.

The two techniques and their interpretations show that the trend in regression analysis is same for both techniques. When there is an increase in housing prices probability or odds of being happy increases. The only surprising result is the education. According to OLS technique an increase in education leads to less happiness, however, using odds technique an increase in education leads to more happiness.

Table 3 represents the similar three regressions using OLS and logistic techniques, however, the dependent variable is HAPPY8. As mentioned earlier HAPPY8 was redefined as individuals from scale of "8 to 10" were considered happier and individuals from "1 to 7" were considered not happier. The coefficients and odds ratio from column two and three

represent similar results that were observed in Table 2. When there is an increase in housing prices individuals who own home are happier. The probability of being happier is 0.27 percentage points higher as compare to non-homeowners in that province. In terms of odds ratio, the odds of being happier for homeowners when there is an increase in housing prices is 1.01 times higher.

Table 3 was generated to capture any change in dependent variables by redefining happiness variable. However, in main independent variables there seems to be no sign or significance difference. The sign is as expected and statistically significant at 1 percent level similar to regression results in Table 2. Dummy and categorical variables also produced the same trend as what was observed in Table 2. Hence, by redefining happiness variables the results and findings are not that different. The full regression tables of HAPPY8 are provided in Appendix-VI.

### CONCLUSION

In economics, happiness literature studies the relationship between happiness and other factors that affect the happiness. Among several other factors, housing prices is one of the most important as it fluctuate the individual's happiness by fluctuating wealth. Over the last few years, housing prices in Canada grew significantly in almost all the provinces. This research estimates the relationship between happiness and changes in housing prices for the period of 2009 to 2013. In past, many studies are conducted on happiness economics, however, only limited research is conducted on happiness and housing prices. Most studies conducted on happiness and

housing prices found positive relationship between happiness and changes in housing prices. Similar to previous literature, this study also finds that happiness and changes in housing prices are positively related.

The results show that there is a significant relationship between housing prices and happiness levels in Canada. When there is an increase in housing prices, homeowners are happier than non-homeowners. However, the magnitude of happiness level affected by change in housing prices seems to be small. In addition to change in housing prices, several control variables are included to observe happiness and individual's characteristics. Individuals with higher income levels responded happier as compare to individuals with less income. In addition, individuals with better health responded higher happiness levels as compare to individuals with poor or fair health.

### IMPLICATIONS

To the best of my knowledge this is the first study to understand the relationship between changes in housing prices and happiness levels in Canadian context. The study focuses on happiness and well being measures captured through changes in housing prices. As discussed earlier changes in housing prices are positively linked to happiness levels. Policy makers can utilise this information in designing homeownership policies. Government can influence housing market by making changes in various economic tools such as interest rate and property taxes. This study encourages policy makers to consider happiness factor in addition to other factors used to design policy for home



investors. Due to this positive relationship, government and regulatory policy makers should implement policies to encourage people to invest more into houses. As more people become homeowners, percentage of population reporting happiness will increase.

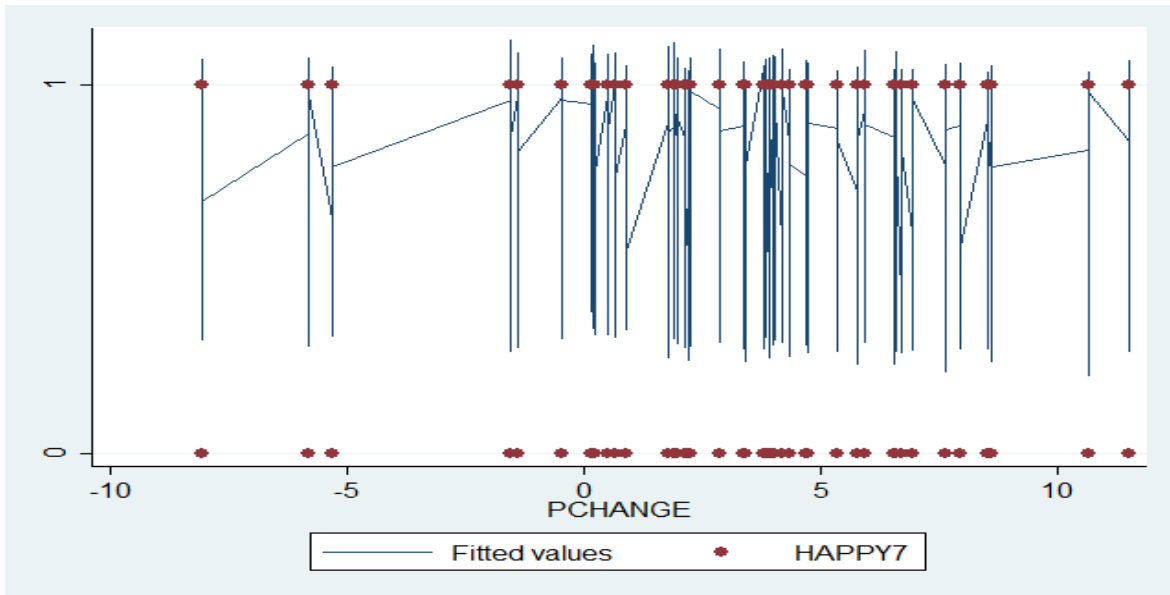
### LIMITATIONS

The limitation of this research is the cross sectional data. The data obtained was cross sectional with different individuals over time. Panel data with same individuals' overtime might provide better happiness level information. As an example an individual with age 30 might be happier, however, same individual might not be happier at age 40. Sampling selection can also be a limitation of this research as sample may not be the true representative of the whole country's population. Future research, after controlling for these limitations, can improve the research outcomes. However, this research gives its readers an idea and trend of how individuals feel when housing prices change in Canada.

