Economics Bulletin

Volume 35, Issue 3

Happiness Adaptation to Income: Evidence from Canada

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Abstract

Using longitudinal data from the Canadian National Population Health Survey (1994-2009), this study examined the short run and long run effects of a one-time increase in income on individual happiness. To control for the unobserved individual specific heterogeneity, this study utilized an individual specific fixed effects method. In the estimation, this study uses three specifications: without controlling year effects and province fixed effects; controlling year effects, but not province fixed effects; and controlling both year effects and province fixed effects. In all of the specifications, current income has a significant positive effect on individual happiness. However in all specifications, the sums of the lags were negative, suggesting a presence of adaptation effects. In other words, this study suggests that an increase in income temporarily increases people's happiness, but the effects wear off as people get used to new levels of income. The study also estimated the happiness model separately for male and female samples. In both cases, this study found evidence of adaptation of happiness with respect to changes in income.

I like to thank the anonymous reviewer for helpful comments. I also thank Dr. Charlie Victorino of Prairie Regional Research Data Centre for his help during my research work on this project.
Citation: Ehsan Latif, (2015) "Happiness Adaptation to Income: Evidence from Canada", *Economics Bulletin*, Volume 35, Issue 3, pages 1477-1487
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Submitted: April 19, 2015. **Published:** July 11, 2015.

1. Introduction

An interesting puzzle in the economics of happiness literature is the Easterlin Paradox (Easterlin, 1995). According to this paradox, at any point in time in a particular country, the rich people are happier than the poor people. However, the average happiness does not increase when the country's income increases over time. An explanation of this phenomenon focuses on the happiness adaptation theory (Clarke et al., 2004). According to this adaptation theory, individuals react to events such as changes in income but soon adapt back to a baseline level of happiness. Thus, as a country's income increases, people's happiness also increases but only temporarily. Over time, the happiness level reverts back to the base line level and consequently, there isn't any change in the average happiness level over time. Using data from European countries and Australia, a number of studies have tested this adaptation theory (Di Tella et al., 2003, 2010; Angeles, 2010; Paul and Guilbert, 2013). However, no study so far has focused on this issue using Canadian data.

A few published studies, primarily using data from European countries, focused on adaptation to changes in income. Using data from the British Household Panel Survey (Waves 1 & 2), Clark (1999) tested the hypothesis that changes in wages, as well as their current level, were positively correlated with levels of reported job satisfaction. The study found that the overall job satisfaction was strongly positively correlated with the change in hourly pay over the past year but uncorrelated with the current level of pay or work hours. The results were consistent with a reference dependent satisfaction function, in which individual well-being was a function of current pay relative to past pay. Using data from the British Household Panel Survey, Burchardt (2005) found that over a long period of time, adaptation to changes in income was asymmetric with greater adaptation to rises in income than to falls in income. In their study using data from the first 19 waves of the German Socio-Economic Panel (GSOEP), Grund and Sliwka (2007) found support for the importance of reference dependent preference. The authors found that wage increases as well as the absolute level of wages had a significant positive effect on job satisfaction. Using panel data from the German Socio-Economic Panel (GSOEP), Di Tella et al. (2010) examined whether income and status had long lasting effects on happiness or whether these dissipated over time. The authors could not reject the hypothesis of no adaptation to income status during the four years following a change in income status. This study found that people adapted totally to an income change within four years. In a previous study, Di Tella et al. (2003) used aggregate income and individual happiness data covering 18 years across 12 European countries and found that the happiness effect of an increase in per capita GDP tended to disappear after two years. Using data from the British Household Panel Survey (Waves 1 to 15), Angeles (2010) found that the effect of income on happiness lost about two-thirds of its initial effect after four years. However, the possibility of full adaptation was not ruled out on statistical grounds since the sum of coefficients on current income and all of its lags was not statistically significant. Using panel data from the five waves (2001–2005) of the Household Income and Labour Dynamics in Australia (HILDA) surveys, Paul and Guilbert (2013) found no support for the adaptation effect on happiness.[1]

[1] For a detailed discussion on theoretical and empirical issues related to adaptation, please refer to Clark et al. (2008).

