

DO IMMIGRANTS SHARE THE SAME LIFE SATISFACTION PROFILE IN AGE  
AS NATIVE-BORN CANADIANS?

by

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Submitted in partial fulfilment of the requirements  
for the degree of Master of Arts

at

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DALHOUSIE UNIVERSITY

DEPARTMENT OF ECONOMICS

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# **DEDICATION**

**To my mother and father**

**for teaching me to be good**

**for supporting me studying in Canada**

**for giving me the motivation of going on**

**for everything...**

# TABLE OF CONTENTS

LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
ABSTRACT.....	ix
LIST OF ABBREVIATIONS USED.....	x
ACKNOWLEDGEMENTS.....	xi
CHAPTER 1 INTRODUCTION.....	1
1.1 THE BACKGROUND AND SIGNIFICANCE OF THE STUDY.....	2
1.2 THE ORGANIZATION OF THIS THESIS.....	3
CHAPTER 2 LITERATURE REVIEW.....	5
2.1 THE VALIDITY OF SUBJECTIVE WELL-BEING.....	5
2.11 SUBJECTIVE WELL-BEING AND OBJECTIVE WELL-BEING.....	5
2.12 DEFINITION OF SUBJECTIVE WELL-BEING.....	6
2.13 HOW TO MEASURE SUBJECTIVE WELL-BEING.....	6
2.14 THE DETERMINANTS OF LIFE SATISFACTION.....	8
2.2 LIFE SATISFACTION AMONG AGE GROUPS.....	9
2.21 TRADITIONAL VIEWS.....	9
2.22 CONTEMPORARY VIEW: U-SHAPED LIFE SATISFACTION PROFILE.....	9
2.23 CANADIAN STUDY.....	10
2.3 LIFE SATISFACTION AMONG IMMIGRANTS.....	11
2.4 CONTROL VARIABLES IN LIFE SATISFACTION EQUATION ..	12
2.41 INCOME.....	12
2.42 DEMOGRAPHIC GROUPS.....	13
CHAPTER 3 DATA.....	14
CHAPTER 4 ECONOMETRIC SPECIFICATION.....	19
4.1 VARIABLE DEFINITIONS.....	19
4.11 AGE.....	19
4.12 IMMIGRANT STATUS.....	19
4.13 CONTROL VARIABLES.....	20

4.2	ORDERED PROBIT AND OLS MODEL.....	22
4.21	THE FIRST SPECIFICATION .....	22
4.22	THE SECOND SPECIFICATION .....	23
4.23	THE THIRD SPECIFICATION .....	23
4.24	THE FOURTH SPECIFICATION .....	24
CHAPTER 5	RESULTS .....	25
5.1	IMMIGRANT LIFE SATISFACTION PROFILES COMPARED TO THE NBC'S..	26
5.11	THE RESULTS OF FOUR SPECIFICATIONS .....	26
5.12	COMPARISON WITH MARRIAGE EFFECTS .....	33
5.2	HUMAN CAPITAL AND DEMOGRAPHIC CATEGORIES .....	34
CHAPTER 6	NBC AND IMMIGRANT SUBSAMPLES .....	36
CHAPTER 7	CONCLUSION.....	40
REFERENCES	.....	42
APPENDIX A	OLS ESTIMATES.....	45
APPENDIX B	ORDERED PROBIT ESTIMATES .....	56
APPENDIX C	SUBSAMPLE ESTIMATES .....	60

## LIST OF TABLES

Table 1	Life satisfaction by immigrant status and gender.....	14
Table 2	Means of explanatory variables.....	15
Table 3	OLS estimates for men, with controlling for belonging.....	45
Table 4	OLS estimates for women, with controlling for sense of belonging to the local community.....	50
Table 5	OLS estimates for men, without controlling for belonging.....	54
Table 6	OLS estimates for women, without controlling for belonging.....	55
Table 7	Ordered probit estimates for men.....	56
Table 8	Ordered probit estimates for women.....	58
Table 9	Ordered probit and OLS estimates for immigrants subsample.....	60
Table 10	Ordered probit and OLS estimates for NBC subsample.....	61

## LIST OF FIGURES

Figure 1	Distribution of Life Satisfaction. NBC and Immigrants.....	17
Figure 2	Distribution of Life Satisfaction. Recent and long-established immigrants. .	18
Figure 3	Life satisfaction profiles of male NBC and immigrants, Table 3, Specification 1.....	26
Figure 4	Life satisfaction profiles of female NBC and immigrants, Table 4, Specification 1.....	27
Figure 5	Life satisfaction profiles of male NBC and recent and long-established immigrants, Table 3, Specification 2.....	28
Figure 6	Life satisfaction profiles of female NBC and recent and long-established immigrants, Table 4, Specification 2.....	29
Figure 7	Life satisfaction profiles of male NBC and immigrants, Table 3, Specification 3.....	30
Figure 8	Life satisfaction profiles of female NBC and immigrants, Table 4, Specification 3.....	31
Figure 9	Life satisfaction profiles of male NBC and recent and long-established immigrants, Table 4, Specification 4.....	32
Figure 10	Life satisfaction profiles of female NBC and recent and long-established immigrants, Table 4, Specification 4.....	32
Figure 11	Life satisfaction profiles of men, estimates from immigrant and NBC subsample, Tables 9 and 10.....	36
Figure 12	Life satisfaction profiles of women, estimates from immigrant and NBC subsample, Tables 9 and 10.....	37



## **ABSTRACT**

This paper studies the difference of life satisfaction profiles between Canadian immigrants and native-born Canadians. In particular, the thesis asks how years of residence in Canada affect the immigrant life satisfaction profile. Using microdata from the 2007 Canadian Health Community Survey, ordered probit and OLS models are employed to estimate the “life satisfaction equation”. The results show that immigrants reach their turning point in the U-shaped life satisfaction profile at age 50 for men and age 42 for women. This is 5 years later than native-born men, and 2 year earlier than native-born women. Further, the life satisfaction levels for immigrants are significantly lower than their native-born counterparts. The value of the low points from the U-shaped profile is 0.39 (on a 5-point scale) lower for immigrant men and 0.42 lower for immigrant women. Also, long-established immigrants ( $\geq 10$  years), have a slightly higher life satisfaction than recent immigrants ( $< 10$  years).

## **LIST OF ABBREVIATIONS USED**

CCHS	Canada Community Health Survey
GSS	General Social Survey
PUMF	Public Use Microdata File
NBC	Native-born Canadians
SWB	Subjective Well-Being

## **ACKNOWLEDGEMENTS**

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## CHAPTER 1 INTRODUCTION

In Canada, 19.8 percent of the population are immigrants, i.e. persons not born in the country in which they are living (Census Canada, 2006). Immigrants constitute an important demographic group. For immigrants, the decision to migrate is made to achieve a better life, but immigrants often face many difficulties when settling into a new country.

First, foreign credentials and working experience are usually discounted in the Canadian labour market (Picot and Hou, 2003), thus immigrants have poorer labour outcomes than native-born Canadians (NBC). Immigrants, especially recent immigrants, are more likely to be below the poverty line. If basic needs cannot be met, life satisfaction is out of their reach. Second, immigration means losing the existing social network in the home country. Social contact is an important determinant of life satisfaction. No relatives, no friends, and no sense of belonging— although these factors decrease with time, these will significantly reduce the subjective well-being. Third, a different culture can also be a disadvantage. Especially in recent years, the main source countries of immigrants have changed from Europe to Asia. Differences between Western and Oriental culture make it harder for immigrants to adjust themselves to Canada. These three reasons seem plausible. However, after controlling for income, sense of belonging, and culture of origin, do immigrants still have lower life satisfaction than their native-born counterparts?

If the answer to the above question is yes, does it remain true years later? After years of residence, long-established immigrants gain Canadian working experiences, construct

new networks in Canada and get used to the social customs. Will the gap in subjective well-being between immigrants and native-born Canadians shrink along years of residence?

These questions lead to the goal of this thesis, which is to examine whether immigrants and native-born Canadians share the same life satisfaction profile in age. In addition, if a difference exists, will it become smaller with immigrants' increased years of residence in Canada?

## **1.1 THE BACKGROUND AND SIGNIFICANCE OF THE STUDY**

From ancient Greek philosophy to the current quality-of-life and well-being research, human history emphasizes the pursuit of overall well-being. The central role of happiness is given by Aristotle:

*What is the highest of all goods achievable by action?...both the general run of man and people of superior refinement say that it is happiness....but with regard to what happiness is they differ. (Aristotle, Nicomachean Ethics, Book1, Chapter 4, Page 4)*

The study of happiness also contributes to economic theory. Happiness, or subjective well-being, is important for individual utilities, making welfare policy, and evaluating governance.

In labour economics, immigrants are found to achieve poorer labour market outcomes than their native-born counterparts. The immigrant “assimilation effect” was raised by

Borjas (1985). It describes that immigrants are usually paid lower wages than their native-born counterparts when they just move to the new country, and the earning gap narrows as the number of years of residence increases. Labour economists use the word assimilation in this context in the narrow sense of immigrants' income getting closer to the native-born over time, rather than inferring the cultural melting pot.

In this thesis, a similar “assimilation” concept is used for the life satisfaction study<sup>1</sup>. It is likely that immigrants have a lower life satisfaction level than their native-born counterparts (Picot and Sweetman, 2005, Burton and Phipps, 2010). The research question asked in this thesis is whether years of residence narrow the gap. If the difference between immigrants and natives is eliminated after a short period, then it means immigrants adapt well to the new country. But if the difference is eliminated only after a very long period, or is not eliminated at all (or becomes even larger), then it suggests immigrants are living a more miserable life relative to their native-born peers. In addition, Canada, as a nation of immigrants, may have negative future outcomes.

## **1.2 THE ORGANIZATION OF THIS THESIS**

This thesis intends to explore the issue of life satisfaction profile by drawing on cross-sectional data from more than 130,000 respondents in the most recent public use microdata file (PUMF) from the 2007 Canadian Community Health Survey (CCHS). The paper consists of five chapters. First, there will be a brief review of the reasons to study subjective well-being (Chapter 1). This will be followed by a survey of existing life

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1. Although I would not call it “assimilation”, since Canadian immigrants are not necessarily assimilated by the main-stream culture in a broad sense. They are likely to remain the culture diversity even after a long time residence.

satisfaction studies (Chapter 2), the description of data used (Chapter 3), the econometric adopted (Chapter 4), the report of results, the discussion of the factors linking with life satisfaction (Chapter 5), and subsample estimates (Chapter 6). Finally, it will end with conclusions and comments (Chapter 7).

## **CHAPTER 2      LITERATURE REVIEW**

This chapter begins with a discussion of the validity of the concept of subjective well-being, as there have been arguments about whether subjective well-being can be used as a valid measurement in research. A definition of subjective well-being, in contrast with objective well-being, is provided, and the measurement is illustrated. The literature reviewed includes previous studies and findings about happiness among age groups, life satisfaction among immigrants and control variables used in estimating the life satisfaction equation.

### **2.1 THE VALIDITY OF SUBJECTIVE WELL-BEING**

#### **2.1.1 SUBJECTIVE WELL-BEING AND OBJECTIVE WELL-BEING**

Traditional economic studies focus on objective measures, such as GDP and income. However, material goods are a means and not an end (Helliwell, 2002). Life satisfaction is usually considered an important goal of life. In recent decades, more attention has been paid to subjective well-being.

Since subjective well-being is not directly observable by others, there is potential for greater measurement error than with “objective” variables. However, subjective measures of well-being appear to be greatly affected by objective variables (Oswald and Wu, 2010). Furthermore, subjective well-being goes further than objective measurement, because it states what people say they actually experience, and that is the issue we really care about (Konow, 2002).