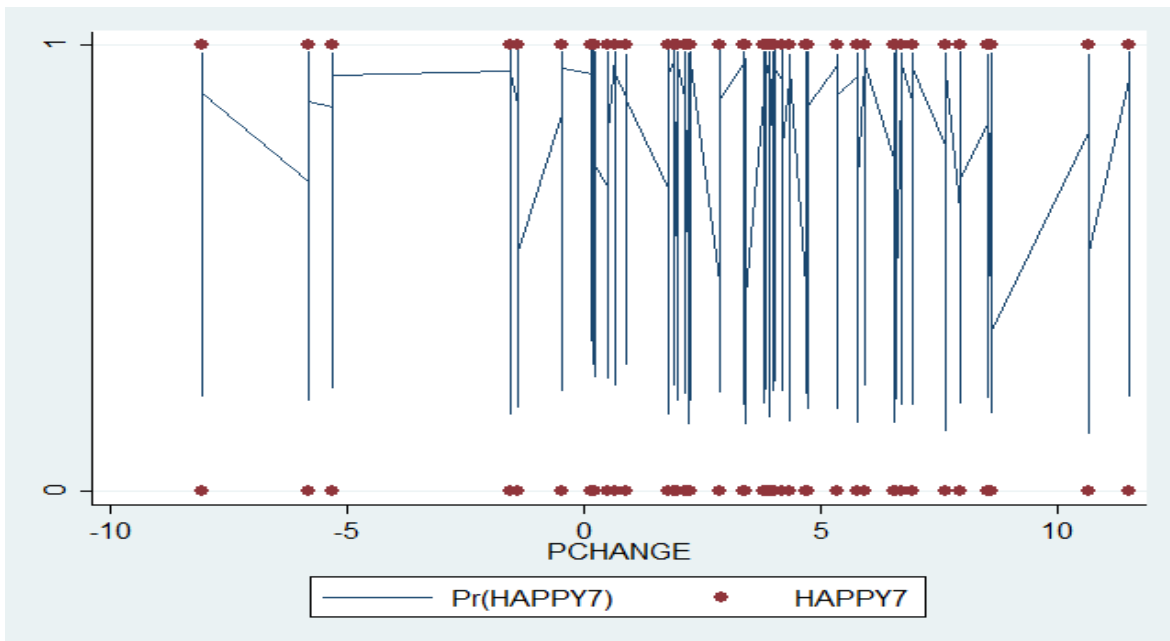
### REFERENCES

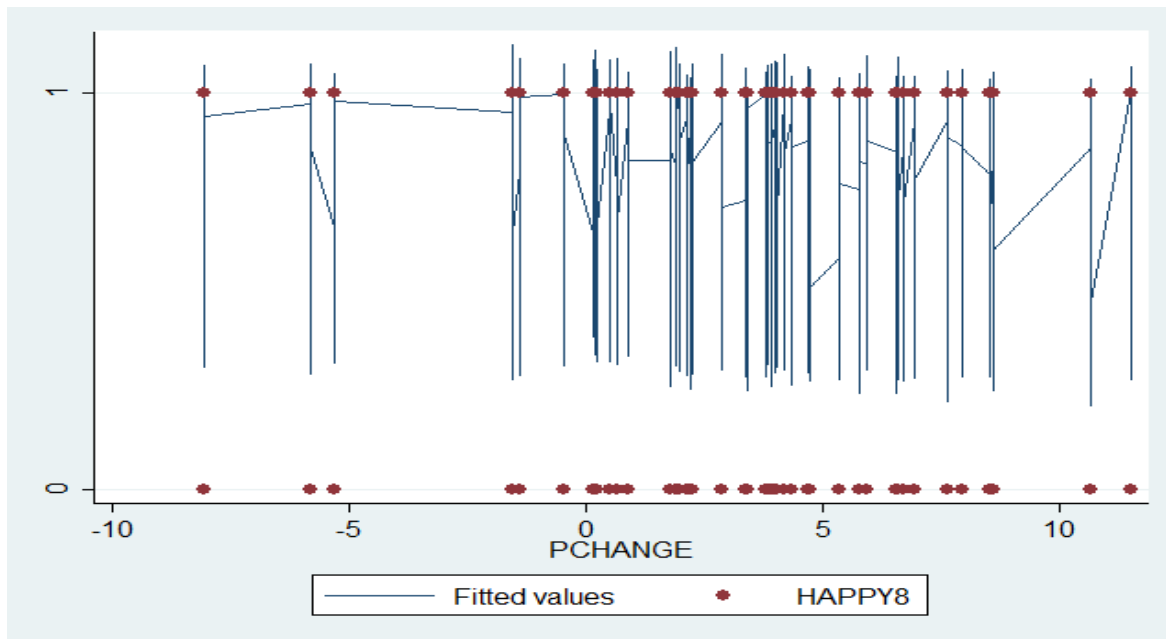
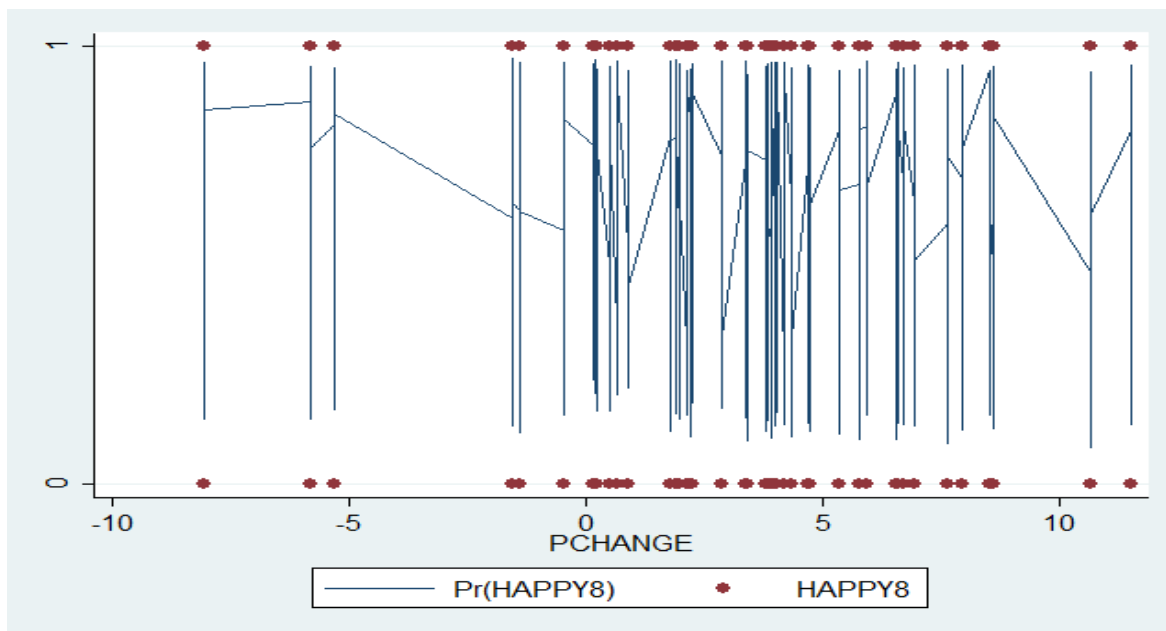
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Fitted Value of HAPPY7 and PCHANGE using OLS