To the best knowledge of the author, no study so far has used Canadian data to examine this issue. The objective of this study is to fill this gap in the economics of happiness literature by using Canadian data to examine the issue of happiness adaptation to changes in income.

This paper is structured in following way: section 2 deals with data and methodology; section 3 presents the results of the study; and section 4 is the concluding section.

2. Data and Methodology

This study used longitudinal data from the Canadian National Population Health Survey (NPHS) covering a period from 1994 to 2009. The NPHS collected data on health status, socio-economic determinants of health and well-being and health care utilization of the Canadian population. The NPHS data has the following three components: the household component, the health institution component and the North component that focuses on the population of the northern part of Canada. In the empirical analyses, this study used data from the household component of the NPHS. The household component started in 1994/95 and then data was collected every two years until 2010/11. This component included data collected from household residents in ten Canadian provinces, excluding persons living on Indian Reserves and Crown Lands, residents of health institutions, full-time members of the Canadian Forces Bases and certain remote areas in Ontario and Quebec. The present study restricted the sample to individuals ages 16 to 64 yielding 46,143 person-wave observations.

The dependent variable of the study is "Happiness" that has five ordinal categories: 1) so unhappy that life is not worthwhile; 2) very unhappy; 3) somewhat unhappy; 4) somewhat happy; and 5) happy and interested in life.

The independent variable "Income" is measured by an individual's household income. Other independent variables in the model include age, marital status, education status, health, employment status and home ownership status. The independent variable "Age" is a continuous variable and another variable "Squared Age" is included in the model to take into account the non-linear effect of age on happiness. The variable "Marital Status" has four categories: single, married, widowed and divorced/separated. The base category is "Single". The independent variable "Education Status" has four categories: less than secondary, secondary graduate, some post-secondary education and college-university education. The base category is "Less than Secondary Education". The variable "Health Status" has five categories: poor health, fair health, good health, very good health and excellent health. The base category is "poor health". "Employed" is a dummy variable suggesting whether or not the individual is employed. "Having Owned Home" is another dummy variable indicating whether or not the individual has owned a home.

This study adopted the following Happiness equation suggested in Di Tella et al. (2010):

$$HAP_{it} = \alpha + \beta_0 Y_{i,t} + \beta_1 Y_{i,t-1} + \beta_2 Y_{i,t-2} + \beta_3 Y_{i,t-3} + \beta_4 Y_{i,t-4} + \lambda X_{it} + \theta_j + \delta_t + \mu_i + \varepsilon_{it} \quad \text{..... (1)}$$

where the dependent variable "HAP_{it}" represents the happiness level of individual i in year t; the level of income denoted by Y is the logarithmic of household income. Following Di Tella et al. (2010), this study included four lags of income level: X_{it} represents a vector of independent variables that includes age, square of age, marital status, education, health, employment status

and home ownership status; θ_j is the province fixed effect; δ_t is the year fixed effect; μ_i is the individual specific fixed effect; and ε_{it} is the error term.

To test for the adaptation effect, this study uses the following hypotheses:

$$H_0: \sum_{i=1}^{4} \beta_i = 0$$
$$H_A: \sum_{i=1}^{4} \beta_i \neq 0 \quad \text{.....(2)}$$

This study also uses the following hypotheses to test for the long run effects:

$$H_0: \sum_{i=0}^{4} \beta_i = 0$$
$$H_A: \sum_{i=0}^{4} \beta_i \neq 0 \quad \text{..... (3)}$$

To take into account the unobserved individual specific time-invariant factors, this study utilizes an individual fixed effects model. Time in-variant individual specific fixed factors such as persistent personality traits are the best predictors of happiness and thus it is important to include individual specific fixed effects in the analyses (Diener and Lucas, 1999; Argyle, 1999; Lykken and Tellegan, 1996). The fixed effects model assumes cardinality of the answers to the happiness question. However, this is not a problem since researchers have shown that the assumption of ordinality or cardinality does not qualitatively change the results of the happiness model (Ferrer-i-Carbonell and Frijters, 2004).