## **2.12 DEFINITION OF SUBJECTIVE WELL-BEING**

Subjective well-being (SWB) is people's cognitive and affective evaluations of their lives (Diener, 2000). According to Strack and Argyle (1991), subjective well-being can be divided into individual aspects, such as self-appraisals, self-esteem and life satisfaction; collective aspects, such as social opinion, acceptance and morale; and mixed aspects, such as emancipation. The focus of these aspects of SWB is life satisfaction.

## **2.13 HOW TO MEASURE SUBJECTIVE WELL-BEING**

The "Likert scale" is most commonly used as an attempt to measure SWB. For example, respondents are asked: "How do you feel about your life as a whole?" and are provided with a 10-point response scale<sup>2</sup> from very happy to terrible.

In previous studies, self-report and non-self-report are the two measures of SWB. Self-report SWB is about how people feel about themselves, and non-self-report SWB is from family and friends informant reports. Diener (2009) finds that self-report instruments are a valid measure of SWB, while non-self-report measures are useful for providing a comprehensive and theoretical account of SWB.

Some measures emphasize emotion, such as a good mood, while other measures emphasize the cognitive, reflective side, such as satisfaction with life (Argyle, 1987). Helliwell and Putman (2004), however, confirm that these two terms generate broadly consistent estimation.

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2. 5-point scale and 10-point scale are most commonly used to evaluate life satisfaction.

Frey and Stutzer (2002) explore the ways to validate subjective data measured by life satisfaction, happiness, and other emotions in different surveys, using ordinal life satisfaction scales. They construct a life satisfaction function to establish an econometric relationship between an ordered life satisfaction variable and the predictors of life satisfaction. Following Frey and Stutzer, Blanchflower and Oswald (2011) present a “life satisfaction equation” from the previous literature:

$$\text{Life satisfaction} = f(\text{age, gender, income, education, marital status, diet, other personal characteristics, region characteristics, country characteristics}) \quad (1)$$

OLS and ordered probit model are the usual econometric methods employed in the empirical happiness literature. The basic idea is that OLS provides a cardinal estimation of life satisfaction; whereas most data provides ordered categorical measurement. In that sense, the ordered probit model is preferable, because there are different reasons for people being very happy and being very unhappy. However, a large number of studies (for example, Helliwell and Putnam, 2004; Burton and Phipps, 2010; Blanchflower and Oswald, 2010) find that OLS estimation has almost identical results to the ordered probit model in terms of significance.

When attention is paid to the detailed methodology, Helliwell and Putnam (2004) point out four factors that interfere with inferring the causal determinants of subjective well-being. First, bivariate analysis usually generates spurious correlation, which does not capture the whole causation. Even when other variables are added, the effect of one

variable can be offset by others. Second, multi-level analysis (such as individual-level and community-level) is required to provide a comprehensive view. For example, absolute income may not be important, but after taking it into account for the comparison of others' income, the relative income can play an important role. Thus both individual-level and community-level should be taken into consideration. Third, reverse causation is a common and significant issue in a subjective well-being study. One simple example is whether a happy man is more likely to get married or a man gets happier because he is married. Fourth, adaptation or habituation is another impediment to life satisfaction estimation. When a sudden change takes place, no matter whether it is winning a lottery or a car accident, people tend to have an extreme reaction in a short period, and then gradually return to the normal mood stage (Brickman et al. 1978). Psychologically, people adjust their aspirations according to the changing environment. Due to adaptation, cross-sectional data gives an incorrect estimation, since it mixes up the short-term sharp effect and the long-term reverting level.

#### **2.14 THE DETERMINANTS OF LIFE SATISFACTION**

From the psychological perspective, Seligman (2011) raises a new gauge to see subjective well-being beyond happiness. He defines five crucial elements of subjective well-being: positive emotion, engagement (feel of being lost in a task), relationship, meaning and accomplishment. Brooks (2008) also points out the importance of sense of accomplishment. Instead of how cheerful you are or how much money you earn, subjective well-being is more linked with the sense of “earned success”

A number of studies find that objective variables are closely related to subjective well-being. The determinants can be divided into specific areas, for example, work, marriage, and health (Argle, 1987). Frey and Stutzer (2002) find that there are three economic determinations of life satisfaction: income, employment and inflation, although the coefficient of income is relatively small. The following section will discuss in detail age, immigrant status, income and other demographic factors.

## **2.2 LIFE SATISFACTION AMONG AGE GROUPS**

### **2.21 TRADITIONAL VIEWS**

At the micro level, much research has been done on the relationship between life satisfaction and age. Traditional views, mainly among psychologists, include four streams. First, life satisfaction is flat along the life cycle (Myers 1992). It means that age has no relationship with life satisfaction, and life satisfaction remains constant across age groups. Second, well-being increases with age (Argyle, 1999 & 2001). This hypothesis suggests that the older people are the higher life satisfaction they have. Third, life satisfaction is non-decreasing with age (Diener 1999). It is the combination of the first two, which means people either remain at the same level of life satisfaction or have a higher life satisfaction as time goes by. Fourth, life satisfaction is decreasing with age (Wilson, 1967), which means that happiness is all about being young.

### **2.22 CONTEMPORARY VIEW: U-SHAPED LIFE SATISFACTION PROFILE**

The contemporary view is that life satisfaction follows a U-shape distributed along the life span. Blanchflower and Oswald (2000) find a strong U-shaped life satisfaction

pattern in age from the United States and Britain. Frey and Stutzer (2002), using the life satisfaction equation with data collected from many different countries and periods of time, find that age and age squared are significant, and the positive coefficient of age squared suggest that age affects life satisfaction in a U-shaped manner. The same conclusion is drawn by Gerlach and Smets (1994), Theodossiou (1998), Di Tella et al (2001), and Graham (2005).

Easterlin (2006), however, argues that cross-sectional data omits cohort effects, which means that previous work fails to consider the effects of different birth period. However, Blanchflower and Oswald (2007) provide evidence that life satisfaction is still U-shaped after eliminating birth-cohort effects, and reaches the minimum by a person's late 40s.

According to Blanchflower and Oswald (2007), the potential reasons for the U-shaped life-satisfaction profile include the following. First, after middle age, people learn to accept their reality and give up unrealistic aspirations. Second, they hypothesize that happy people live longer, and the U-shaped life satisfaction profile reflects this. Third, as a person's peer group begins to die, the person is likely to value his/her remaining years more..

### **2.23 CANADIAN STUDY**

Canadian studies also suggest the U-shaped life satisfaction profile in age. John Helliwell has done many studies with international and national data. Helliwell (2005) summarizes the empirical findings. He confirms that the life satisfaction profile is U-shaped over the life cycle, and the large cross-sectional data from the 2003 Canadian General Social

Survey (GSS) suggest that one-third of the U-shape is diminished when “stress” is taken into consideration. Helliwell and Putnam (2004) draw data from Canadian Equality, Security and Community (ESC) survey. The uniqueness of this survey is that the respondents are asked to report health status compared with others of their own age. This variable tends to offset the personal bias from being optimistic or pessimistic. They report the results of the life satisfaction equation from linear estimation (survey-ordered probit estimation provides the identical significance and size) and find that the lowest point for SWB is in the 35 to 54 age group; whereas the highest is in the 65 and above age groups, after taking into account physical health. Without physical health effects, the U shape twists and the older age group hits the bottom. The conclusion is that older people have poorer health status, which reduces the subjective well-being significantly but older people tend to report a higher life satisfaction than younger people with the same level of health status.

### **2.3 LIFE SATISFACTION AMONG IMMIGRANTS**

Helliwell and Putnam (2004) use the Blinder-Oaxaca decomposition to analyze differences in happiness for individuals with different characteristics. They put immigrant status into the decomposition and find a weak but significant negative coefficient. It means that being an immigrant has a negative effect on subjective well-being.

Burton and Phipps (2010) take a close look at the well-being of immigrant children and parents in Canada. They pool cross-sectional data for the years 2002 to 2008 from the Canada Community Health Survey (CCHS) and employ an ordered probit estimation for

life satisfaction. They find that immigrant children and parents have lower life satisfaction and less sense of belonging to the local community (another aspect of well-being) even after controlling personal characteristics. This finding is especially true for girls. Also, Burton and Phipps (2010) use OLS models and the Blinder-Oaxaca decomposition and find low income to be an important reason for the lower subjective well-being, explaining 20 percent to 30 percent of the gap.

Another important finding from Burton and Phipps (2010) is that there is no significant improvement in life satisfaction for immigrants who reside much longer in Canada. In this paper, I want to expand this point further. It is well known that the labour market outcomes of immigrants will adjust towards those of native workers after the immigrants' arrival in the host country. With the assimilation effect in labour market outcomes introduced into the life satisfaction study, this paper examines whether immigrants' life satisfaction profile adjusts towards their native-born peers.

## **2.4 CONTROL VARIABLES IN LIFE SATISFACTION EQUATION**

### **2.41 INCOME**

Blanchflower and Oswald (2007) point out that income has a small but significant coefficient, which means that richer people are more satisfied with their lives. However, income-happiness relationship at the national level remains controversy. Clark and Oswald (1994), Theodossiou (1998), and Winkelmann and Winkelmann (1998) present a negative correlation. On the other hand, Di Tella and MacColluch (2001) find that life satisfaction is positively correlated with a country's GDP. Alternatively, Easterlin et al.

(2010) discover that life satisfaction does not increase with GDP in the long term. They argue that the positive relationship in previous studies is either a statistical artefact or due to the confusion between long term and short term. Thus, national income growth without increases in happiness” is called the Easterlin paradox. So the happiness - income relationship remains ambiguous. Clearly, it is essential to control for income when estimating age profiles for the life satisfaction of immigrants and NBC.

#### **2.42 DEMOGRAPHIC GROUPS**

The existing literature also examines how other factors, such as gender, education, marriage, and geography, contribute to life satisfaction. Blanchflower and Oswald (2011) find that life satisfaction is higher among women, whites, the highly educated, full-time workers, and married people; while life satisfaction is lower among the unemployed, widowed, divorced, separated, and those whose parents divorced before their children were 16 years old. Similarly, Frey and Stutzer (2002) demonstrate that life satisfaction is higher in women, couples, nationals (rather than foreigners), and those with higher education and good health.

Helliwell and Putnam (2004) compare the SWB in British Columbia and the Atlantic provinces. As opposed to the positive correlation between income and SWB at the country-level, people in B.C. who have relatively higher income report lower SWB than those in the Atlantic Provinces. They also find that non-economic factors, such as sense of belonging and network, favour the Atlantic Provinces.



## CHAPTER 3 DATA

This paper draws on cross-sectional data for about 130,000 respondents in the most recent public use microdata file (PUMF) from the 2007 Canadian Community Health Survey (CCHS). It asks respondents from households in ten provinces and three territories to report their satisfaction with life. The exact wording of the life satisfaction question is: *How satisfied are you with your life in general, very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, or very dissatisfied?* The response is coded 1 if very satisfied and coded 5 if very dissatisfied. Sense of belonging to the local community is another subjective variable that is worth noting. The respondents are asked: *“How would you describe your sense of belonging to your local community? Would you say it is: very strong, somewhat strong, somewhat weak, or very weak?”* The response is also coded on a 4-point scale.

Table 1 Life satisfaction by immigrant status and gender.

Life satisfaction	Frequency	All	Men		Women	
			NBC	Immigrants	NBC	Immigrants
Very satisfied	44,323	37.86	38.49	31.8	40.22	32.29
Satisfied	62,416	53.32	53.24	58.22	51.65	56.7
Neither	6,235	5.33	5.08	6.27	4.95	6.8
Dissatisfied	3,345	2.86	2.62	3.15	2.57	3.53
Very dissatisfied	743	0.63	0.56	0.56	0.61	0.67
Mean/Total	117,062	4.26	4.26	4.18	4.28	4.16

Table 1 reports the value, frequency, and percentage of each level of life satisfaction within each group, for native-born Canadians (NBC), recent immigrants (< 10 years), long-established ( $\geq 10$  years) immigrants, and all people in both genders.