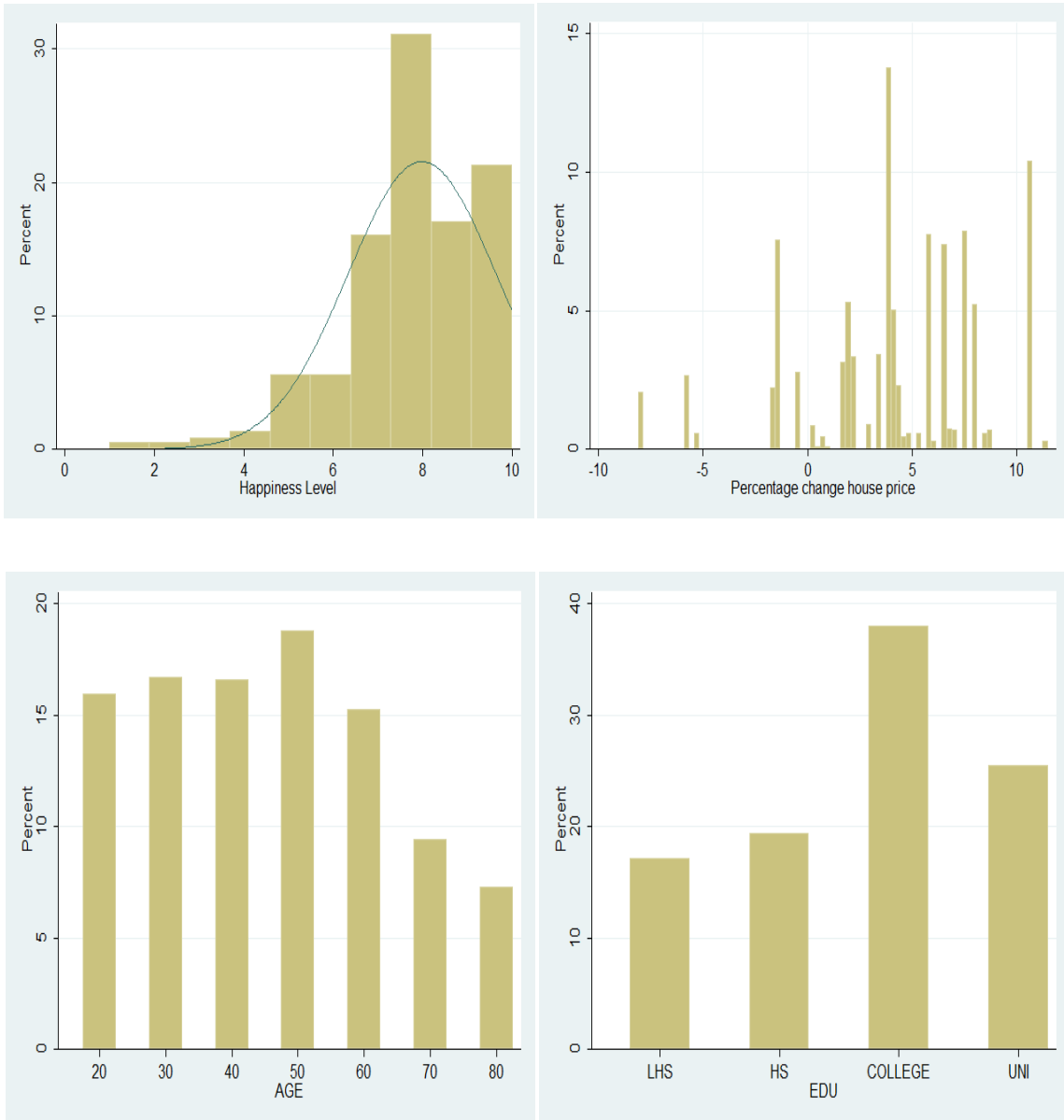


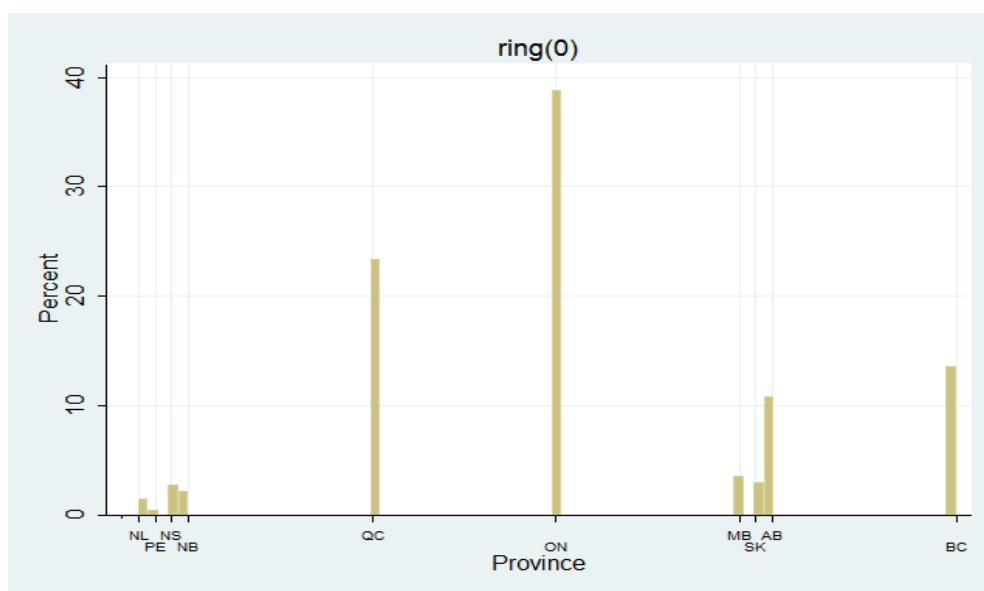
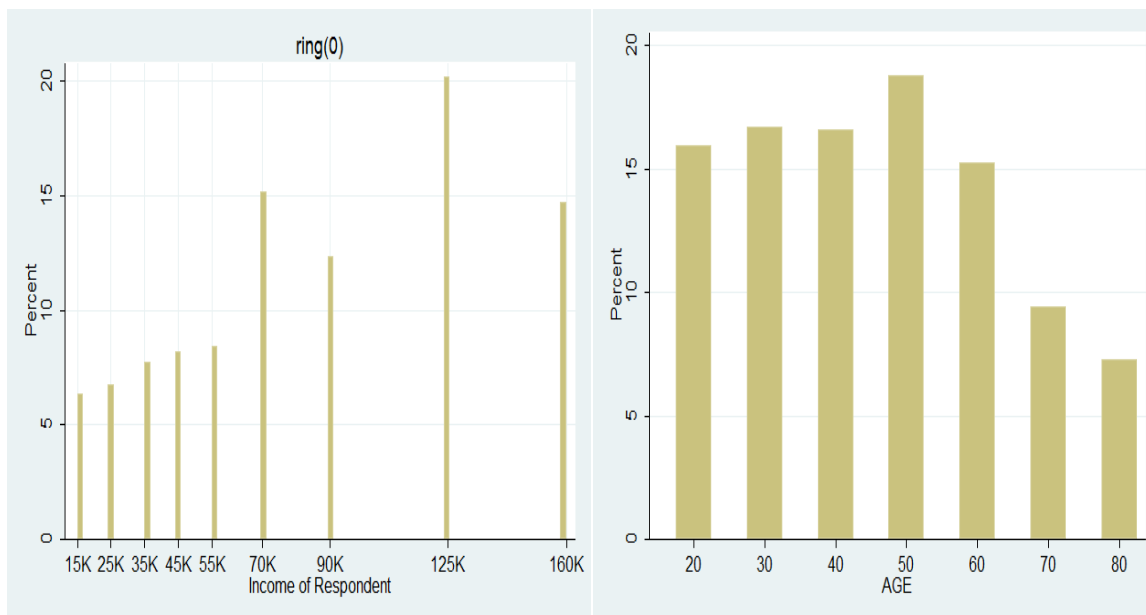
Fitted Values of HAPPY7 and PCHANGE using Logistic



**Fitted Values of HAPPY8 and PCHANGE using OLS****Fitted Values of HAPPY8 and PCHANGE using logistic**

**Histograms of Variables**





Dependent Variable	Mean	S.D	Min	Max	Percentage
HAPPY7	0.85	0.36			85% Happier
HAPPY8	0.69	0.46			69% Happier
<b>Main Independent Variables</b>					
PCHANGE	3.63	4.01	-8.07	32.24	
<b>Dummy Variables</b>					
MALE	0.49	0.49			49%
HOMEOWN	0.79	0.40			79%
EMPL	0.59	0.49			59%
<b>Categorical Variables</b>					
<b>AGE</b>					
30 (Base group)	0.167	0.373			16.7%
40	0.165	0.371			16.5%
50	0.187	0.390			18.7 %
60	0.152	0.359			15.2 %
70	0.094	0.292			9.4%
80	0.072	0.259			7.2%
<b>Marital Status</b>					
MS_SINGLE (Base group)	0.262	0.44			26.2%
MS_MARRIED	0.512	0.499			51.2%
MS_COMMLAW	0.111	0.31			11.1%
MS_WIDOW	0.049	0.216			4.9%
MS_SEPARATE	0.0206	0.1423			2.06%
MS_DIVORCE	0.043	0.204			4.3%
<b>Health</b>					
H_POOR (Base group)	0.026	0.16			2.6%
H_FAIR	0.089	0.285			8.9%
