International Institute of Social Studies

Government Expenditure and Happiness: Direct and Indirect Effects

A Research Paper presented by:

Tung K. Dao
(Vietnam)

in partial fulfillment of the requirements for obtaining the degree of
MASTER OF ARTS IN DEVELOPMENT STUDIES

Major:
Economics of Development
(ECD)

Members of the Examining Committee:
Dr. Elissaios Papyrakis
Dr. Lorenzo Pellegrini

The Hague, The Netherlands
November 2017

Inquiries:

Postal address:

Institute of Social Studies
P.O. Box 29776
2502 LT The Hague
The Netherlands

Location:

Kortenaerkade 12
2518 AX The Hague
The Netherlands

Telephone: +31 70 426 0460
Fax: +31 70 426 0799

Contents

List of Tables

List of Appendices

List of Acronyms

GDP   : Gross Domestic Product

OECD   : Organization for Economic Co-operation and Development

OLS   : Ordinary Least Squares

The US   : The United States of America

Abstract

This research paper aims to investigate the importance and significance of government size on happiness. Utilizing a relative large panel sample, which covers 183 countries in a period from 1990 to 2016, the research objective is first to study the direct effect of government expenditure on happiness through basic panel analyses. After understanding the importance and significance of government expenditure, this paper then tries to determine the indirect effects of government expenditure on happiness through the transmission channels include income, inequality, unemployment rate, inflation rate, economic growth and social development. In order to obtain the research objectives, this paper applies not only panel data regression methodologies, such as Pooled OLS, Fixed Effects, Random Effects Models, but also cross-sectional analysis; and finds that government expenditure only affects happiness in short term and that the importance and direction of the transmission channels are heterogeneous.

Relevance to Development Studies

This research is expected to contribute to the existing literature the evidence of the existence of a linkage between government size and happiness not only in long term but also in short term. In addition, the results of this study would shed light on the effects of government expenditure on happiness, both in direct and indirect ways. Besides, when performing analyses on the relationship between government expenditure and happiness, this research also provide strong evidences of other drivers of happiness as well as the relative importance of the transmission channels, which could be helpful and useful for further development studies.

Keywords

Government expenditure, public spending, happiness, subjective well-being, transmission channels.

CHAPTER 1

INTRODUCTION

1.1 Background

"Economists are trained to infer preferences from observed choices; that is, economists typically watch what people do, rather than listening to what people say. Happiness research departs from this tradition" (Di Tella & MacCulloch, 2006, p. 25). For a long time, economic researches prefer objective measures of human well-being, such as income per capita, when studying different models of development. However, Easterlin (1974) points out that economic growth does not always lead to a raise in life satisfaction, the happiness as a subjective approach has been introduced in many economic research to gain more precise knowledge of human well-being. By identifying the determinants of happiness and understanding the dependence of happiness on macroeconomic variables, especially government expenditure, governments could improve their economic and social policies.

The size and volatility of government spending are believed to have significant effects on the social well-being. Higher public spending in fields like education, health, and development could result in higher living standard which means higher happiness level. Lower government spending could imply that the government is applying a lower tax rate, which might boost the economic growth that can also lead to an increasing the living standard in the country. The effect of government quality on happiness is positive and supported by many empirical researches (Blanchflower & Oswald, 2008; Ott, 2015; Radcliff, 2013). However, divergent impact of government expenditure on welfare is found in different studies using different methods and datasets. While Bjørnskov et al. (2007) emphasize the drawback of government consumption; Ram (2009) finds no evidence of a negative impact of government expenditure on happiness. On the other hand, Perovic and Golem (2010) suggest that public spending and happiness have a non-linear relationship.

Considering the importance of happiness in the economic and social development, many researchers have been trying to identify significant

factors affecting the welfare. Previous studies have taken into account numerous factors, such as climate and environment (Rehdanz & Maddison, 2005; Welsch, 2006); culture, gender, and religion (Dorn et al., 2007; Mookerjee & Beron, 2005); as well as macroeconomic components, including governance factors (Di Tella et al., 2003; Ruprah & Luengas, 2011). It is widely agreed that government has significant impacts on happiness. However, there are two main conflicting arguments on the consequences of government expenditure.

1.2 Research questions and contribution

This research paper aims to investigate the importance and significance of government size on happiness. Given the vast literature on happiness, there are very limited studies available on various explanatory variables as transmission mechanisms of government expenditure. The research objective is first to study the direct effect of government expenditure on happiness through basic panel analyses. After understanding the importance and significance of government expenditure, this paper then tries to determine the indirect effects of government expenditure on happiness through the transmission channels include income, inequality, unemployment rate, inflation rate, economic growth and social development. Therefore, to achieve these objectives, this research attempts to address following questions:

    i.   Does government expenditure have direct effect the level of happiness directly?

   ii.   Does government expenditure have indirect effects on the level of happiness through the transmission channels?