This study includes age and squared age since researchers consistently found an U-shaped relationship between age and happiness (Frijters and Beatton, 2012; Blanchflower and Oswald, 2004; Gerdtham and Johannesson, 2001). This study includes marital status as a predictor of happiness since previous studies found that married persons report greater subjective well-being than persons who have never been married or have been divorced, separated or widowed (Graham and Pettinato, 2002; Di Tella et al., 2001; Diener et al., 2000; Argyle, 1999). There is no consistent finding on the impact of education on happiness. Some studies found that education positively impacts happiness, some found education has no significant effect on happiness while others found education negatively effects happiness (Blanchflower and Oswald, 2004; Flouri, 2004; Clark, 2003). In particular, fixed effect models haven't found any significant effect of education since adult respondents are unlikely to change their education level during their time in a panel survey (Meier and Stutzer, 2006). The variable health status is included in the model as studies consistently showed a strong positive effect of health on subjective well-being (Dolan et al., 2008). Researchers also consistently found a relationship between employment status and happiness (Latif, 2010; Di Tella et al., 2001; Helliwell, 2003; Frey and Stutzer, 2000). Studies suggested home ownership had an effect on happiness and psychological well-being (Tao et al., 2011; Evans et al., 2003).

To control for the determinants of happiness that differ across locations but are time-invariant, such as different types of natural beauty and climate, the model includes provincial dummies (θ_j). Finally, the model also includes year dummies (δt) to take into account the yearly changes that are the same for all individuals, such as inflation rate.

3. Results

The results of the regressions are shown in Table 1. The first column of Table 1 shows the results of the model that does not include year effects and province effects. In this model, current household income has a significant positive effect on happiness. However, all of the lagged income variables have negative coefficients. The amount of adaptation can be measured using the sum of the lags. This sum is negative and significantly implies rejection of the null hypothesis of no adaptation. The sum of the coefficients on all income variables is -.023 (i.e., .013-.018-.012-.004-.001). However, an F test for the sum of the coefficients on current income and all its lags being equal to zero does not reject the null hypothesis (i.e., $F(1,5223)= 4.19$; Prob > F=0.14). Thus it is not possible to rule out total adaptation. Other results of this model are as follows: being married has a significant positive while being divorced has a significantly negative effect on happiness; health positively impacts happiness; and being employed has a significant positive effect on happiness.

The second column of Table 1 shows the results of the model that include province specific fixed effects. Also in this model, current income has a significant positive effect on happiness. All of the four lagged income variables have negative coefficients. The sum of the lags is negative and significantly suggests a rejection of the null hypothesis of no adaptation. The sum of the coefficients of all income variables is -.012. Once again, the F test on whether the sum of all income coefficients is equal to zero cannot reject the null hypothesis. Thus the F test result suggests that there is no long run effect of income on happiness. Other results of this model are qualitatively similar to the results of the first model shown in column 2.

The third column of Table 1 shows the results of the model that include both year effects and province fixed effects. Also in this model, current income positively impacts happiness while the lag income coefficients have negative coefficients. The sum of the coefficients of lag income variables is -.025 and significantly implies a rejection of the hypothesis of no adaptation to income. The sum of the coefficients of all income variables is -.012 and the F test cannot reject the null hypothesis of no long run effect of income on happiness. Other results of this model are qualitatively similar to the findings shown in column 2 and column 3.

In sum, the study found evidence that individuals adapt to changes in income. Furthermore, the study cannot reject the hypothesis that individuals adapt totally to income within 4 years.

The study estimated the happiness model for males and females separately. The results of these estimations, shown in Table 2, confirm the findings from the overall model that individuals adapt to changes in income.

4. Conclusions

Using longitudinal data from the Canadian National Population Health Survey (1994-2009), this study examined the short run and long run effects of a one-time increase in income on individual happiness. To control for the unobserved individual specific heterogeneity, this study utilized an individual specific fixed effects method. In the estimation, this study uses three specifications: without controlling year effects and province fixed effects; controlling year effects, but not province fixed effects; and controlling both year effects and province fixed effects. In all of the specifications, current income has a significant positive effect on individual

happiness. However in all specifications, the sums of the lags were negative, suggesting a presence of adaptation effects. In other words, this study suggests that an increase in income temporarily increases people's happiness, but the effects wear off as people get used to new levels of income. The study also estimated the happiness model separately for male and female samples. In both cases, this study found evidence of adaptation of happiness with respect to changes in income.