H_GOOD	0.276	0.447			27.6%
H_VGOOD	0.353	0.478			35.3%
H_EXCELLENT	0.254	0.435			25.4
<b>Province</b>					
ON-Ontario (Base group)	0.388	0.487			38.8%
NFLD-Newfoundland	0.015	0.122			1.5%
PEI -Prince Edward Island	0.004	0.064			0.4%
NS -Nova Scotia	0.027	0.164			2.7%
NB -New Brunswick	0.0222	0.147			2.22%
QC -Quebec	0.233	0.422			23.3%
MB -Manitoba	0.035	0.184			3.5%
SK -Saskatchewan	0.029	0.169			2.9%
AB -Alberta	0.107	0.31			10.7%
BC -British Colombia	0.136	0.34			13.6%

<b>Education</b>					
Less than High School (Base group)	0.169	0.375			16.9%
High school	0.191	0.393			19.1%
College	0.374	0.484			37.4
University	0.251	0.433			25.1%
<b>Average Annual Household Income</b>					
15,000 (Base group)	0.063	0.244			6.3%
25,000	0.067	0.25			6.7%
35,000	0.077	0.267			7.7%
45,000	0.081	0.274			8.1%
55,000	0.084	0.277			8.4%
70,000	0.151	0.358			15.1%
90,000	0.123	0.329			12.3%
125,000	0.202	0.401			20.2%
160,000	0.147	0.354			17.7%
<b>Household Size</b>					
Household size 1 (Base)	0.112	0.316			11.2%
Extra people	0.396	0.489			39.6%
<b>SAMPLE SIZE</b>	<b>107,874</b>				