By answering the above questions, this research is expected to contribute to the existing literature the evidence of the existence of a linkage between government size and happiness not only in long term but also in short term. In addition, the results of this study would shed light on the effects of government expenditure on happiness, both in direct and indirect ways. Moreover, this research introduces the social development dimensions, which are hardly seen in previous happiness studies, along with other macroeconomic factors. Besides, when performing analyses on the relationship between government expenditure and happiness, this research

also provide strong evidences of other drivers of happiness as well as the relative importance of the transmission channels, which could be helpful and useful for further development research.

1.3 Scopes and limitations of the study

This research covers 183 countries (see Appendix 4 for list of countries), in a period from 1990 to 2016 (the exact time of available data for happiness includes 1990, 1995, 2000, 2006, 2009, 2012, and 2016). Such sample could be considered relatively large and inclusive. However the availability of data is not continuous throughout the period, especially that of happiness, social development data. Furthermore, the analysis would have been much deeper, had the different components of public expenditure, e.g., education expenditure, health expenditure, social expenditure, be analyzed.

1.4 Data and methodology

Data in this research is obtained from various sources. To acquire happiness at country level, this research employs the "life satisfaction" data from the Gallup World Poll. The data for government expenditure and several macroeconomic happiness determinants namely income, inequality, unemployment rate, inflation rate, and economic growth are acquired from the World Bank's World Development Indicators dataset. In addition, the social development data is obtained from the Indices of Social Development database.

Analysis in this research paper follows the methodology ofPapyrakis and Gerlagh (2004), who study the transmission channels through which natural resource abundance indirectly affects economic growth[1]. In order to analyze the dependence of happiness on government expenditure, this study conducts regression analysis through the Pooled OLS, Fixed Effect, and Random Effect Models. Then model specification tests are employed to identify the most appropriate model for further analyses. Next, to investigate the magnitude and significance of the transmission channels, I estimate the effects of government expenditure on income, inequality,

---

[1] I also review the methodology of Pellegrini and Gerlagh (2004) who study the transmission channels through which corruption affects economic growth.

unemployment rate, inflation rate, economic growth and social development to capture their indirect effects on happiness.

1.5 Organization of the research paper

The remaining of this paper is structured as follows. Chapter 2 provides the literature review on happiness in the relations with government expenditure and other explanatory variables. Chapter 3 explains the data and the econometric methodology employed in addressing the research questions. Chapter 4 analyzes the regression results to understand the direct and indirect effects of government expenditure on happiness. Chapter 5 concludes the research paper.

CHAPTER 2

LITERATURE REVIEW

2.1 Key concepts

Frey (2008) argues that *happiness* is considered as individuals' "ultimate goal in life" and is not stable. Happiness is subjected to change over time and is affected by various actions and factors, both material and non-material. Many economists perceive happiness as *objective well-being* which can be increased through material factors, such as better economic conditions, better healthcare and education. In this research, happiness is referred to as *subjective well-being*, of which data can be collected by asking the follow question from the Gallup World Poll: "All things considered, how satisfied are you with your life as a whole these days?"

Much of the happiness economics literature has a tendency to use measures of "life satisfaction" when carrying out the analyses of happiness. This is based on the argument that the measures of "life satisfaction" and the measures of "happiness" are, to some extent, similar and uniform; and that "these alternative measures of well-being are highly correlated and have similar covariates" (Stevenson & Wolfers, 2008, p. 4). However, there's still been criticism on the measurements of happiness saying that happiness is more about attitudinal things in the sense of feelings while life satisfaction is more into evaluating the conditions of life. Consider that evaluations of and feelings towards living conditions are highly correlated, in this research, I follow the main stream of happiness economics literature and use the term of "happiness" and "life satisfaction" interchangeably.

Government expenditure is defined as the overall and final public spending in terms of consumption which includes all the expenditures for purchasing goods and services, and is measured as percentage of GDP. Although government expenditure has many components, such as health, education, national defense expenditures, this study only considers government expenditure as a whole and analyzes the direct and indirect effects of government size on happiness.

Social development is defined by Midgley (1995) as "a process of planned social change designed to promote the well-being of the population

as a whole in conjunction with a dynamic process of economic development." According to this definition, social development refers to all progresses to improve the quality of human beings and their surrounding environment, includes institutional development and political development. The *Indices of Social Development* is tracking these progresses through 6 dimensions: Civic Activism; Clubs and Associations; Intergroup Cohesion; Interpersonal Safety and Trust; Gender Equality and Inclusion of Minorities. In this research paper, due to high correlation between the log of GDP per capita and Civic Activism, the latter is dropped from the model.