The dataset also contains information on age, income, immigrant status, years in Canada since immigration, education, marital status, and other personal characteristics. Means of these explanatory variables<sup>3</sup> are shown in Table 2. In the present study, observations for people younger than 18 years old were dropped from the sample. This is because people under 18 years old are generally too young to have completed education, have a job or be married.

The public use data file does not report age as a continuous variable. Instead, the data was grouped in 5 year intervals for each group, with exceptions as noted<sup>4</sup>. The average age of respondents is 46, and the standard deviation is 4.1. The mean of each age group is used to provide an approximately continuous measurement<sup>5</sup>.

Table 2 Means of explanatory variables in weighted sample.

Variable	All	Men		Women	
		NBC	Immigrants	NBC	Immigrants
Age	46.293	44.794	48.150	46.298	48.689
Household Income (from all sources)	61269	65490	59890	59238	55458
Immigrant	0.235	0.000	1.000	0.000	1.000
0-9 years	0.060	0.000	0.265	0.000	0.265
10 or more years	0.168	0.000	0.735	0.000	0.735
White	0.779	0.912	0.434	0.914	0.428
Visible minority	0.185	0.075	0.556	0.074	0.562

3. Since almost all the variables are dummies, which take the value of either 1 or 0, the average value of each variable also represents the percentage of people by different categories. For example, 0.2 represents 20% of given population.
4. Exception is for the first three groups and last group, which are 12 to 15, 15 to 17, 18 to 19 and 80 years or more.
5. For the group 80 years or more, 85 is used as an approximation.

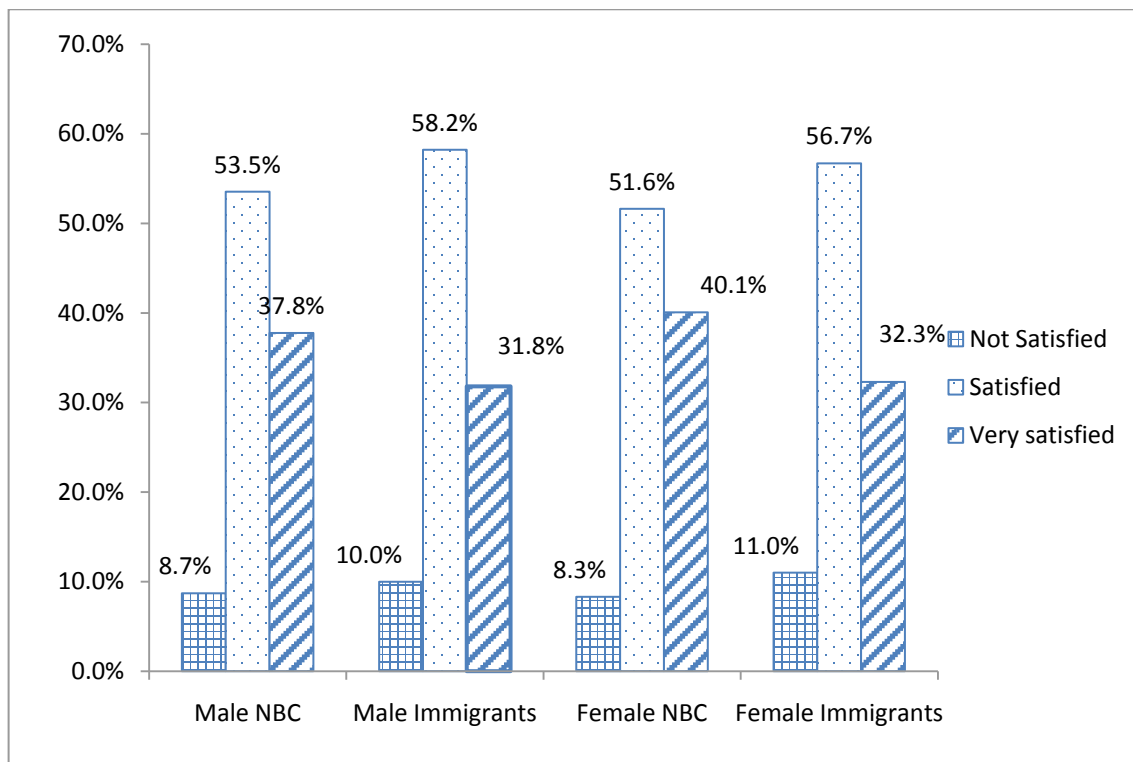
Table 3 Means of explanatory variables in weighted sample, *continued*.

Variable	All	Men		Women	
		NBC	Immigrants	NBC	Immigrants
Married	0.525	0.500	0.701	0.470	0.612
Common-law	0.111	0.135	0.042	0.132	0.041
Widowed, divorced, separated	0.131	0.083	0.076	0.174	0.192
Single	0.231	0.280	0.179	0.222	0.153
Less than secondary education	0.160	0.168	0.127	0.155	0.177
Secondary education	0.169	0.169	0.153	0.173	0.168
Other post-secondary education	0.087	0.096	0.059	0.093	0.069
Post-secondary education	0.585	0.567	0.661	0.579	0.586
<b>Perceived health status</b>					
Excellent	0.214	0.216	0.222	0.217	0.190
Very good	0.369	0.380	0.341	0.386	0.316
Good	0.296	0.290	0.312	0.280	0.344
Fair	0.090	0.085	0.083	0.088	0.110
Poor	0.031	0.029	0.041	0.028	0.041
<b>Sense of belonging to the local community</b>					
Very strong	0.172	0.163	0.186	0.171	0.183
Strong	0.462	0.470	0.432	0.464	0.453
Weak	0.264	0.271	0.263	0.268	0.239
Very weak	0.102	0.096	0.119	0.097	0.125
NFLD	0.016	0.020	0.003	0.021	0.001
PEI	0.004	0.005	0.001	0.005	0.001
NS	0.029	0.035	0.006	0.037	0.006
NB	0.023	0.029	0.003	0.029	0.003
QB	0.237	0.264	0.149	0.270	0.132
ON	0.389	0.338	0.540	0.336	0.560
MB	0.034	0.037	0.025	0.037	0.023
SSK	0.028	0.035	0.007	0.035	0.006
ALB	0.103	0.110	0.095	0.106	0.085
BC	0.135	0.123	0.170	0.120	0.181
YKT	0.003	0.003	0.001	0.003	0.001

In the CCHS data set, 16.4 percent of respondents are immigrants, providing 18,024 observations. About 1/5 of them have stayed 0 to 9 years, and the rest 10 or more years.

A smaller percentage of immigrants report very satisfied as compared with their native-born counterparts in both genders. The gaps between the NBC and immigrants are 7.0 percent less for immigrant men and 7.8 percent less for immigrant women (Figure 1). Also, a significant difference in the rate of being very satisfied from recent immigrants to long-established immigrants is found in both genders (Figure 2).

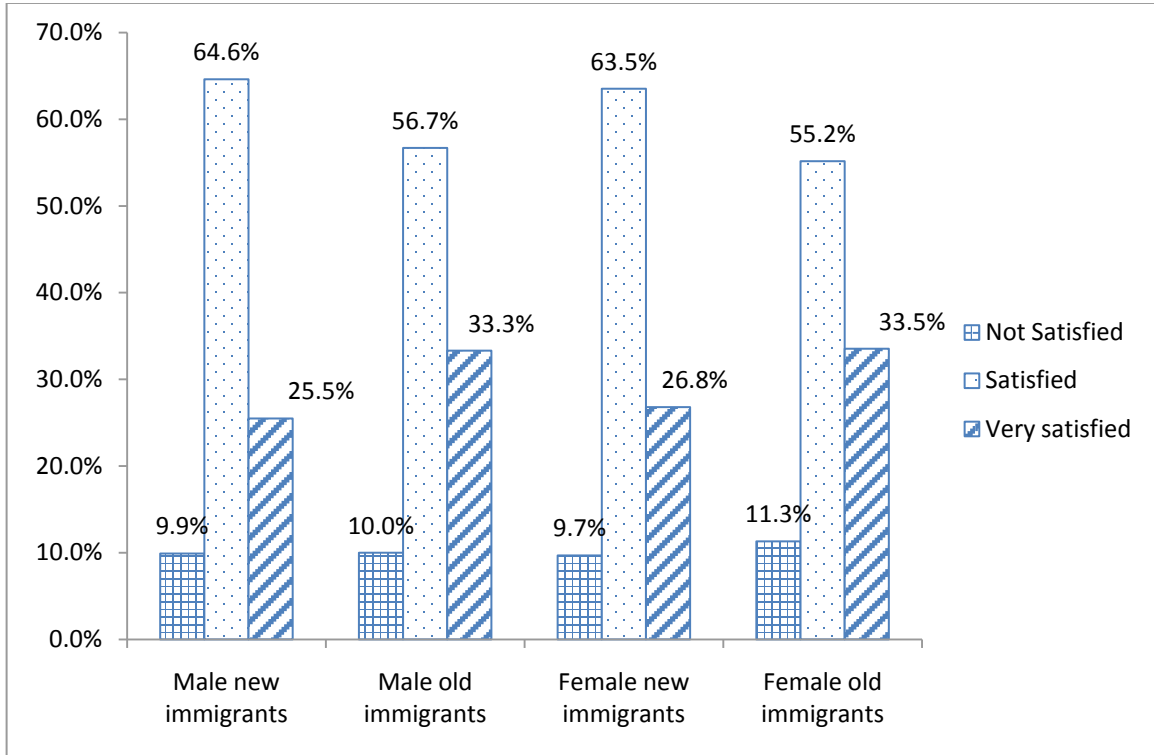
Figure 1 Distribution of Life Satisfaction. NBC and Immigrants.



CCHS also provides sample weights, also known as pweights, to ensure that the estimated results do not just represent the sample; they also refer to the total population. The sample weights correspond with the number of people that the respondents actually represent. These weights are calculated from the inverse probability of being in the sample. For example, the 10 percent sample gives the weight of 10. Applying sample

weights with some further adjustment, CCHS gives the final person-level weights in the Public Use Microdata File (PUMF). The weights are incorporated in all the estimations to derive meaningful results.

Figure 2 Distribution of Life Satisfaction. Recent and long-established immigrants.



## **CHAPTER 4      ECONOMETRIC SPECIFICATION**

The goal of this section of the thesis is to explain how I will test for differences in the age profile of life satisfaction between Canadian immigrants and native-born Canadians. First, I will pool immigrants and the NBC. The primary strategy is adding both dummies for immigrant status and interactions between immigrant status and age variable, then further distinguishing recent immigrants and long-established immigrants, thereby allowing tests of the hypothesis that life satisfaction profiles of immigrants differ from native-born Canadians (NBC). Second, I will estimate the NBC subsample, and immigrant subsample with one new immigrant dummy.

### **4.1 VARIABLE DEFINITIONS**

The dependent variable is self-reported life satisfaction, 5 for very satisfied, 1 for very dissatisfied (Table 1). Explanatory variables (Table 2) are defined in the following categories:

#### **4.11 AGE**

- Age is the respondent's age in the year of survey, ranging from 18 to 80 and above. In the sample, the average age for NBC men is 44.8 and for immigrant men is 48.1. For women, the average age for NBC is 46.3 and for immigrants is 48.7 (Table 2).
- Age<sup>2</sup> stands for Age squared.

#### **4.12 IMMIGRANT STATUS**

It contains three dummies and six interactions.

- Immigrant dummy, 1 for immigrant, 0 otherwise. In the data, immigrants account for 14.9 percent of men, and 14.8 percent of women.
- Recent immigrant dummy, 1 for 0 - 9 years since arrival, 0 otherwise. There are 26.5 percent male immigrants are recent immigrants, and the same percent for their female immigrant counterparts.
- Long-established immigrant dummy, 1 for 10 years or more since arrival, 0 otherwise. About 73.5 percent of immigrants have arrived 10 years ago, and it is the same percent for immigrant women.