*Table 1: Summary Statistics*

<b>HAPPY7</b>	<b>OLS(1)</b>	<b>OLS(2)</b>	<b>LOGISTIC</b>
<b>Constant</b>	0.785	0.319	
<b>HOMEOWN</b>	0.0970** (0.0035)	0.0249** (0.0001)	1.237** (0.0013)
<b>PCHANGE</b>	-0.0056** (0.0005)	-0.0042** (0.00002)	0.974** (0.0001)
<b>HOMEOWN*PCHANGE</b>	0.0024** (0.0006)	0.00194** (0.00002)	1.002** (0.0001)
<b>MALE</b>	-	-0.0114** (0.00007)	0.901** (0.0006)
<b>Fair Health</b>	-	0.146** (0.0003)	1.794** (0.0030)
<b>Excellent Health</b>	-	0.412** (0.0003)	15.038** (0.027)
<b>AGE: 50</b>	-	-0.023** (0.0003)	0.9404** (0.0018)
<b>AGE: 60</b>	-	0.044** (0.0002)	1.407** (0.0026)
<b>EMPL*AGE:50</b>	-	-0.0032** (0.0003)	0.826** (0.0019)
<b>EMPL*AGE:60</b>	-	-0.0675** (0.0002)	0.574** (0.0013)
<b>Province: Quebec</b>	-	0.0358** (0.000)	1.413** (0.0013)
<b>Saskatchewan</b>	-	0.0144** (0.0002)	1.1505** (0.0025)
<b>Marital Status: Married</b>	-	0.095** (0.0001)	2.27** (0.0027)
<b>Income: 55,000</b>	-	0.0718** (0.0002)	1.449** (0.0024)
<b>Income: 90,000</b>	-	0.0955** (0.0002)	1.834** (0.0031)
<b>Education: College</b>	-	-0.0022** (0.0001)	1.007** (0.0011)
<b>** Significant at 1% level</b>			

Source: Estimated by Author



## Appendix-V

<b>HAPPY8</b>	<b>OLS(1)</b>	<b>OLS(2)</b>	<b>LOGISTIC</b>
<b>Constant</b>	0.618	0.1611	
<b>HOMEOWN</b>	0.127** (0.004)	0.0327** (0.0001)	1.186** (0.0010)
<b>PCHANGE</b>	-0.0072** (0.0007)	-0.0062** (0.000)	0.969** (0.0001)
<b>HOMEOWN*PCHANGE</b>	0.0017** (0.0008)	0.0027** (0.000)	1.010** (0.00015)
<b>MALE</b>	-	-0.028** (0.000)	0.853** (0.0004)
<b>Fair Health</b>	-	0.0866** (0.0003)	1.478** (0.0025)
<b>Excellent Health</b>	-	0.473** (0.0003)	11.127** (0.0184)
<b>AGE: 50</b>	-	-0.0136** (0.0003)	0.9515** (0.0015)
<b>AGE: 60</b>	-	0.0661** (0.0002)	1.414** (0.0022)
<b>EMPL*AGE:50</b>	-	-0.0074** (0.0003)	0.9455** (0.0018)
<b>EMPL*AGE:60</b>	-	-0.0586** (0.0003)	0.7529** (0.0013)
<b>Province: Quebec</b>	-	0.0503** (0.0001)	1.323** (0.0009)
<b>Saskatchewan</b>	-	0.0417** (0.0002)	1.264** (0.0021)
<b>Marital Status: Married</b>	-	0.1685** (0.0001)	2.374** (0.0021)
<b>Income: 55,000</b>	-	0.0261** (0.0002)	1.123** (0.0015)
<b>Income: 90,000</b>	-	0.0562** (0.0002)	1.323** (0.0018)
<b>Education: College</b>	-	-0.0261** (0.0001)	0.878** (0.0007)
<b>** Significant at 1% level</b>			

Source: Estimated by Author

## Regression Results

```
reg HAPPY7 i.HOMEOWN##c.PCHANGE;
```

Source	SS	df	MS	Number of obs = 103685		
Model	232.050915	3	77.350305	F( 3,103681)	=	607.92
Residual	13192.2322103681		.127238667	Prob > F	=	0.0000
				R-squared	=	0.0173
				Adj R-squared	=	0.0173
Total	13424.2831103684		.129473044	Root MSE	=	.35671

HAPPY7	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
1.HOMEOWN	.0970886	.0035997	26.97	0.000	.0900333	.104144
PCHANGE	-.0056404	.0005975	-9.44	0.000	-.0068115	-.0044692
HOMEOWN#						
c.PCHANGE						
1	.002419	.0006731	3.59	0.000	.0010999	.0037382
_cons	.785981	.0031842	246.84	0.000	.77974	.792222

```
reg HAPPY7 i.HOMEOWN##c.PCHANGE MALE H_FAIR H_GOOD H_VGOOD H_EXCELLENT i.AGE##c.EMPL /*
>> */NFLD PEI NS NB QC MB SK AB BC MS_MARRIED MS_COMMLAW MS_WIDOW MS_SEPARATE MS_DIVORCE
EXTRAPEOPLE/*
>> */ i.HSDINCOM HIGHSCH COLLEGE UNIVERSITY if AGE !=20 [fw=WEIGHT], r;
```

Linear regression

Number of obs =82613343  
 F( 45,82613297) =  
 Prob > F = 0.0000  
 R-squared = 0.1386  
 Root MSE = .31905

HAPPY7	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]	
1.HOMEOWN	.0249612	.0001368	182.41	0.000	.024693	.0252295
PCHANGE	-.0042489	.0000239	-177.59	0.000	-.0042958	-.004202
HOMEOWN#						
c.PCHANGE						
1	.0019435	.0000251	77.37	0.000	.0018943	.0019928
MALE	-.0114488	.0000723	-158.36	0.000	-.0115905	-.0113071
H_FAIR	.1464044	.0003706	395.06	0.000	.145678	.1471307
H_GOOD	.2941626	.0003399	865.37	0.000	.2934964	.2948289
H_VGOOD	.3829354	.0003358	1140.45	0.000	.3822773	.3835935
H_EXCELLENT	.4127615	.000336	1228.37	0.000	.4121029	.4134201
AGE						
40	-.0097756	.0002973	-32.88	0.000	-.0103582	-.0091929
50	-.0230619	.0003001	-76.86	0.000	-.02365	-.0224738
60	.04401	.0002496	176.35	0.000	.0435209	.0444992
70	.0891849	.0002433	366.50	0.000	.0887079	.0896618
80	.1094986	.000267	410.10	0.000	.1089753	.110022
EMPL	.0679811	.0002164	314.17	0.000	.067557	.0684052
AGE#c.EMPL						
40	-.0139002	.000318	-43.71	0.000	-.0145235	-.0132769
50	-.0032795	.000319	-10.28	0.000	-.0039047	-.0026543