2.2 Government expenditure and happiness

There has been a long-established argument between neoclassical economic view, which argues that governments unequivocally and positively affect subjective well-being, and public choice view, which was proposed in order to understand why governments often behave in ways that would damage citizens' benefits (Bjørnskov et al., 2007). First, neoclassical economic theory emphasizes the role of government in solving market failures by facilitating and maintaining suitable institutions for market functioning and transactions, as well as intervening to correct externalities. Besides, government is the only possible economic agent to provide public goods, such as national defense and infrastructure, which private producers fail to supply due to their specific characteristics (Musgrave, 1959). This theory implies that government performs as a 'benevolent dictator' that always tries to maximize citizens' interests, which means the general social average life satisfaction would increase with government size (Bjørnskov et al., 2007).

On the other hand, public choice theory argues that politicians, officialdoms, and bureaucrats might prioritize their own benefits when making and implementing policies, which results in superfluous interventions, larger government expenditure, and expansion of rent-seeking. Hence, public choice theory suggests that bigger government size carries more government failures that vandalize the average overall well-being. There have been many empirical works that follow these two main streams of theoretical framework. Their findings are is far from being conclusive, however.

First, many economists believe that government help to solve the market failure, which would free citizens from anxiety and make them happier. This point of view is supported by a number of researches in developed countries where big governments offering generous public services. Blanchflower and Oswald (2008) argue that European birth-cohorts are happier than the American ones due to more comprehensive social safety net and lower tuition fee. The authors find that the effects are quantitatively large in terms of magnitude and statistically significant. In addition, Kotakorpi and Laamanen (2010) find a positive impact on life satisfaction of public spending on health care in Finland. More recently, focusing on 21 traditional members of the OECD, which are well developed and have relatively high quality governments, Radcliff (2013) finds that bigger government provides happier lives to its citizens. In addition, using a well-being index proposed by Pesta et al. (2010) for each US state; Belasen and Hafer (2012, 2013) report a positive and strong relationship between the institutions of economic freedom and happiness. Their further investigation reveals that most of the effect comes from the government size. Extending the works of Belasen and Hafer, Jackson (2016) applies panel methods at individual level and confirms the positive relationship for both general economic freedom and its components. This correlation remains consistent when including additional individual characteristics.

In contrast, public choice theorists argue that government which is too big in terms of size would damage the citizens' welfare. Given the assumption that people feel happier when their income increases, citizens would prefer lower tax rates which means higher disposable income. On the other hand, high government expenditure implies high tax rates because public spending is mostly financed by taxes. In this case, government size has negative effect on happiness. Besides, public spending usually comes with corruption, rent-seeking, and inefficiency. From the cross-country approach, many empirical studies have found supportive evidences for the public choice view. Bjørnskov et al. (2007) suggest that government size, represented by the ratio of government expenditure in GDP, has negative impacts on life satisfaction. This correlation is confirmed by the work of Ott (2015). Covering a large number of countries in their research, Kim and Kim (2012) suggest that small but efficient government would enhance the

quality of life. Earlier, Scully (2001) analyzes, for a set of 112 countries, the relationship between government expenditure and physical quality of life. The paper finds that extravagant government spending damage citizens' well-being. Furthermore, considering the issue of inequality, Ott (2005) shows that government transfers and subsidies decrease happiness.

2.3 Social development and happiness

Scitovsky (1976) suggests that a higher level of consumption does not lead to a higher level of satisfaction, which is in line with the Easterlin paradox. Moreover, other authors – among them Lane (1994, 2000) and Layard (2005) – argue that friendship and other community relationships could bring more happiness than consumption. Given previous studies which argue that economic development could not make people happier, Veenhoven (2012) suggests that there would be alternative ways to be happier. This author argues that social development is one of these alternatives. In general, from the existing literature, there are limited studies considering the pivotal role of social development level in the relationship between government size and happiness.

In this research, social development is captured through five dimensions, including Clubs and associations, Intergroup cohesion, Interpersonal safety and trust, Gender equality, and Inclusion of minorities. First, Clubs and associations dimension represents the level of how associative life in a certain community is. The hypothesis behind this is that living in a more associative neighborhood makes people feel better about their own life. Second, the dimension of Intergroup cohesion measures ethnic and religious tensions, and the level of discrimination. In a region, where people could interact with other social groups without discrimination or violence, one would expect people in this community to feel happier; hence, the coherence between different social groups would enhance the subjective well-being. Third, it is believed that living in a safer, friendlier environment and less being surrounded by crimes and bad intentions would results in higher life satisfaction; this aspect of social development is manifested through the Interpersonal safety and trust dimension. Next, to both females and males, it is important to have more equal opportunities, choices, and paths, in terms of gender equality, at home, work, and in public society. So, a higher score in the Gender equality dimension should

associate with higher score in happiness. Finally, a human being whether or not belongs to the minor groups such as indigenous peoples, migrants, refugees, can be affected by the levels of discrimination against these vulnerable groups (which is captured by the dimension of Inclusion of minorities), in terms of perceptions and feelings. In sum, it is reasonable to believe that all these five dimensions of social development are possible drivers of happiness.