These variables are designed to capture the different intercepts of recent immigrants, long-established immigrants, and the NBC. Six interactions are the immigrant status (immigrant dummy, recent immigrant dummy, long-established immigrant dummy) interacting with age and age squared.

These variables are used to capture the different slopes for immigrants from their native-born counterparts and for recent immigrants from long-established immigrants.

#### **4.13 CONTROL VARIABLES**

X is other personal characteristics.

- Income is total household income from all sources, which is grouped into 5 categories<sup>6</sup>, ranging from 0 to \$80,000 and above. The log of the mean income in each group is used as an approximation. In the weighted sample, the average

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6. The five categories are no income to less than \$20,000, \$20,000 to \$39,999, \$40,000, to \$59,999, \$60,000 to \$79,999, and \$80,000 or more.

income is \$65,490 for male NBC and \$59,890 for male immigrants. For women, the average income is \$59,238 for the NBC and \$55,458 for immigrants.

- Marital dummies include married (base), common-law, widowed or separated or divorced, and single or never married. Among the NBC, 50.0 percent men and 47.0 percent women are married, compared to 70.1 percent immigrant men and 61.2 percent immigrant women married.
- The highest level of education of respondents includes less than secondary, secondary graduate (base), other post-secondary and post-secondary graduate. For the NBC, 56.7 percent men and 57.9 percent women have completed post secondary education. For immigrants, 66.1 percent men and 58.6 percent women have completed post-secondary education.
- Self-perceived health status is scaled from 1 to 5. The middle one is used as the base. About 38.0 percent NBC men and 38.6 percent NBC women are in very good health status, which is only 34.1 percent for immigrant men, and 31.6 percent for immigrant women.
- Sense of belonging to the local community is scaled from 1 to 4. *Strong sense of belonging* (3 in the 4-point scale) is used as the base. In the weighted sample, 47.0 and 46.4 percent of NBC men and women feel strong belonging to the local community. But only 43.2 percent of immigrant men and 45.3 percent of immigrant women feel the same way.
- Provinces and territories are grouped into 11 categories (three territories are in one group due to the small proportion of respondents). Ontario is chosen as the



base, and 33.8 percent men and 33.6 percent women of the sample are from Ontario.

- Culture of origin includes whites and visible minorities. *Whites* is used as the base. In the sample, 91.2 percent of men and 91.4 percent of women are whites.

## **4.2 ORDERED PROBIT AND OLS MODEL**

Four specifications are estimated; both using OLS (Tables 3 and 4) and ordered probit models (Tables 7 and 8)<sup>7</sup>. Since life satisfaction is not a cardinal number, the ordered probit model is theoretically correct. However, OLS estimation provides almost identical results in terms of significance and magnitude, and it is easier to illustrate life satisfaction profiles graphically using OLS estimates. Therefore, OLS results will be used for figures and comparative and sensitivity analysis.

### **4.2.1 THE FIRST SPECIFICATION**

For the first specification, the alternative hypothesis<sup>8</sup> is that there is a parallel shifting down of the life satisfaction profile of immigrants from the NBC's. The hypothesis underlying this specification is thus that immigrants always remain at a constant and lower level of life satisfaction than NBC. This specification has one immigrant dummy to change the intercept of the life satisfaction profile, and X is a vector of other independent variables:

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7. The full results for OLS estimates with controlling for belonging are reported in Tables 3 and 4. For other econometric specifications, only the variables of interests are reported in the Appendices.

8. Normally, the null hypothesis is that they are the same. Here the alternative hypothesis is that immigrant life satisfaction is lower.

$$Y = \alpha + \beta_1 \text{Age} + \beta_2 \text{Age}^2 + \beta_3 \text{Immigrant} + \beta_4 X + u \quad (2)$$

#### 4.22 THE SECOND SPECIFICATION

The alternative hypothesis of the second specification is that the downward shifting is different for long-established immigrants (in the country for more than 10 years) and recent immigrants (in the country for less than 10 years). The meaning underlying this specification is thus that long-established immigrants are expected to have higher life satisfaction than recent immigrants (because of the adaptation to the new environment, for example), and will still remain below their native-born counterparts. The specification has recent and long-established immigrant dummies to allow for different intercepts, which indicate the downward shifts of recent immigrant and long-established immigrant life satisfaction profiles from the NBC's:

$$Y = \alpha + \beta_1 \text{Age} + \beta_2 \text{Age}^2 + \beta_3 \text{Recent immigrant} + \beta_4 \text{Long-established immigrant} + \beta_5 X + u \quad (3)$$

#### 4.23 THE THIRD SPECIFICATION

The third specification introduces changes in slopes. The alternative hypothesis is that being an immigrant not only shifts down the life satisfaction profile, but also gives different shapes in life satisfaction profile. The intuitive hypothesis is that the life satisfaction gap is not constant across age groups, but there are catch-up effects. Thus, this specification includes age and age squared in interaction with the immigrant dummy. Unlike the first specification, these two interactions give immigrants different slopes of life satisfaction profiles from the NBC's in addition to shifting intercepts:

$$Y = \alpha + \beta_1 \text{Age} + \beta_2 \text{Age}^2 + \beta_3 \text{Immigrant} + \beta_4 \text{Age} * \text{Immigrant} + \beta_5 \text{Age}^2 * \text{Immigrant} + \beta_6 X + u \quad (4)$$

#### 4.24 THE FOURTH SPECIFICATION

The alternative hypothesis of the fourth specification is that there are different intercepts and slopes for recent immigrants, long-established immigrants, and the NBC. It suggests that recent and long-established immigrants have different paces to catch up to the NBC (due to culture shock, for example). The fourth specification includes recent and long-established immigrant dummies and new and old interactions; so that we can capture not only the shift-down effects, but also have different shapes of life satisfaction profiles:

$$Y = \alpha + \beta_1 \text{Age} + \beta_2 \text{Age}^2 + \beta_3 \text{Recent immigrant} + \beta_4 \text{Long-established immigrant} + \beta_5 \text{Age} * \text{Recent immigrant} + \beta_6 \text{Age}^2 * \text{Recent immigrant} + \beta_7 \text{Age} * \text{Long-established immigrant} + \beta_8 \text{Age}^2 * \text{Long-established immigrant} + \beta_9 X + u \quad (5)$$

Because sense of belonging can also be considered as an aspect of subjective well-being, four specifications of OLS model are also done without “sense of belonging to the local community”: the results are in Appendix A, Tables 5 and 6. The coefficients of immigrant dummy, recent immigrant dummy and long-established immigrant dummy fall considerably after controlling for belonging. It means that immigrant effects are reduced after controlling for “belonging to the local community”. As an aspect of subjective well-being, lack of sense of belonging is an important factor in reducing immigrant life satisfaction.

## CHAPTER 5 RESULTS

As mentioned before, life satisfaction, the categorical dependent variable requires an ordered probit model to ensure the correct econometric procedure<sup>9</sup>. However, when comparing the results of OLS model (Appendix A, Tables 3 and 4) and ordered probit model (Appendix B, Tables 7 and 8), we can see that these two models provide almost identical significance of variables. Because OLS results are easier to interpret, they will mainly be used in this thesis. Tables 3 and 4 show OLS estimates with controlling for “belonging to the local community” for men and women respectively, and Tables 5 and 6 show OLS estimates without controlling for “belonging to the local community” for men and women respectively. Table 9 reports ordered probit and OLS estimates of NBC and immigrant subsamples, which will be discussed in Chapter 6.

Consistent with previous findings in the United States, Europe and Canada, there is strong evidence that the Canadian life satisfaction profile is U-shaped in age. All the quadratic age terms are significant at the 1 percent level in all the specifications (Tables 3 to 9, second row). Also, the positive coefficient of Age<sup>2</sup>, and the negative coefficient of Age give the life satisfaction profile a convex shape. As it will be discussed in Chapter 6, the lowest point is at age 45 for Canadian men and 44 for Canadian women.

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9. As mentioned previously, life satisfaction is a categorical variable. People usually have different reasons for being very happy or very unhappy. Thus, when estimating the probability of being in either of the two extremes, we cannot simply reverse the explanatory variables. Instead, we need to allow for different variables and/or differences in their significance and magnitude.

## **5.1 IMMIGRANT LIFE SATISFACTION PROFILES COMPARED TO THE NBC'S**

### **5.11 THE RESULTS OF FOUR SPECIFICATIONS**

Specification 1 adds an immigrant dummy to shift down the life satisfaction profile of immigrants from the NBC's, after controlling for all the personal characteristics (see Tables 3 and 4, first column). The immigrant dummies for men and women are both negative and statistically significant at 1 percent, which means that immigrants have significantly lower life satisfaction than their native-born counterparts after controlling for income, white or visible minority, education, and sense of belonging. The coefficients of the immigrant dummy for men and women are -0.099 and -0.096.

Figures 3 and 4 illustrate the life satisfaction profile of male and female immigrants compared to native-born Canadians using one immigrant dummy variable.

Figures 3 and 12 are drawn based on the coefficients of age, age squared, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.

Figure 3 Life satisfaction profiles of male NBC and immigrants, Table 3, Specification 1.

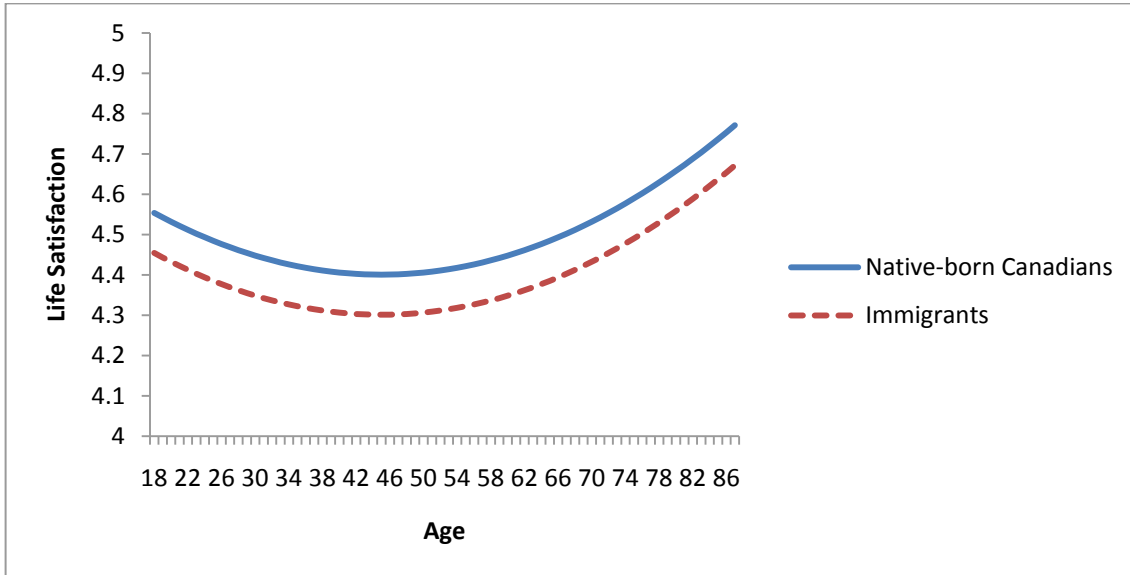
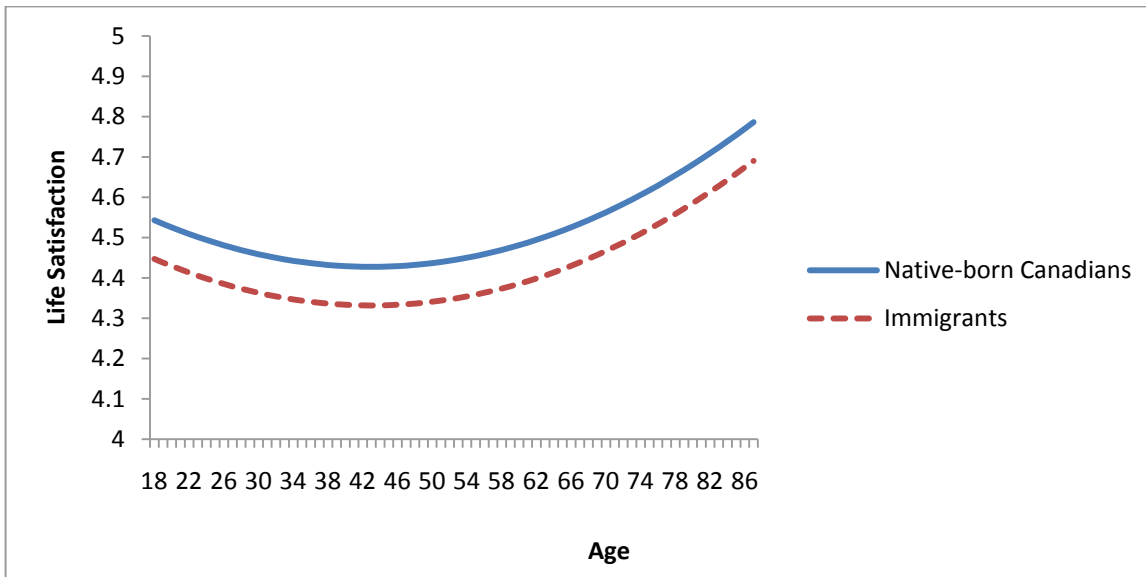