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60		-.0675676	.0002753	-245.43	0.000	-.0681072	-.067028
70		-.0817178	.0003215	-254.15	0.000	-.082348	-.0810876
80		-.084879	.0006416	-132.30	0.000	-.0861365	-.0836215
NFLD		.0442134	.0002617	168.94	0.000	.0437005	.0447263
PEI		.034229	.0005129	66.73	0.000	.0332237	.0352344
NS		.009784	.00022	44.48	0.000	.0093529	.0102152
NB		.0309118	.0002334	132.45	0.000	.0304543	.0313692
QC		.0358828	.0000947	378.85	0.000	.0356972	.0360684
MB		.0147283	.0002013	73.16	0.000	.0143337	.0151229
SK		.0143614	.0002142	67.06	0.000	.0139416	.0147812
AB		-.0199391	.0001331	-149.85	0.000	-.0201999	-.0196783
BC		-.0058183	.0001186	-49.07	0.000	-.0060507	-.0055859
MS_MARRIED		.0951414	.0001446	657.74	0.000	.0948579	.0954249
MS_COMMLAW		.0673569	.0001623	415.09	0.000	.0670388	.0676749
MS_WIDOW		.0607677	.0002502	242.84	0.000	.0602772	.0612581
MS_SEPARATE		-.0075096	.0003283	-22.88	0.000	-.008153	-.0068662
MS_DIVORCE		.0090085	.0002405	37.45	0.000	.0085371	.0094799
EXTRAPEOPLE		-.0176937	.0000894	-197.98	0.000	-.0178689	-.0175185
HSDINCOM							
25000		.0223662	.0002485	90.02	0.000	.0218792	.0228531
35000		.0566343	.0002368	239.21	0.000	.0561702	.0570983
45000		.0724648	.000236	307.08	0.000	.0720022	.0729273
55000		.0718357	.0002372	302.85	0.000	.0713708	.0723006
70000		.0902981	.0002226	405.65	0.000	.0898618	.0907344
90000		.0955394	.0002298	415.79	0.000	.0950891	.0959898
125000		.1107992	.0002248	492.84	0.000	.1103586	.1112399
160000		.1231317	.0002306	533.92	0.000	.1226797	.1235837
HIGHSCH		-.005676	.0001459	-38.90	0.000	-.005962	-.00539
COLLEGE		-.002222	.0001338	-16.60	0.000	-.0024843	-.0019597
UNIVERSITY		-.0004613	.0001396	-3.30	0.001	-.0007348	-.0001877
_cons		.3196752	.0004423	722.80	0.000	.3188084	.3205421

```
logistic HAPPY7 i.HOMEOWN##c.PCHANGE MALE H_FAIR H_GOOD H_VGOOD H_EXCELLENT i.AGE##c.EMPL
/*
>> */NFLD PEI NS NB QC MB SK AB BC MS_MARRIED MS_COMMLAW MS_WIDOW MS_SEPARATE MS_DIVORCE
EXTRAPEOPLE/*
>> */ i.HSDINCOM HIGHSCH COLLEGE UNIVERSITY if AGE !=20 [fw=WEIGHT], r;
```

```
Logistic regression                               Number of obs   =   82613343
                                                    Wald chi2(45)   =   8747355.60
                                                    Prob > chi2     =   0.0000
Log pseudolikelihood = -27947488                Pseudo R2      =   0.1528
```

	HAPPY7	Odds Ratio	Robust Std. Err.	z	P> z	[95% Conf. Interval]
1. HOMEOWN		1.237171	.0013924	189.10	0.000	1.234445 1.239903
PCHANGE		.9743362	.000161	-157.29	0.000	.9740207 .9746519
HOMEOWN#						
c. PCHANGE						
1		1.002614	.0001865	14.03	0.000	1.002248 1.00298
MALE		.9019162	.0006498	-143.29	0.000	.9006435 .9031907
H_FAIR		1.794418	.0030241	346.93	0.000	1.7885 1.800355
H_GOOD		3.933064	.0062523	861.45	0.000	3.920829 3.945337
H_VGOOD		8.9787	.0148152	1330.19	0.000	8.94971 9.007784
H_EXCELLENT		15.03855	.027449	1485.07	0.000	14.98485 15.09244