2.4 Other macroeconomic determinants of happiness
2.4.1 GDP per capita and economic growth

It is generally believed that richer people are happier. It is generally believed that richer people are happier. Classical economists usually consider income as objective well-being, believing that gaining higher income, living in a strongly grow economy would results in better life as high income people could enjoy higher consumption. However, in his seminal article, Easterlin (1974) puts forward the paradox in Western countries that substantial raise in real income does not improve the level of self-reported happiness. This paradox has been empirically tested using different sets of data and is supported by researches in developed countries, such as Easterlin (1995) and Oswald (1997). These papers argue that economic growth in developed countries leads to greater happiness of no-one. However, later researches in less developed countries, such as East Germany and Russia, where the initial income level is much lower, suggest that economic growth does associate with increase in subjective well-being (Frijters et al., 2006; Frijters et al., 2004). Beside absolute income and past income, relative income is also found as an important driver of happiness, especially where social comparisons have strong effects on one's perception of happiness. For example, in the case of rural China in Knight et al. (2009), relative income affects happiness at least twice as much as absolute income.

The relationship between income and happiness appears to be significant in many studies (Blanchflower & Oswald, 2004; Di Tella & MacCulloch, 2006; Diener & Oishi, 2000; Easterlin, 1974, 1995, 2001; Frey & Stutzer, 2000, 2010; Kenny, 1999; Myers, 2000). In these studies, income effects on happiness are not entirely consistent: some results suggest positive effect while others support the Easterlin paradox. Di Tella et al. (2003) find that the level of GDP and GDP growth affect happiness in

Europe in 1975 – 1992, however, the effect of growth seems to be faded with time. The effects on happiness of GDP per capita and economic growth are also significant in transition countries, both these macroeconomic factors are proved to have positive influence on subjective economic well-being (Malešević Perović, 2009). Therefore, considering the significance of income in the relationship with happiness, this research includes both *GDP per capita* and *economic growth* in its estimates.

2.4.2 Inequality

In addition, it is not only income itself but also the distribution of income that has significant impact on happiness. As a matter of fact, income distribution is intolerable in most counties (Deaton, 2005) and governments are working hard on the issue of redistribution income at large scale (Alesina & La Ferrara, 2005). Alesina et al. (2004) and Alesina and Glaeser (2004) find difference in the effects of inequality on happiness between the US and Europe which emphasizes the significantly negative effect in the Europe while such correlation is not as strong in the US. Oishi et al. (2011) find that increase in income inequality leads to declining in happiness. Moreover, Helliwell (2003) suggests that lower inequality implies better healthcare and income possibility which in turn affects happiness.

On the other hand, when analyzing Canadian survey data, Tomes (1986) discovers that self-reported happiness is lower when there is an increase in the share of income for the 40% poorest, while all other personal characteristics are held constant. Clark (2003) also finds a positive correlation between happiness and inequality using the British Household Panel Survey data. In addition, not only the GINI coefficient but also the perception of rising income inequality show a positive but weak relationship with happiness in Japan (Ohtake & Tomioka, 2004). Thus, this research takes into account both income and *income inequality* when analyzing the determinants of happiness.

2.4.3 Inflation and Unemployment

A large part of macroeconomics literature argues that there is a tradeoff between inflation and unemployment in terms of increasing happiness which assumes that citizens' well-being is reduced both by a higher rate of inflation and by a higher rate of unemployment in a certain

economy. Then how much inflation should governments scarify in order to reduce unemployment rate so that its people would feel happier, or vice versa? Wolfers (2003), using the Ordered Probit Model, shows that an additional percentage point of unemployment worsen happiness by 4.7 times more than a percentage point of inflation while Di Tella et al. (2001) find that it is only almost twice as much in a smaller sample.

Weimann et al. (2015) argue that job security is extremely important for every individual in terms of life satisfaction, hence there is a negative correlation between unemployment rate and happiness. They also suggest that a fall in unemployment rate would increase happiness because people would feel better about career expectation. A number of studies, including Di Tella et al. (2003), Helliwell (2003), and Alesina et al. (2004), confirm this negative effect. However, Rehdanz and Maddison (2005) fail to provide any evidence of such correlation. On the other hand, Frey (2008) indicates that inflation consistently and significantly reduces self-reported individual well-being. So, an increase in inflation rate would lower happiness (Alesina et al., 2004; Di Tella et al., 2001, 2003). However, in terms of policy making, there is always tradeoff between inflation and unemployment. Therefore, both *unemployment rate* and *inflation rate* are included in this research given their importance in the relationship with happiness.