Figure 4 Life satisfaction profiles of female NBC and immigrants, Table 4, Specification 1.



Note: Figures 3 and 4 are drawn based on the coefficients of age, age squared, immigrant dummy, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.

Instead of using one immigrant dummy, Specification 2 uses a recent immigrant dummy (0 to 9 years since arrival) and a long-established immigrant dummy (more than 10 years since arrival). This allows for shifting down the life satisfaction profiles differently for recent immigrants and long-established immigrants (Tables 3 and 4, second column). All the immigrant variables are significant at the 1 percent level. The coefficients are negative, and the absolute values for recent immigrant dummies are larger than long-established immigrant dummies in both genders. Figures 5 and 6 illustrate the story.

Figure 5 Life satisfaction profiles of male NBC and recent and long-established immigrants, Table 3, Specification 2.

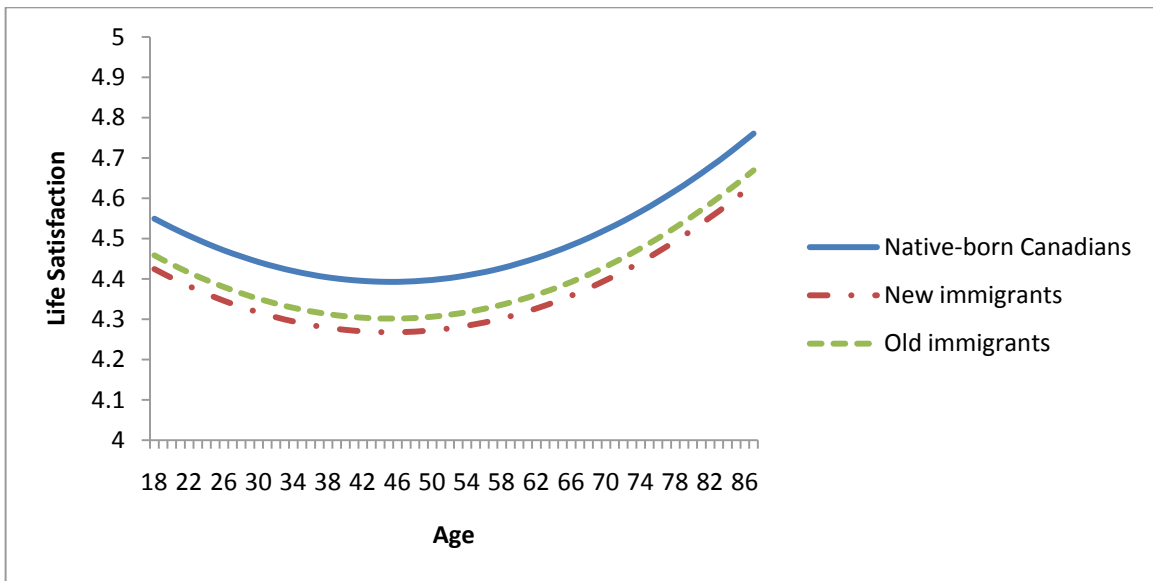
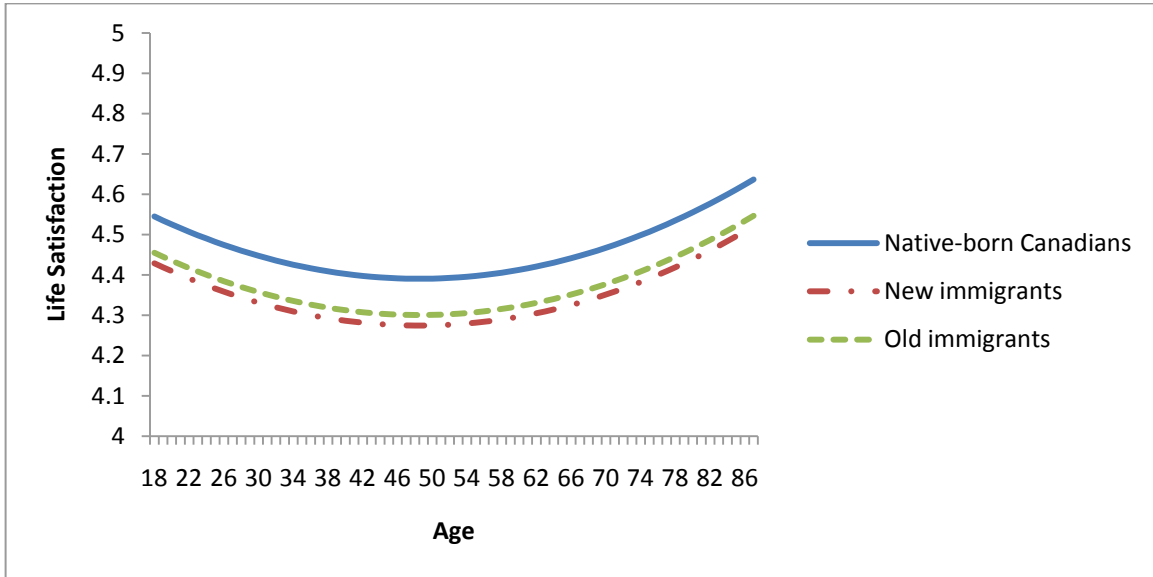


Figure 6 Life satisfaction profiles of female NBC and recent and long-established immigrants, Table 4, Specification 2.



Note: Figures 5 and 6 are drawn based on the coefficients of age, age squared, immigrant status, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.

As we can see, immigrants who live in Canada for more than 10 years have slightly higher life satisfaction than new comers, but it is still much lower than their Canadian-born counterparts.

The first two specifications verify the different intercepts for immigrants from the NBC: immigrants have lower life satisfaction than their native-born peers, and recent immigrants have lower life satisfaction than long-established immigrants.

Specification 3 shifts the intercepts and slope of immigrants from NBC's. The immigrant dummies become insignificant after adding the interactions (Tables 3 and 4, third



column). The interaction terms are significant in the female ordered probit and OLS models, but insignificant for male immigrant. These results suggest that female immigrants have a different shape of life satisfaction profile from the NBC' rather than just a simple shift down by a constant, but this is not so for men. Also, Figures 7 and 8 show that the life satisfaction gap between Canadians and immigrants becomes larger in age for men and smaller in age for women. Immigrant women have a steeper slope than the NBC's and catch up at the age of 70.

Figure 7 Life satisfaction profiles of male NBC and immigrants, Table 3, Specification 3

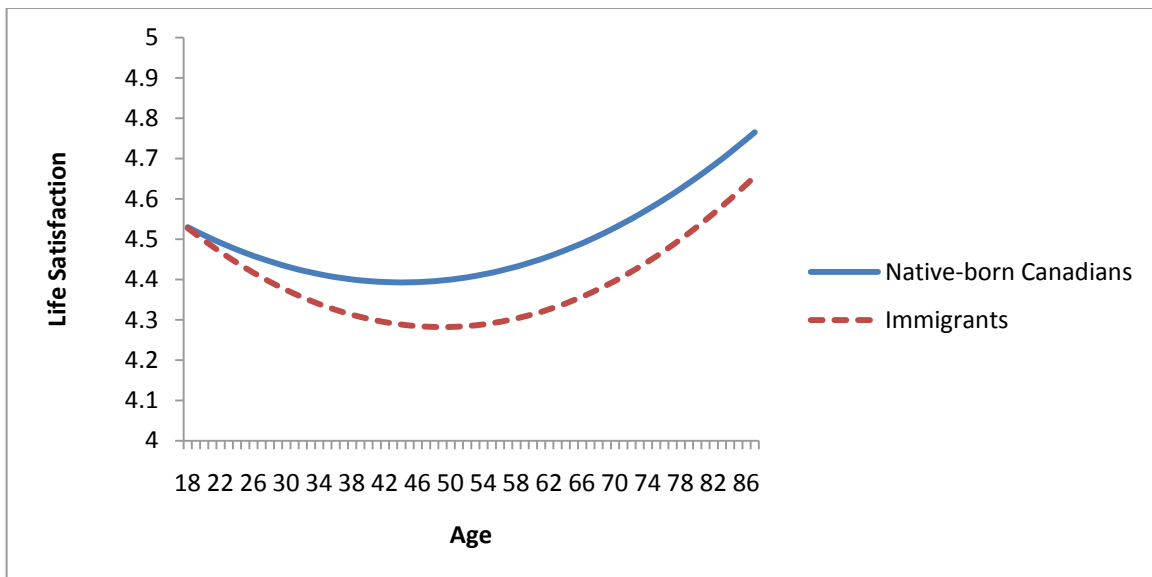
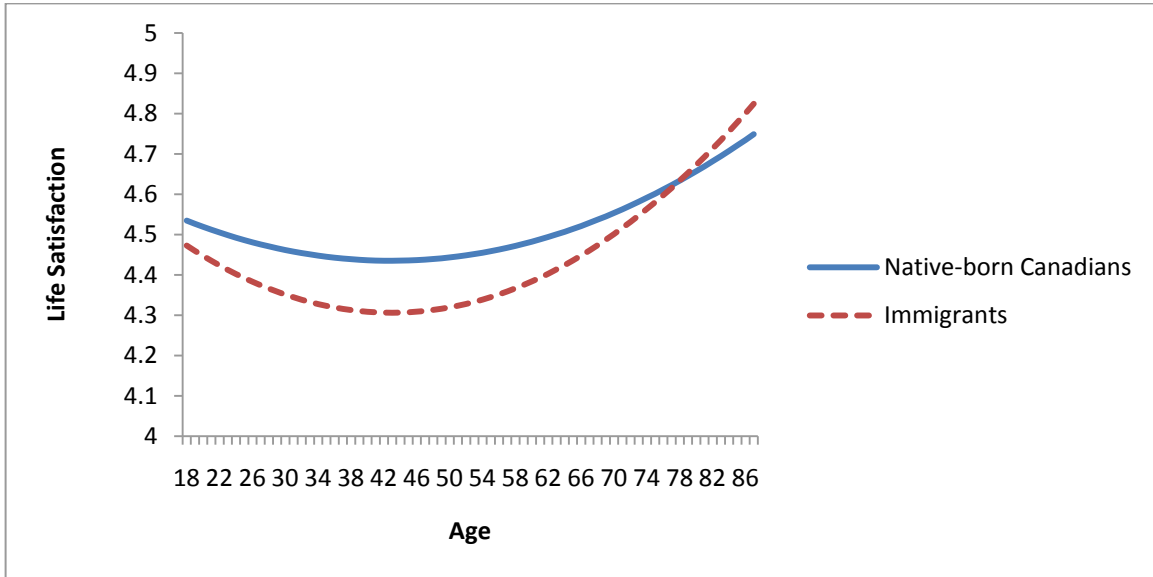


Figure 8 Life satisfaction profiles of female NBC and immigrants, Table 4, Specification 3.