## Syed

AGE							
40		.9615788	.0019813	-19.01	0.000	.9577033	.9654699
50		.9404788	.0018616	-31.00	0.000	.9368372	.9441346
60		1.407404	.0026673	180.32	0.000	1.402185	1.412641
70		2.078871	.0041321	368.18	0.000	2.070788	2.086986
80		2.356509	.0051866	389.46	0.000	2.346366	2.366697
EMPL		1.721806	.0028894	323.80	0.000	1.716152	1.727478
AGE#c.EMPL							
40		.8345324	.0020289	-74.40	0.000	.8305652	.8385185
50		.8264592	.0019234	-81.90	0.000	.822698	.8302375
60		.5744841	.0013338	-238.74	0.000	.5718759	.5771042
70		.5622613	.0020075	-161.27	0.000	.5583405	.5662097
80		.5883987	.0050108	-62.28	0.000	.5786593	.5983021
NFLD		1.586714	.0050054	146.35	0.000	1.576933	1.596554
PEI		1.40996	.0081313	59.57	0.000	1.394113	1.425987
NS		1.107768	.0022907	49.49	0.000	1.103287	1.112266
NB		1.355787	.0032284	127.83	0.000	1.349475	1.36213
QC		1.413585	.0013571	360.53	0.000	1.410927	1.416247
MB		1.153049	.0022697	72.35	0.000	1.148609	1.157506
SK		1.150549	.002583	62.47	0.000	1.145497	1.155623
AB		.8191376	.0010557	-154.80	0.000	.8170711	.8212094
BC		.951163	.0010557	-45.11	0.000	.9490961	.9532343
MS_MARRIED		2.277025	.002718	689.36	0.000	2.271704	2.282358
MS_COMMLAW		1.738176	.0024402	393.79	0.000	1.7334	1.742965
MS_WIDOW		1.533751	.003103	211.41	0.000	1.527682	1.539845
MS_SEPARATE		1.046899	.0022064	21.75	0.000	1.042583	1.051232
MS_DIVORCE		1.136042	.001888	76.75	0.000	1.132348	1.139749
EXTRAPEOPLE		.8235494	.0007661	-208.68	0.000	.8220492	.8250524
HSDINCOM							
25000		1.040727	.0015963	26.03	0.000	1.037603	1.04386
35000		1.296931	.0020299	166.12	0.000	1.292958	1.300916
45000		1.454128	.0023603	230.67	0.000	1.449509	1.458761
55000		1.449526	.0024201	222.35	0.000	1.44479	1.454277
70000		1.722389	.0026909	348.02	0.000	1.717123	1.727672
90000		1.834038	.0031339	354.95	0.000	1.827906	1.84019
125000		2.259224	.0037947	485.23	0.000	2.251799	2.266674
160000		2.773445	.005352	528.62	0.000	2.762975	2.783954
HIGHSCH		.9710552	.0011846	-24.08	0.000	.9687361	.9733797
COLLEGE		1.007017	.0011161	6.31	0.000	1.004832	1.009207
UNIVERSITY		1.033173	.0012869	26.20	0.000	1.030654	1.035699

```
reg HAPPY8 i.HOMEOWN##c.PCHANGE;
```

Source	SS	df	MS	Number of obs = 103685		
Model	387.301238	3	129.100413	F( 3,103681)	=	619.86
Residual	21594.0854103681		.208274278	Prob > F	=	0.0000
Total	21981.3866103684		.212003652	R-squared	=	0.0176
				Adj R-squared	=	0.0176
				Root MSE	=	.45637

HAPPY8	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]
1.HOMEOWN	.1269257	.0046055	27.56	0.000	.117899 .1359523
PCHANGE	-.0072526	.0007645	-9.49	0.000	-.008751 -.0057542

HOMEOWN#	c.PCHANGE	1	_cons
		.0017516	.6183858
		.0008611	.0040739
		2.03	151.79
		0.042	0.000
		.0000638	.610401
		.0034394	.6263706

```

. . reg HAPPY8 i.HOMEOWN##c.PCHANGE MALE H_FAIR H_GOOD H_VGOOD H_EXCELLENT i.AGE##c.EMPL
/*
>> */NFLD PEI NS NB QC MB SK AB BC MS_MARRIED MS_COMMLAW MS_WIDOW MS_SEPARATE MS_DIVORCE
EXTRAPEOPLE/*
>> */ i.HSDINCOM HIGHSCH COLLEGE UNIVERSITY if AGE!=20 [fw=WEIGHT], r;

```

```

Linear regression
Number of obs =82613343
F( 45,82613297) =
Prob > F = 0.0000
R-squared = 0.1438
Root MSE = .42004

```

HAPPY8	Coef.	Robust Std. Err.	t	P> t	[95% Conf. Interval]
1.HOMEOWN	.032728	.0001702	192.32	0.000	.0323945 .0330616
PCHANGE	-.0062708	.0000281	-222.88	0.000	-.0063259 -.0062156
HOMEOWN#					
c.PCHANGE					
1	.0027875	.0000302	92.38	0.000	.0027283 .0028466
MALE	-.0282515	.0000095	-297.31	0.000	-.0284377 -.0280653
H_FAIR	.0866415	.0003583	241.81	0.000	.0859393 .0873438
H_GOOD	.2215909	.0003295	672.60	0.000	.2209451 .2222366
H_VGOOD	.3831927	.0003259	1175.97	0.000	.382554 .3838313
H_EXCELLENT	.4729278	.0003267	1447.73	0.000	.4722876 .4735681
AGE					
40	-.018258	.0003461	-52.76	0.000	-.0189364 -.0175797
50	-.0136805	.0003415	-40.06	0.000	-.0143498 -.0130112
60	.0660121	.000299	220.75	0.000	.065426 .0665982
70	.1368082	.0002949	463.95	0.000	.1362303 .1373862
80	.1894152	.0003199	592.18	0.000	.1887883 .1900421
EMPL	.0583758	.0002623	222.54	0.000	.0578616 .0588899
AGE#c.EMPL					
40	-.0129349	.0003814	-33.92	0.000	-.0136823 -.0121874
50	-.0074512	.0003745	-19.90	0.000	-.0081853 -.0067172
60	-.058626	.0003399	-172.48	0.000	-.0592922 -.0579598
70	-.0708419	.0004204	-168.50	0.000	-.071666 -.0700179
80	-.0697091	.000816	-85.43	0.000	-.0713085 -.0681098
NFLD	.0811354	.0003485	232.81	0.000	.0804524 .0818185
PEI	.0437742	.0006983	62.69	0.000	.0424056 .0451427
NS	.0233504	.0002812	83.03	0.000	.0227992 .0239016
NB	.0669499	.0003011	222.33	0.000	.0663597 .0675401
QC	.0503183	.0001256	400.75	0.000	.0500722 .0505644
MB	.0402275	.0002619	153.59	0.000	.0397141 .0407408
SK	.0417832	.0002798	149.35	0.000	.0412349 .0423315
AB	-.0063266	.000172	-36.78	0.000	-.0066637 -.0059894
BC	-.0044967	.0001545	-29.11	0.000	-.0047995 -.0041939
MS_MARRIED	.1685998	.0001819	926.89	0.000	.1682433 .1689563
MS_COMMLAW	.1280442	.0002073	617.80	0.000	.1276379 .1284504
MS_WIDOW	.0998112	.0002998	332.88	0.000	.0992235 .1003989
MS_SEPARATE	.01662	.0003759	44.22	0.000	.0158832 .0173567
MS_DIVORCE	.0448562	.0002812	159.53	0.000	.0443051 .0454073