CHAPTER 3

DATA AND METHODOLOGY

3.1 Data and variable explanation

Data required for estimation in this research has been compiled from multiple sources. Data on government expenditure (general government final consumption expenditure, as percentage of GDP), income per capita (based on purchasing power parity, in 2011 US dollar), GINI coefficient (measuring income inequality), unemployment rate, inflation rate, and growth rate have been taken from the World Bank's World Development Indicators 2017. Besides, social development is measured by five indices (Clubs and associations, Intergroup cohesion, Interpersonal safety and trust, Gender equality, Inclusion of minorities). Each of these indices is based on a combination of data from different sources. They are acquired from the Indices of Social Development database. Finally, the source of information on the dependent variable, happiness, is the "life satisfaction" in the Gallup World Poll in 1990, 1995, 2000, 2006, 2009, 2012, and 2016. The overall panel dataset utilized in this research paper covers 183 countries over the period 1990 – 2016.

There are two models which estimate the direct and indirect effects of government size on happiness. The first model analyzes the direct effect following Pooled OLS, Fixed Effects, and Random Effects Models. The second model investigates the transmission channels, which captures the effects of government expenditure on other explanatory variables, and calculates the indirect effect of government expenditure on happiness for each transmission channel. The dependent variable in both models is happiness. The explanatory variables in this study can be clustered into macroeconomic variables and social development variables. Table 3.1 provides descriptions and data sources of the dependent and explanatory variables. Table 3.2 presents the descriptive statistics, including means, number of observations, standard deviations, value of minimum and maximum, for of the variables mentioned in Table 3.1. Finally, Table 3.3 provides the correlations between explanatory variables, in which, all of the correlations are quite small (except for the correlation between gender

equality and log of GDP per capita, which is at an acceptable level) suggests that there should not be a problem of multicollinearity.

Happiness, the dependent variables, contains 702 observations and covers 183 countries (see Appendix 4 for list of countries). The average life satisfaction is about 5.807 on a 0 to 10 scale, where 0 is dissatisfied and 10 is satisfied, and the maximum value is quite distinguished from the minimum value: 8.5 and 2.4 respectively.

In terms of expected regression results in the direct effect model, although consensus has not been reached on whether these macroeconomic variables have positive or negative effects on happiness, I propose the expectations on the sign of these variables as follow. Log of GDP per capita and government expenditure are expected to have positive effects on happiness. GDP per capita and economic growth capture a country's level of income and its economic performance, so, it is reasonable to believe that increases in GDP per capita could make people happier. As discussed in Chapter 3, higher government expenditure relatively enhance citizens' life satisfaction level. On the other hand, income inequality, unemployment, and inflation are expected to affect happiness negatively. A nation with high inequality, high unemployment rate, and high inflation rate would damage its people's feeling about life, which means its citizens are more likely to be less happy.

For the social development variables, as suggested by Veenhoven (2012), intergroup cohesion, and gender equality are expected to affect happiness positively while clubs and associations, interpersonal safety and trust are expected to have negative effects. Inclusion of minorities is not included in Veenhoven (2012) and is expected to have positive effect on happiness.

Table 3.1 List of variables with description

Variable	Description	Data source
Dependent variable		
Happiness (H)	Life satisfaction measures subjective well-being by answering the question: "All things considered, how satisfied are you with your life as a whole these days?"	Gallup World Poll
Independent variables		
Macroeconomic variables		
Log of GDP per capita (ln(GDPpc))	Natural logarithm of income per capita (based on purchasing power parity, in 2011 US dollar	Calculate from World Bank's World Development Indicators 2017
Government expenditure (Exp)	General government final consumption expenditure includes all government current expenditures for purchases of goods and services, as percentage of GDP	World Bank's World Development Indicators 2017
Income inequality	The extent to which the distribution of income among individuals or households within an economy deviates from a perfectly equal distribution	
Unemployment	The share of the labor force that is without work but available for and seeking employment, as percentage of total labor force) (modeled ILO estimate)	
Inflation	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals	

Growth	Annual percentage growth rate of GDP at market prices based on constant local currency	
Social development variables		
Clubs and associations	The extent to which there is a lavish community associative life within towns, neighborhoods and villages	Indices of Social Development database
Intergroup cohesion	The extent to which there is social cohesion between defined religious, ethnic, and sectarian groups, without transformation into social unrest or violent crimes	
Interpersonal safety and trust	The extent to which there is social interaction between strangers, as demonstrated by bonds of trust, reciprocity, and absence of criminal intention	
Gender equality	The extent to which women have equal opportunities as men in the fields of education, employment, in the home, and in political life	
Inclusion of minorities	The level of discrimination against vulnerable groups such as indigenous people, migrants, refugees, or lower caste groups	