Note: Figures 7 and 8 are drawn based on the coefficients of age, age squared, immigrant status, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.

Specification 4 allows recent and long-established immigrants to shift both intercepts and slopes, and it is a combination of the above specifications. The results are reported in Tables 3 and 4, fourth column. For men, all the immigrant dummies and interactions become insignificant, which means that these terms capture the same effect and reduce the significance. For women, three interactions are still significant.

Figure 9 Life satisfaction profiles of male NBC and recent and long-established immigrants, Table 4, Specification 4.

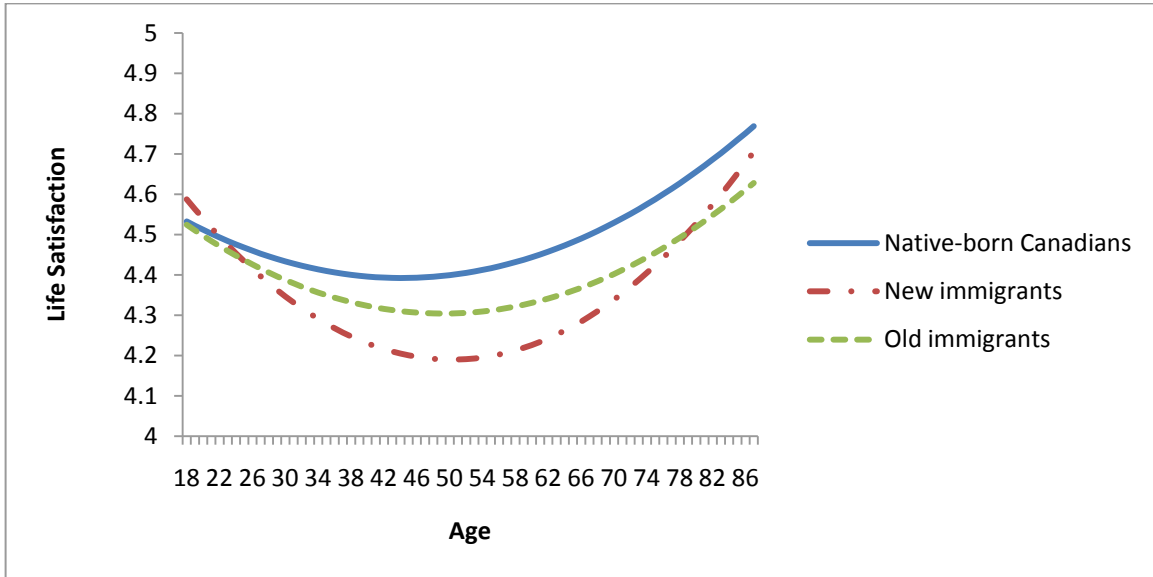
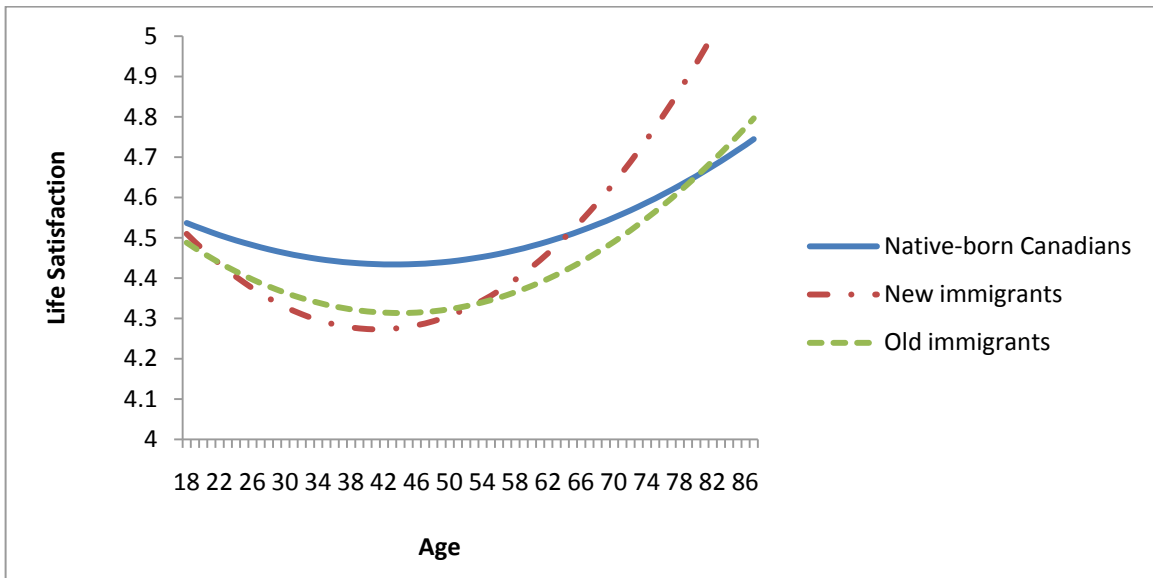


Figure 10 Life satisfaction profiles of female NBC and recent and long-established immigrants, Table 4, Specification 4.



Note: Figures 9 and 10 are drawn based on the coefficients of age, age squared, immigrant status, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.

Figures 9 and 10 show the life satisfaction profiles of the NBC, recent and long-established immigrants for men and women, respectively. As we can see, specification 5 for women generates a life satisfaction profile similar to the fourth specification. The estimates for men suggest a narrowing of the life satisfaction gap between recent immigrants and the NBC.

Combining the four estimates, we can conclude that the best fit for men is specification 2, because all the immigrant dummies are significant and it distinguishes new and old immigrants. It means that immigrant men are likely to have a constant and lower life satisfaction than NBC, and there is no evidence for the catch-up effects (Figure 5).

However, female immigrants have a different story. Since all the interactions are still significant, specification 4 gives the best description of the female life satisfaction profile. As Figure 10 shows, recent female immigrants catch up to NBC at a fast pace, whereas long-established female immigrants catch up at a relatively slow pace. But either group of female immigrants will catch up to the NBC after a period of time.

## **5.12 COMPARISON WITH MARRIAGE EFFECTS**

When we capture the marriage effect, the coefficients for widowed, separated, or divorced are -0.228 for men and -0.191 for women, when married is used as the base.

These results mean that there is 0.228 life satisfaction reduction in the 5-scale life satisfaction for men, and 0.191 life satisfaction reductions for women.

The coefficients of immigrant dummies are -0.099 for men and -0.096 for women, which means that the immigrant effects are as large as about half of the effects of divorce. The

immigrant reduction has largest effects on recent immigrant women, which is 59.8 percent of the effects of being widowed, separated, or divorced. And it has the smallest effects in long-established immigrant men, which is only more than one third of the divorce effects.

## **5.2 HUMAN CAPITAL AND DEMOGRAPHIC CATEGORIES**

In OLS estimates, log income is significant at 1 percent level in all four specifications with positive coefficients, which are around 0.134 for men and 0.102 for women—(Table 3, 12<sup>th</sup> row).

Education is an important factor in determining life satisfaction. When secondary education is used as the base, people who finished less secondary education have significantly lower life satisfaction. The coefficients for higher education level are positive (Tables 3 and 4).

Marriage affects people's life satisfaction significantly. When married people are used as the base, the other marital statuses are all significantly negative (Tables 3 and 4).

Common-law has small negative effects, whereas widowed, separated or divorced has the largest negative impact on life satisfaction. It supports the finding in Blanchflower and Oswald (2011) that singles have slightly higher life satisfaction than widowed, separated and divorced people.

The location of residence is also important. People in New Brunswick and Quebec have significantly higher life satisfaction. Women in Prince Edward Island have highest life

satisfaction. Alberta women also report significantly higher life satisfaction. This result provides no strong support for the previous finding that Newfoundlanders and Nova Scotians have higher life satisfaction (Bok, 2011).

There is strong linkage between health, sense of belonging and life satisfaction. Good health and strong sense of belonging to local community increase life satisfaction significantly (Tables 3 and 4).

## CHAPTER 6 NBC AND IMMIGRANT SUBSAMPLES

The discussion of age profiles in Chapter 5 above pools the data for NBC and immigrants. We now begin the estimation for NBC and immigrants separately. Tables 9 and 10 show the results for immigrant and NBC subsample estimates respectively. The life satisfaction profiles of NBC and immigrant men are drawn in Figure 11; and NBC and immigrant women are drawn in Figure 12. Again, OLS results (column 2 and 4) are used for the analysis.

Figure 11 Life satisfaction profiles of men, estimates from immigrant and NBC subsample, Tables 9 and 10.

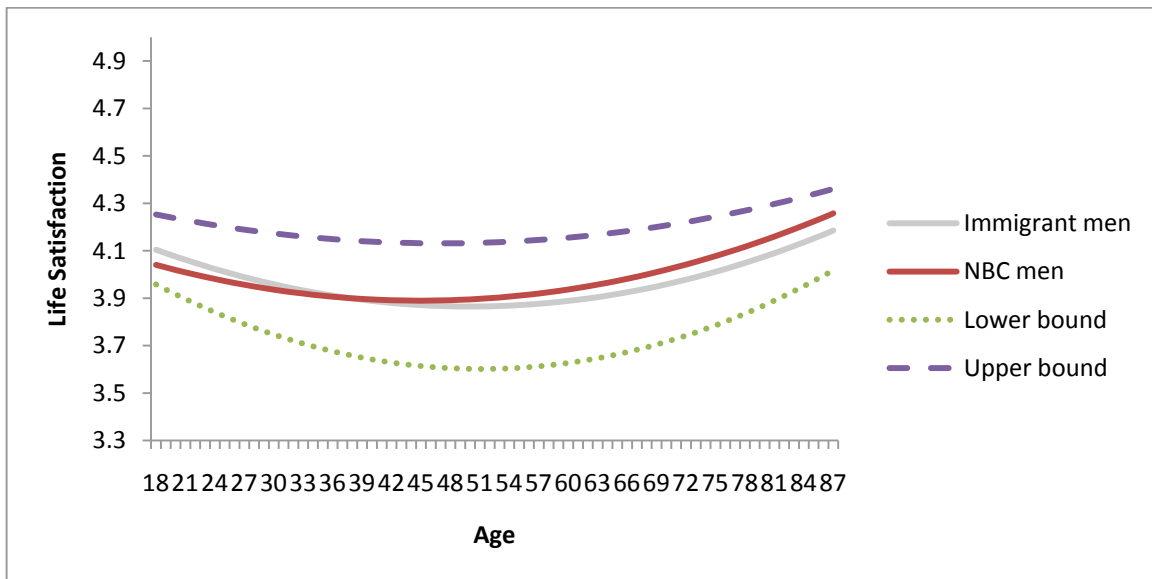
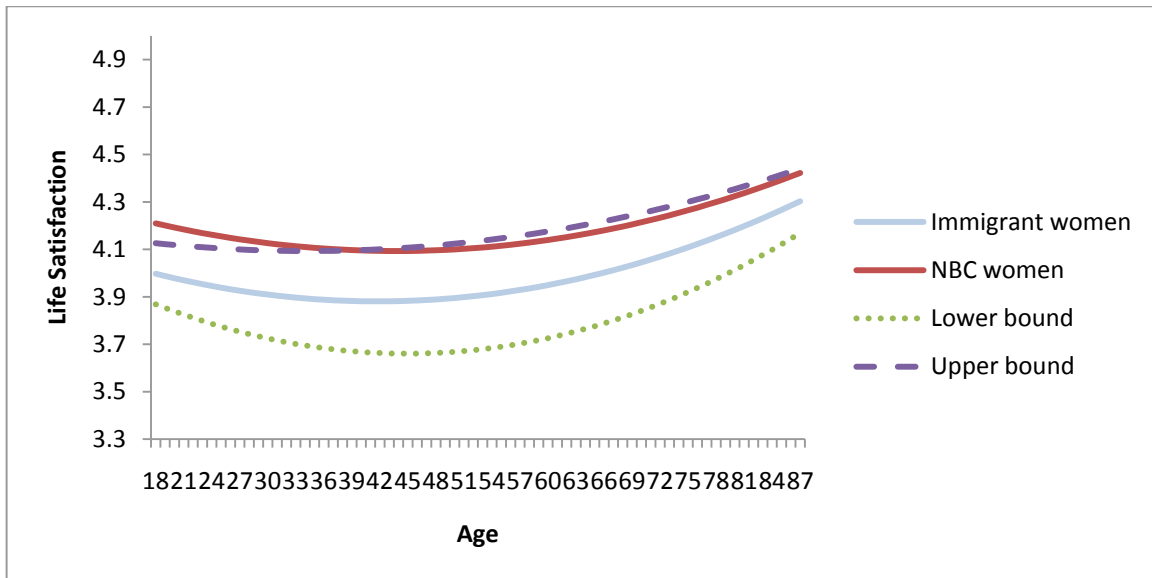