## Syed

EXTRAPEOPLE		-.0238364	.0001184	-201.29	0.000	-.0240685	-.0236043
HSDINCOM							
25000		-.0011416	.0002718	-4.20	0.000	-.0016743	-.000609
35000		.023619	.0002662	88.74	0.000	.0230973	.0241406
45000		.0368136	.0002679	137.43	0.000	.0362886	.0373386
55000		.0260644	.0002729	95.50	0.000	.0255294	.0265993
70000		.0512021	.0002536	201.91	0.000	.0507051	.0516991
90000		.0562397	.0002662	211.26	0.000	.055718	.0567615
125000		.0825713	.0002584	319.60	0.000	.082065	.0830777
160000		.1098589	.000271	405.43	0.000	.1093279	.11039
HIGHSCH		-.024394	.000178	-137.05	0.000	-.0247429	-.0240452
COLLEGE		-.0261376	.000162	-161.38	0.000	-.026455	-.0258202
UNIVERSITY		-.0376449	.0001737	-216.78	0.000	-.0379853	-.0373046
_cons		.1611454	.0004631	347.99	0.000	.1602378	.162053

```

. logistic HAPPY8 i.HOMEOWN##c.PCHANGE MALE H_FAIR H_GOOD H_VGOOD H_EXCELLENT
i.AGE##c.EMPL /*
>> */NFLD PEI NS NB QC MB SK AB BC MS_MARRIED MS_COMMLAW MS_WIDOW MS_SEPARATE MS_DIVORCE
EXTRAPEOPLE/*
>> */ i.HSDINCOM HIGHSCH COLLEGE UNIVERSITY if AGE!=20 [fw=WEIGHT], r;

Logistic regression                               Number of obs   =   82613343
                                                  Wald chi2(45)  =   1.01e+07
                                                  Prob > chi2    =   0.0000
Log pseudolikelihood = -43739555                Pseudo R2      =   0.1213

```

		Odds Ratio	Robust Std. Err.	z	P> z	[95% Conf. Interval]
1. HOMEOWN		1.186412	.0010599	191.33	0.000	1.184336 1.188491
PCHANGE		.9698724	.0001369	-216.80	0.000	.9696042 .9701407
HOMEOWN#						
c. PCHANGE						
1		1.010599	.0001566	68.06	0.000	1.010292 1.010906
MALE		.8530062	.0004615	-293.86	0.000	.8521021 .8539112
H_FAIR		1.478659	.0025011	231.24	0.000	1.473765 1.483569
H_GOOD		2.664026	.0042048	620.79	0.000	2.655797 2.67228
H_VGOOD		5.91924	.0094227	1117.05	0.000	5.900801 5.937737
H_EXCELLENT		11.1275	.0184841	1450.48	0.000	11.09133 11.16379
AGE						
40		.9150981	.0015886	-51.11	0.000	.9119899 .918217
50		.9515303	.001627	-29.06	0.000	.9483467 .9547246
60		1.414038	.0022063	222.04	0.000	1.40972 1.418369
70		2.116909	.0033879	468.61	0.000	2.110279 2.123559
80		2.798927	.0049996	576.20	0.000	2.789145 2.808743
EMPL		1.322414	.0017662	209.24	0.000	1.318957 1.32588
AGE#c.EMPL						
40		.9296778	.0018124	-37.40	0.000	.9261324 .9332368
50		.9455737	.001809	-29.25	0.000	.9420347 .949126
60		.7529551	.0013758	-155.29	0.000	.7502635 .7556564
70		.7310516	.0019417	-117.95	0.000	.7272558 .7348671
80		.8090774	.0051898	-33.03	0.000	.7989692 .8193135
NFLD		1.630435	.0037504	212.52	0.000	1.623101 1.637802
PEI		1.272681	.0052209	58.78	0.000	1.26249 1.282955
NS		1.139252	.0017964	82.68	0.000	1.135736 1.142778
NB		1.466509	.0026823	209.33	0.000	1.461261 1.471776

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QC		1.323864	.000952	390.12	0.000	1.321999	1.325731
MB		1.250315	.0018791	148.65	0.000	1.246637	1.254003
SK		1.264704	.0021081	140.88	0.000	1.260579	1.268843
AB		.9621228	.0009351	-39.73	0.000	.9602917	.9639573
BC		.9764229	.0008336	-27.95	0.000	.9747905	.978058
MS_MARRIED		2.374722	.00221	929.34	0.000	2.370394	2.379057
MS_COMMLAW		1.884654	.0020191	591.56	0.000	1.880701	1.888616
MS_WIDOW		1.564284	.0025279	276.87	0.000	1.559337	1.569246
MS_SEPARATE		1.104357	.0019846	55.24	0.000	1.100474	1.108253
MS_DIVORCE		1.23678	.0017103	153.67	0.000	1.233432	1.240137
EXTRAPEOPLE		.864425	.0005914	-212.96	0.000	.8632667	.8655848
HSDINCOM							
25000		.9823445	.0013462	-13.00	0.000	.9797096	.9849866
35000		1.117431	.0015209	81.58	0.000	1.114454	1.120415
45000		1.195551	.001643	129.97	0.000	1.192335	1.198776
55000		1.128834	.0015796	86.60	0.000	1.125743	1.131935
70000		1.289578	.0016851	194.62	0.000	1.286279	1.292885
90000		1.323574	.0018321	202.52	0.000	1.319988	1.32717
125000		1.546177	.0020875	322.77	0.000	1.542091	1.550274
160000		1.836353	.0026966	413.90	0.000	1.831075	1.841646
HIGHSCH		.8851181	.0008755	-123.38	0.000	.8834038	.8868357
COLLEGE		.8783456	.0007888	-144.44	0.000	.8768009	.8798929
UNIVERSITY		.8227103	.0008034	-199.85	0.000	.8211372	.8242864

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