Table 3.2 Descriptive statistics

Variables	Observations	Mean	Standard deviation	Minimum	Maximum
Dependent variable					
Happiness (H)	702	5.807	1.250	2.400	8.500
Independent variables					
Macroeconomic variables					
Log of GDP per capita (ln(GDPpc))	4,695	8.762	1.262	5.489	11.770
Human Development Index	4,265	0.647	0.168	0.194	0.949
Government expenditure (Exp)	4,489	16.316	7.927	2.047	156.532
Income inequality	1,160	39.842	9.795	16.230	65.760
Unemployment	4,627	9.193	6.597	0.100	39.300
Inflation	4,388	37.819	567.153	-35.837	24411.030
Growth	4,718	3.719	6.517	-64.047	149.973
Social development variables					
Clubs and associations	459	0.500	0.100	0.138	0.860
Intergroup cohesion	585	0.601	0.098	-0.032	0.789
Interpersonal safety and trust	536	0.500	0.100	0.232	0.774
Gender equality	860	0.698	0.100	0.212	1.021
Inclusion of minorities	413	0.499	0.100	0.173	0.901

Table 3.3 Correlations between explanatory variables

	1	2	3	4	5	6	7	8	9	10	11
1. Ln(GDPpc)	1.000										
2. Government Expenditure	0.360	1.000									
3. Unemployment	-0.004	0.138	1.000								
4. Inflation	-0.047	0.003	-0.016	1.000							
5. Inequality	-0.345	-0.346	0.104	-0.019	1.000						
6. Growth	-0.199	-0.216	-0.071	-0.173	0.054	1.000					
7. Clubs and Associations	0.044	-0.089	-0.175	-0.088	0.174	-0.044	1.000				
8. Intergroup Cohesion	0.273	0.180	-0.005	-0.010	-0.259	-0.127	0.014	1.000			
9. Interpersonal Safety and Trust	0.338	0.192	0.004	-0.019	-0.421	-0.080	0.027	0.262	1.000		
10. Gender Equality	0.590	0.320	-0.019	-0.005	-0.319	-0.103	-0.101	0.445	0.159	1.000	
11. Inclusion of Minorities	0.344	0.167	-0.041	0.032	-0.183	-0.146	0.037	0.282	0.404	0.245	1.000

3.2 Methodology
3.3.1 Direct effect model

To examine the direct effect of government expenditure on happiness, empirical models with (a) log of GDP per capita, (b) government expenditure, (c) macroeconomic variables, including income inequality, unemployment, inflation, growth, and (d) clubs and associations, intergroup cohesion, interpersonal safety and trust, gender equality, inclusion of minorities as independent variables are used to analyze and identify the factors that influence happiness. Because the social development indices measure different aspects of social development, it is reasonable to include them in the regressions in alternate order. The empirical analysis is based on panel data covering a 27-year-period; hence the Pooled OLS, Fixed Effects, and Random Effect models with time dummies are used. The general form of the empirical models is:

$$H_{it} = \gamma_0 + \lambda_1 \ln(GDPpc_{it}) + \gamma_2 Exp_{it} + \gamma_3 Z_{it} + \varepsilon_{it} \tag{1}$$

In Equation (1), besides log of GDP per capita and government expenditure, Z_{it} is the vector of all other explanatory variables[2]. At this stage of investigation, the sign and significance of government expenditure and other variables in vector Z are the main focus of analyses.

3.3.2 Indirect effect model

In order to capture the indirect effect of government expenditure on happiness, this research analyzes the dependence of changes in happiness in the period of 2009 – 2012 on government expenditure and other explanatory variables in 2012 following the methodology in Pellegrini and Gerlagh (2004) and Papyrakis and Gerlagh (2007). The transmission channels are analyzed through three steps. First, a basic OLS Model is applied to investigate the relationship between changes in happiness and independent variables:

$$H_i^{09-12} = \alpha_0 + \alpha_1 \ln(GDPpc_i) + \alpha_2 Exp_i + \alpha_3 Z_i + \varepsilon_i \tag{2}$$

---

[2] The five social development variables are included in alternate order.