The results of this study are consistent with the findings from similar studies using data from European countries (Di Tella et al., 2003, 2010; Angeles, 2010). However, the findings of this study contradict the results from Paul and Guilbert (2013).

The results from the present study imply that money can buy happiness but only temporarily. Over the long run, money has no significant effect on happiness. This raises questions as to whether people have good justifications to pursue more money ignoring leisure, family life, health, etc. It is important for future research to identify factors that permanently enhance an individual's happiness level.

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Table 1: Regression Results: Determinants of Happiness

Variable	Fixed Effects Model-1	Fixed Effects Model-2	Fixed Effects Model-3
Age	.003 (.002)	-.0006 (.0022)	-.0008 (.0022)
Squared Age	-.00003 (.00002)	-.00002 (.00002)	-.00002 (.00002)
Marital Status -Base: Single			
Being Married	.044* (.013)	.044* (.013)	.043* (.013)
Being Widow/ Divorced	-.062* (.019)	-.059* (.019)	-.060* (.019)
Education Status Base: Less Than Secondary			
Secondary Grad.	.013 (.014)	.009 (.014)	.010 (.014)
Some Post-Secondary Education	.009 (.015)	.004 (.015)	.004 (.015)
College University Education	.023 (.014)	.020 (.014)	.020 (.015)
Health Status Base: Poor Health			
Excellent	.150* (.011)	.149* (.011)	.149* (.012)
Very Good	.126* (.012)	.124* (.013)	.124* (.013)
Good	.076* (.013)	.075* (.014)	.075* (.014)
Fair	.053* (.014)	.055* (.014)	.055* (.014)
Employed	.027* (.006)	.025* (.007)	.025* (.007)
Having Own Home	.008 (.009)	.008 (.007)	.009 (.009)
Log Household Income	.013* (.005)	.013* (.005)	.013* (.005)
Lag 1 Log Household Income	-.018* (.005)	-.008** (.004)	-.009** (.004)
Lag 2 Log Household Income	-.012* (.004)	-.008** (.004)	-.008** (.004)
Lag 3 Log Household Income	-.004 (.004)	-.004 (.004)	-.004 (.004)
Lag 4 Log Household Income	.001 (.004)	-.005 (.004)	-.004 (.005)
Constant	4.75* (.102)	4.86* (.1060	4.88* (.104)
Province Control	No	No	Yes
Year Control	No	Yes	Yes

Notes: Significance: * 1%, ** 5%, ***10%

Table 2: Regression Results: Determinants of Happiness by Gender

Variable	Fixed Effects Model (Male)	Fixed Effects Model (Female)
Age	-.0006 (.0033)	-.001 (.003)
Squared Age	-.00002 (.00003)	-.00002 (.00003)
Marital Status -Base: Single		
Being Married	.034** (.019)	.052* (.017)
Being Widow/ Divorced	-.069** (.031)	-.051** (.024)
Education Status Base: Less Than Secondary		
Secondary Grad.	.032 (.019)	-.008 (.021)
Some Post-Secondary Education	.006 (.019)	.002 (.021)
College University Education	.028 (.020)	.014 (.021)
Health Status Base: Poor Health		
Excellent	.137* (.016)	.158* (.017)
Very Good	.109* (.016)	.135* (.018)
Good	.060* (.013)	.086* (.019)
Fair	.065* (.020)	.047* (.019)
Employed	.022** (.011)	.028* (.009)
Having Own Home	.017 (.013)	.003 (.012)
Log Household Income	.015** (.007)	.013** (.006)
Lag 1 Log Household Income	-.005 (.006)	-.010** (.005)
Lag 2 Log Household Income	-.008 (.006)	-.008** (.005)
Lag 3 Log Household Income	.006 (.007)	-.011** (.005)
Lag 4 Log Household Income	-.006 (.007)	-.004 (.005)
Constant	4.75* (.170)	4.98* (.142)
Province Control	Yes	Yes
Year Control	Yes	Yes

Notes: Significance: * 1%, ** 5%, ***10%