Figure 12 Life satisfaction profiles of women, estimates from immigrant and NBC subsample, Tables 9 and 10.



- Note: 1. Figures 11 and 12 are drawn based on the coefficients of age, age squared, income and a constant. The underlying assumption is that the base chosen for each category (see Section 4.1) stands for the average level, so that the overall summation of all categories other than age, income and the constant, is zero.
2. The lower bound and upper bound for immigrants are drawn from the coefficients of age and age squared at the 95 percent level of confidence.

These subsample estimations also affirm that immigrants have much lower life satisfaction than their native-born counterparts. For the NBC, the lowest life satisfaction levels still remain at 4.40 (out of 5) for men and 4.42 for women, while the lowest levels for immigrants are only 4.01 for men and 4.00 for women. However, when the standard errors are taken into consideration, both immigrant men and women have the possibility of higher life satisfaction than their native-born counterparts at a 95 percent level of confidence.



The recent immigrant dummy is only significant at the 10 percent level for men and the coefficient is -0.061. Compared with divorce shock (-0.268), there is not much improvement from male recent immigrants to long-established immigrants. For female immigrants no evidence supports the difference between recent and long-established immigrant women. This result implies that immigrants are not better off based on years of residence.

According to the estimates, the least happy ages for Canadians are 45 for men and 44 for women. According to the specification run for the immigrant subsample, the lowest point for immigrant men is at age 50, and age 42 for women.

Compared with the previous Canadian study, Helliwell (2002), which reports that the low point of the life satisfaction profile occurs in the 35-44- year-old age group, and the 55-64- year-old age group is as happy as the 18-24-year-old age group (Helliwell, 2002), this paper finds that the life satisfaction level is minimized at older ages. Male NBC have to wait until they are 72 years old to be as happy as when they were 18 years old, while immigrant men have to wait until they are 84 years old. This result is striking for immigrant men, because the average age at death for Canadian men is 71.1 (Statistics Canada, 2005). It is almost impossible to get back to their good old days. Things are better for their female counterparts. When female NBC and immigrants are 68 years old, they can be as happy as when they were 18-year-olds. Thus, the results in this paper are more pessimistic than the previous Canadian study.

When this paper is compared with international life satisfaction studies, it suggests that Canadians share a similar age profile with Europeans, whose turning points of the U-shaped profile are at the age of 44 for men and 43 for women (Blanchflower and Oswald, 2007), and they leave the valley earlier than their American counterparts, whose turning points are at the age of 49 for men and 45 for women (Blanchflower and Oswald, 2007).

## CHAPTER 7 CONCLUSION

This paper studies life satisfaction data on about 130,000 immigrants and native-born Canadians. It draws three main conclusions. First, Canadian subjective well-being is a convex structure based on age groups. The least happy age group is around 45 for men and 44 for women. Second, immigrants in Canada have significantly lower life satisfaction than their native-born counterparts. The life satisfaction curve in age groups among immigrants shows different patterns from native-born Canadians. The minimum level of life satisfaction is found in the age group 50 for men and 42 for women, which is almost 10 percent less than their native-born counterparts. Third, long-established immigrants have higher life satisfaction than recent immigrants. It means that immigrants tend to have lower life satisfaction than their native-born counterparts, but the life satisfaction gap is narrower along increasing years of residence in Canada. This catch-up effect is more significant for immigrant women than immigrant men.

Some improvements can be made in future studies. Age at arrival is also considered an important variable in estimating immigrant effects. It is likely that immigrants who arrive at a young age perform better than those who arrive at an older age. This thesis does not directly test this point due to the data availability. Also, CCHS public used dataset only provides respondents' age in 5-year intervals, which reduces the accuracy of age effect estimation.

Due to data availability, cross-sectional data are used to do the estimations. However, cross-sectional data cannot follow individuals over years. The life satisfaction level is reported by the people who were born in different periods. When we compare the 18-year-old group with the 60-year-old group, we are comparing people born in different time. However, people born in different periods may have different feelings about life satisfaction, which is defined as birth cohorts. Thus, it is unclear that the high level of life satisfaction for old people is due to their age (age effect), or their life experiences such as war or depression (birth cohort). When the age effect and birth cohort are both present in the data, we cannot say that the U-shaped life satisfaction profile is due to the age effect. Longitudinal data are required to distinguish the age effect from birth cohort. It is an important task for future work when such kind of data is available.

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## APPENDIX A OLS ESTIMATES

Table 4 OLS estimates for men, with controlling for belonging.

Specification	(1)	(2)	(3)	(4)
Age	-0.0189*** (0.00171)	-0.0191*** (0.00169)	-0.0178*** (0.00175)	-0.0181*** (0.00174)
Age <sup>2</sup>	0.000210*** (0.0000164)	0.000211*** (0.0000164)	0.000202*** (0.0000170)	0.000205*** (0.0000169)
Immigrant	-0.0994*** (0.0159)		0.112 (0.114)	
Recent immigrant		-0.125*** (0.0284)		0.363* (0.209)
Long-established immigrant		-0.0911*** (0.0174)		0.0601 (0.147)
Age*Immigrant			-0.00735 (0.00462)	
Age <sup>2</sup> *Immigrant			0.0000552 (0.0000436)	



Table 5 OLS estimates for men, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
Age*Long-established immigrant				-0.0203* (0.0105)
Age <sup>2</sup> *Long-established immigrant				0.000177 (0.000127)
Age*Recent immigrant				-0.00418 (0.00573)
Age <sup>2</sup> *Recent immigrant				0.0000215 (0.0000523)
<b>Sense of belonging to the local community</b>				
Very strong	0.140*** (0.0134)	0.141*** (0.0133)	0.140*** (0.0134)	0.140*** (0.0134)
Weak	-0.114*** (0.0118)	-0.113*** (0.0118)	-0.114*** (0.0118)	-0.113*** (0.0118)
Very weak	-0.244*** (0.0220)	-0.243*** (0.0219)	-0.244*** (0.0219)	-0.244*** (0.0219)

Table 6 OLS estimates for men, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
Log income	0.134*** (0.00988)	0.132*** (0.0100)	0.135*** (0.00990)	0.132*** (0.0100)
Visible Minority	-0.0613*** (0.0180)	-0.0596*** (0.0180)	-0.0664*** (0.0186)	-0.0641*** (0.0184)
Common Law	-0.0393* (0.0164)	-0.0400* (0.0164)	-0.0378* (0.0164)	-0.0391* (0.0164)
Widowed, Separated or Divorced	-0.228*** (0.0190)	-0.228*** (0.0190)	-0.229*** (0.0190)	-0.229*** (0.0189)
Single, Never married	-0.200*** (0.0149)	-0.203*** (0.0148)	-0.200*** (0.0148)	-0.204*** (0.0148)
Less secondary	-0.0327* (0.0189)	-0.0343* (0.0188)	-0.0335* (0.0188)	-0.0344* (0.0188)
Other post-secondary	-0.0154 (0.0222)	-0.0138 (0.0222)	-0.0154 (0.0222)	-0.0126 (0.0221)
Post-secondary	0.0153 (0.0143)	0.0162 (0.0143)	0.0154 (0.0143)	0.0190 (0.0142)

Table 7 OLS estimates for men, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
Excellent Health	0.172*** (0.0126)	0.172*** (0.0126)	0.170*** (0.0126)	0.170*** (0.0126)
Good health	-0.232*** (0.0119)	-0.232*** (0.0119)	-0.232*** (0.0119)	-0.233*** (0.0119)
Fair health	-0.459*** (0.0220)	-0.459*** (0.0220)	-0.458*** (0.0220)	-0.458*** (0.0220)
Poor health	-0.986*** (0.0600)	-0.987*** (0.0597)	-0.982*** (0.0593)	-0.984*** (0.0591)
NFLD	0.0101 (0.0268)	0.0110 (0.0267)	0.00852 (0.0268)	0.00966 (0.0267)
NS	0.0241 (0.0216)	0.0255 (0.0216)	0.0226 (0.0217)	0.0233 (0.0216)
PEI	0.0488* (0.0290)	0.0426 (0.0290)	0.0471 (0.0290)	0.0411 (0.0290)
NB	0.0782*** (0.0219)	0.0791*** (0.0218)	0.0766*** (0.0219)	0.0773*** (0.0218)
QB	0.0764*** (0.0140)	0.0771*** (0.0139)	0.0746*** (0.0140)	0.0757*** (0.0139)

Table 8 OLS estimates for men, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
MTB	0.0177 (0.0193)	0.0185 (0.0192)	0.0179 (0.0193)	0.0183 (0.0193)
SSK	0.00341 (0.0202)	0.00509 (0.0201)	0.00300 (0.0202)	0.00519 (0.0201)
ALB	0.0143 (0.0179)	0.0137 (0.0179)	0.0145 (0.0179)	0.0143 (0.0179)
BC	0.0171 (0.0165)	0.0174 (0.0164)	0.0170 (0.0165)	0.0171 (0.0163)
YKT	0.0263 (0.0273)	0.0262 (0.0273)	0.0285 (0.0273)	0.0286 (0.0273)
Constant	3.687*** (0.0965)	3.703*** (0.0975)	3.646*** (0.0984)	3.670*** (0.0990)
N	44476	44682	44476	44682
R <sup>2</sup>	0.216	0.216	0.216	0.217
F	122.1	120.8	116.1	108.2

Standard errors are reported in parentheses; \* indicates statistically significant at 10 percent; \*\* indicates statistically significant at 5 percent; \*\*\* indicates statistically significant at 1 percent.

Table 9 OLS estimates for women, with controlling for belonging.