Next, the dependence of each explanatory variable in vector Z on government expenditure is estimated by the following equation:

$$Z_i = \beta_0 + \beta_1 \ln(GDPpc) + \beta_2 Exp_i + \mu_i \tag{3}$$

In Equation (3), β_0, β_1, β_2, μ_i are vectors contain results from the regressions in which each explanatory variables in vector Z is the regressand while government expenditure and log of GDP per capita are the only regressors. To avoid problem arising from having different sample sizes due to data availability, the Equation (3) is analyzed using the same sample of Equation (2) which contains only 67 observations. Then, substituting Equation (3) into Equation (2) yields:

$$H_i^{09-12} = \left(\alpha_0 + \alpha_3\beta_0\right) + \left(\alpha_1 + \alpha_3\beta_1\right)\ln\left(GDPpc_i\right) + \left(\alpha_2 + \alpha_3\beta_2\right)Exp_i + \alpha_3\mu_i + \varepsilon_i \tag{4}$$

In Equation (4), $\alpha_2 Exp_i$ is the direct effect of government expenditure on the changes in happiness and $\alpha_3\beta_2 Exp_i$ is the indirect effect of government expenditure on the changes in happiness, while μ_i are the residuals of Equation (3). This stage of analyses allow me to investigate not only the indirect effect of government expenditure on the changes in happiness but also the relative importance of each transmission channel in explaining the indirect effect of government expenditure on changes in happiness.

CHAPTER 4

RESULTS AND ANALYSIS

4.1   Findings and interpretation of the basic panel regressions
4.1.1   Basic happiness regressions

The estimated coefficient of the basic happiness regressions using Pooled OLS, Fixed Effects, and Random Effects Models are reported in Table 4.1, 4.2, and 4.3, respectively. Among Pooled OLS, Fixed Effects and Random Effects Model, this research paper prefer the results from random effects regressions due to the outcomes of the Breusch-Pagan Lagrange multiplier test and the Hausman test (see Appendix 1). Hence, this section focuses on interpreting the results in Table 4.3 while also checking the consistency of these results across Table 4.1 and 4.2.

The results, presented in all columns of the three tables, indicate a consistently insignificant relationship between government expenditure and happiness. Regardless the form of model, the variety of other variables used in analyzing, the coefficients of government expenditure in the basic happiness regressions are statistically insignificant. Besides, the magnitude of these coefficients is usually very small, nearly zero in many cases. Such results mean government expenditure does not have any effects on the level of happiness, which fails to provide evidences, in the long run, on whether government expenditure affects happiness positively or negatively.

Furthermore, the log of GDP per capita affects happiness positively and consistently in both Pooled OLS and Random Effects Models while fails to maintain its significance in the Fixed Effects Model but the signs remain positive in all cases. In Column 1 of Table 4.2, log of GDP per capita is the only significant explanatory variable yet at a slightly level of significance – 10% level. In other columns of Table 4.2, when more independent variables are added, log of GDP per capita loses its significance. According to Table 4.3, an increase of 1% in GDP per capita increases the happiness score by an amount in the range from $0.691*\ln(1.01)=0.007$ to $0.871*\ln(1.01)=0.009$, while all other explanatory variables in the model are held constant. The effect of GDP per capita on happiness is strongly statistically significant in all ten columns in Table 4.3.

Table 4.1 Direct effect regressions – Pooled OLS model

Dependent variable: Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-2.454	-1.937	-2.016	-2.543	-3.095	-2.703	-1.892	-3.068	-3.738	-4.076
Ln(GDPpc)	0.868*** (12.42)	0.844*** (12.28)	0.852*** (11.41)	0.77*** (9.82)	0.757*** (9.22)	0.766*** (8.66)	0.857*** (11.16)	0.778*** (9.37)	0.652*** (6.79)	0.690*** (7.92)
Government Expenditure (as percentage of GDP)	0.010 (0.67)	-0.001 (-0.06)	-0.001 (-0.07)	0.004 (0.29)	-0.000 (-0.01)	0.003 (0.19)	-0.000 (-0.03)	-0.005 (-0.34)	0.006 (0.40)	0.005 (0.33)
Unemployment	-0.069*** (-6.28)	-0.073*** (-6.74)	-0.073*** (-6.74)	-0.061*** (-5.54)	-0.075*** (-6.55)	-0.075*** (-6.98)	-0.073*** (-6.71)	-0.072*** (-6.37)	-0.063*** (-5.39)	-0.064*** (-5.48)
Inflation	-0.024*** (-2.74)	-0.023*** (-2.85)	-0.022*** (-2.83)	-0.014** (-1.99)	-0.021*** (-2.7)	-0.020*** (-2.66)	-0.022*** (-2.83)	-0.020*** (-2.59)	-0.011* (-1.67)	-0.012* (-1.68)
Inequality	0.034*** (5.04)	0.035*** (5.07)	0.035*** (5.12)	0.029*** (3.85)	0.040*** (5.38)	0.045*** (4.78)	0.035*** (5.04)	0.039*** (5.34)	0.039*** (3.73)	0.039*** (3.78)
Growth		-0.042*** (-2.60)	-0.011 (-0.08)	-0.154 (-1.16)	0.005 (0.04)	-0.066 (-0.48)	-0.018 (-0.14)	-0.043 (-0.32)	-0.178 (-1.33)	-0.034** (-2.26)
Growth + Growth*ln(GDPpc)			-0.003 (-0.23)	0.011 (0.84)	-0.004 (-0.31)	0.002 (0.18)	-0.002 (-0.17)	0.001 (0.07)	0.014 (1.08)	
Clubs and Associations				2.605*** (4.06)					2.374*** (3.64)	2.291*** (3.59)
Intergroup Cohesion					3.053*** (3.07)				2.473** (2.14)	2.513** (2.18)