Specification	(1)	(2)	(3)	(4)
Age	-0.0159*** (0.00163)	-0.0161*** (0.00161)	-0.0138*** (0.00169)	-0.0140*** (0.00169)
Age <sup>2</sup>	0.000185*** (0.0000159)	0.000186*** (0.0000157)	0.000161*** (0.0000165)	0.000162*** (0.0000164)
Immigrant	-0.0958*** (0.0151)		0.0682 (0.101)	
Recent immigrant		-0.116*** (0.0276)		0.283 (0.212)
Long-established immigrant		-0.0900*** (0.0163)		0.0779 (0.117)
Age*Immigrant			-0.00914* (0.00416)	
Age <sup>2</sup> *Immigrant			0.000106*** (0.0000393)	
Age*Long-established immigrant				-0.0222* (0.0104)
Age <sup>2</sup> *Long-established immigrant				0.000277* (0.000120)

Table 10 OLS estimates for women, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
Age*Recent immigrant				-0.00881* (0.00464)
Age <sup>2</sup> *Recent immigrant				0.0000978* (0.0000425)
<b>Sense of belonging to the local community</b>				
Very strong	0.140*** (0.0130)	0.141*** (0.0130)	0.141*** (0.0130)	0.142*** (0.0130)
Weak	-0.124*** (0.0114)	-0.124*** (0.0114)	-0.124*** (0.0114)	-0.124*** (0.0114)
Very weak	-0.234*** (0.0209)	-0.232*** (0.0209)	-0.234*** (0.0209)	-0.233*** (0.0208)
Log income	0.104*** (0.00899)	0.102*** (0.00901)	0.103*** (0.00893)	0.101*** (0.00893)
Visible Minority	-0.0560*** (0.0182)	-0.0551*** (0.0183)	-0.0484*** (0.0186)	-0.0503*** (0.0186)
Common Law	-0.0444*** (0.0159)	-0.0465*** (0.0159)	-0.0470*** (0.0159)	-0.0491*** (0.0159)
Widowed, Separated or Divorced	-0.191*** (0.0167)	-0.194*** (0.0166)	-0.192*** (0.0166)	-0.195*** (0.0165)
Single, Never married	-0.175*** (0.0150)	-0.177*** (0.0149)	-0.177*** (0.0149)	-0.179*** (0.0149)

Table 11 OLS estimates for women, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
Less secondary	-0.00630 (0.0172)	-0.00649 (0.0172)	-0.00617 (0.0172)	-0.00726 (0.0171)
Other post-secondary	0.0114 (0.0212)	0.0101 (0.0212)	0.0123 (0.0212)	0.0109 (0.0212)
Post-secondary	-0.00272 (0.0125)	-0.00187 (0.0125)	-0.00197 (0.0125)	-0.000487 (0.0125)
Excellent Health	0.155*** (0.0117)	0.155*** (0.0116)	0.154*** (0.0117)	0.155*** (0.0116)
Good health	-0.262*** (0.0120)	-0.261*** (0.0120)	-0.262*** (0.0120)	-0.261*** (0.0120)
Fair health	-0.518*** (0.0196)	-0.519*** (0.0197)	-0.519*** (0.0196)	-0.521*** (0.0196)
Poor health	-1.095*** (0.0495)	-1.094*** (0.0493)	-1.096*** (0.0495)	-1.094*** (0.0494)
NFLD	-0.0126 (0.0211)	-0.0136 (0.0211)	-0.0128 (0.0211)	-0.0140 (0.0211)
NS	0.0413* (0.0217)	0.0413* (0.0216)	0.0415* (0.0217)	0.0415* (0.0216)
PEI	0.118*** (0.0274)	0.118*** (0.0274)	0.118*** (0.0274)	0.118*** (0.0274)
NB	0.0604*** (0.0195)	0.0565*** (0.0199)	0.0605*** (0.0195)	0.0565*** (0.0199)
QB	0.0766*** (0.0140)	0.0774*** (0.0140)	0.0779*** (0.0139)	0.0789*** (0.0140)

Table 12 OLS estimates for women, with controlling for belonging, *continued*.

Specification	(1)	(2)	(3)	(4)
MTB	0.0336 (0.0243)	0.0338 (0.0242)	0.0328 (0.0244)	0.0336 (0.0243)
SSK	0.0236 (0.0202)	0.0234 (0.0201)	0.0239 (0.0202)	0.0241 (0.0201)
ALB	0.0357* (0.0164)	0.0356* (0.0163)	0.0357* (0.0164)	0.0361* (0.0164)
BC	0.0281* (0.0152)	0.0283* (0.0152)	0.0278* (0.0152)	0.0286* (0.0152)
YKT	0.00682 (0.0266)	0.00587 (0.0265)	0.00312 (0.0266)	0.00385 (0.0266)
Constant	3.905*** (0.0884)	3.925*** (0.0884)	3.875*** (0.0884)	3.897*** (0.0885)
N	52895	53117	52895	53117
R <sup>2</sup>	0.220	0.221	0.221	0.221
F	147.5	144.4	138.6	127.9

Standard errors are reported in parentheses; \* indicates statistically significant at 10 percent; \*\* indicates statistically significant at 5 percent; \*\*\* indicates statistically significant at 1 percent.



Table 13 OLS estimates for men, without controlling for belonging.

Variable	(1)	(2)	(3)	(4)
Age	-0.0186*** (0.00175)	-0.0189*** (0.00173)	-0.0176*** (0.00176)	-0.0179*** (0.00176)
Age <sup>2</sup>	0.000216*** (0.0000168)	0.000217*** (0.0000167)	0.000210*** (0.0000171)	0.000213*** (0.0000170)
Immigrant	-0.106*** (0.0160)		0.0940 (0.117)	
Recent immigrant		-0.143*** (0.0285)		0.363* (0.216)
Long-established immigrant		-0.0945*** (0.0176)		0.0492 (0.150)
Age*Immigrant			-0.00676 (0.00475)	
Age <sup>2</sup> *Immigrant			0.0000486 (0.0000447)	
Age*Long-established immigrant				-0.0207* (0.0107)
Age <sup>2</sup> *Long-established immigrant				0.000178 (0.000128)
Age*Recent immigrant				-0.00361 (0.00585)
Age <sup>2</sup> *Recent immigrant				0.0000139 (0.0000533)
N	44985	45198	44985	45198
R <sup>2</sup>	0.194	0.195	0.195	0.196
F	118.2	116.9	111.3	103.1

Table 14 OLS estimates for women, without controlling for belonging.

Variable	(1)	(2)	(3)	(4)
Age	-0.0158*** (0.00165)	-0.0162*** (0.00163)	-0.0139*** (0.00171)	-0.0142*** (0.00170)
Age <sup>2</sup>	0.000194*** (0.0000160)	0.000196*** (0.0000158)	0.000172*** (0.0000166)	0.000174*** (0.0000165)
Immigrant	-0.100*** (0.0152)		0.0506 (0.103)	
Recent immigrant		-0.130*** (0.0276)		0.292 (0.220)
Long-established immigrant		-0.0914*** (0.0166)		0.0590 (0.119)
Age*Immigrant			-0.00842* (0.00423)	
Age <sup>2</sup> *Immigrant			0.0000972* (0.0000399)	
Age*Long-established immigrant				-0.0228* (0.0109)
Age <sup>2</sup> *Long-established immigrant				0.000275* (0.000126)
Age*Recent immigrant				-0.00782* (0.00472)
Age <sup>2</sup> *Recent immigrant				0.0000863* (0.0000432)
N	53438	53664	53438	53664
R <sup>2</sup>	0.199	0.199	0.199	0.200
F	138.5	135.9	129.0	118.7

## APPENDIX B ORDERED PROBIT ESTIMATES

Table 15 Ordered probit estimates for men.

Specification	(1)	(2)	(3)	(4)
Age	-0.0324*** (0.00321)	-0.0329*** (0.00318)	-0.0307*** (0.00336)	-0.0313*** (0.00335)
Age <sup>2</sup>	0.000361*** (0.0000307)	0.000364*** (0.0000306)	0.000350*** (0.0000327)	0.000356*** (0.0000327)
Immigrant	-0.200*** (0.0288)		0.116 (0.203)	
Recent immigrant		-0.281*** (0.0518)		0.562 (0.389)
Long-established immigrant		-0.174*** (0.0310)		0.0304 (0.254)
Age*Immigrant			-0.0109 (0.00825)	
Age <sup>2</sup> *Immigrant			0.0000811 (0.0000779)	
Age*Long-established immigrant				-0.0337* (0.0191)
Age <sup>2</sup> *Long-established immigrant				0.000275 (0.000225)

Table 16 Ordered probit estimates for men, *continued*.

Specification	(1)	(2)	(3)	(4)
Age*Recent immigrant				-0.00490 (0.00987)
Age <sup>2</sup> *Recent immigrant				0.0000151 (0.0000903)
N	44476	44682	44476	44682
Pseudo-R-squared	0.114	0.115	0.115	0.115
LR chi2	3075.7	3109.8	3107.7	3154.2
Log Likelihood	-8956525.3	-8987006.7	-8954733.4	-8981759.8
Prob > chi2	0	0	0	0

Table 17 Ordered probit estimates for women.

Specification	(1)	(2)	(3)	(4)
Age	-0.0255*** (0.00295)	-0.0261*** (0.00292)	-0.0218*** (0.00308)	-0.0222*** (0.00307)
Age <sup>2</sup>	0.000304*** (0.0000284)	0.000307*** (0.0000281)	0.000259*** (0.0000296)	0.000263*** (0.0000295)
Immigrant	-0.199*** (0.0266)		0.0839 (0.181)	
Recent immigrant		-0.250*** (0.0486)		0.552 (0.385)
Long-established immigrant		-0.184*** (0.0287)		0.0905 (0.213)
Age*Immigrant			-0.0162* (0.00740)	
Age <sup>2</sup> *Immigrant			0.000190*** (0.0000697)	
Age*Long-established immigrant				-0.0441* (0.0192)
Age <sup>2</sup> *Long-established immigrant				0.000542* (0.000229)

Table 18 Ordered probit estimates for women, *continued*.

Specification	(1)	(2)	(3)	(4)
Age*Recent immigrant				-0.0149* (0.00837)
Age <sup>2</sup> *Recent immigrant				0.000168* (0.0000764)
N	52895	53117	52895	53117
Pseudo-R-squared	0.118	0.118	0.118	0.118
LR chi2	3793.6	3852.0	3818.4	3867.7
Log Likelihood	-9054048.5	-9080139.8	-9050448.1	-9075494.8
Prob > chi2	0	0	0	0

## APPENDIX C      SUBSAMPLE ESTIMATES

Table 19 Ordered probit and OLS estimates for immigrants subsample.

Variable	Men		Women	
	Oprobit	OLS	Oprobit	OLS
Age	-0.0407*** (0.00930)	-0.0234*** (0.00500)	-0.0283*** (0.00806)	-0.0172*** (0.00439)
Age <sup>2</sup>	0.000401*** (0.0000841)	0.000234*** (0.0000460)	0.000347*** (0.0000755)	0.000206*** (0.0000412)
Recent immigrant	-0.156* (0.0621)	-0.0610* (0.0342)	-0.0166 (0.0580)	0.00161 (0.0324)
Log income	0.176*** (0.0377)	0.107*** (0.0237)	0.179*** (0.0360)	0.107*** (0.0207)
Constant		3.945*** (0.243)		3.740*** (0.214)
N	6409	6409	7303	7303
R <sup>2</sup>		0.229		0.203
F		19.46		24.24

Table 20 Ordered probit and OLS estimates for NBC subsample.

Variable	Men		Women	
	Oprobit	OLS	Oprobit	OLS
Age	-0.0320*** (0.00334)	-0.0187*** (0.00175)	-0.0247*** (0.00304)	-0.0154*** (0.00169)
Age <sup>2</sup>	0.000360*** (0.0000325)	0.000208*** (0.0000170)	0.000288*** (0.0000293)	0.000176*** (0.0000166)
Log income	0.230*** (0.0173)	0.138*** (0.0102)	0.171*** (0.0164)	0.0985*** (0.00970)
Constant		3.653*** (0.0997)		3.970*** (0.0943)
N	38273	38273	45814	45814
R <sup>2</sup>		0.209		0.220
F		127.3		142.1