21

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interpersonal Safety and Trust							1.901* (1.91)		0.822 (0.79)	0.745 (0.73)
Gender Equality							-0.255 (-0.29)		-0.521 (-0.60)	-0.382 (-0.46)
Inclusion of Minorities								3.080*** (2.95)	0.951 (0.73)	0.840 (0.64)
R-squared	0.602	0.614	0.615	0.653	0.632	0.623	0.615	0.627	0.671	0.670
Observations	230	230	230	230	230	230	230	230	230	230

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.2 Direct effect regressions – Fixed Effects model

Dependent variable: Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-3.827	-1.027	0.089	0.473	-0.039	-4.108	-0.336	1.579	-1.914	-3.144
Ln(GDPpc)	0.879* (1.79)	0.636 (1.29)	0.490 (1.00)	0.472 (0.98)	0.491 (1.01)	0.646 (1.37)	0.503 (1.04)	0.419 (0.83)	0.535 (1.09)	0.663 (1.35)
Government Expenditure (as percentage of GDP)	0.038 (1.35)	0.019 (0.65)	0.016 (0.53)	0.016 (0.52)	0.016 (0.56)	0.000 (0.00)	0.015 (0.52)	0.015 (0.47)	-0.002 (-0.08)	-0.001 (-0.04)
Unemployment	-0.018 (-1.05)	-0.041** (-2.10)	-0.038** (-2.03)	-0.038** (-2.00)	-0.038** (-2.05)	-0.036* (-1.90)	-0.041** (-2.17)	-0.036* (-1.88)	-0.034* (-1.84)	-0.037* (-1.92)
Inflation	0.015 (1.64)	0.011 (1.15)	0.011 (1.22)	0.011 (1.24)	0.011 (1.22)	0.010 (1.20)	0.010 (1.15)	0.011 (1.16)	0.009 (1.10)	0.009 (1.02)
Inequality	0.033 (1.06)	0.035 (1.19)	0.041 (1.39)	0.042 (1.44)	0.041 (1.39)	0.028 (1.01)	0.039 (1.33)	0.042 (1.43)	0.032 (1.11)	0.026 (0.89)
Growth		-0.035*** (-2.78)	-0.178** (-2.52)	-0.182*** (-2.65)	-0.178** (-2.52)	-0.145* (-1.96)	-0.169** (-2.32)	-0.184** (-2.56)	-0.152** (-2.00)	-0.039*** (-3.15)
Growth + Growth*ln(GDPpc)			0.014** (2.03)	0.014** (2.16)	0.014** (2.03)	0.010 (1.46)	0.013* (1.81)	0.014** (2.07)	0.011 (1.50)	
Clubs and Associations				-0.595 (-0.45)					-0.786 (-0.55)	-0.633 (-0.45)
Intergroup Cohesion					0.197 (0.11)				0.052 (0.03)	-0.032 (-0.02)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interpersonal Safety and Trust						6.558*** (2.92)			6.451*** (2.79)	6.749*** (2.97)
Gender Equality							0.637 (0.65)		0.601 (0.52)	0.689 (0.59)
Inclusion of Minorities								-1.845 (-0.70)	-2.542 (-0.94)	-2.434 (-0.91)
F-statistic	17.89	25.36	23.45	21.94	23.13	23.10	23.43	22.80	20.16	21.66
Observations	230	230	230	230	230	230	230	230	230	230
Number of groups	88	88	88	88	88	88	88	88	88	88

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.3 Direct effect regressions – Random Effects model

Dependent variable: Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	-2.542	-1.855	-1.704	-2.245	-2.095	-2.364	-1.905	-2.301	-3.187	-3.362
Ln(GDPpc)	0.871*** (11.34)	0.845*** (11.05)	0.829*** (10.73)	0.798*** (10.09)	0.776*** (8.82)	0.759*** (8.29)	0.805*** (9.69)	0.789*** (9.08)	0.691*** (6.75)	0.718*** (7.11)
Government Expenditure (as percentage of GDP)	0.003 (0.13)	-0.011 (-0.57)	-0.011 (-0.56)	-0.007 (-0.39)	-0.010 (-0.53)	-0.009 (-0.51)	-0.012 (-0.65)	-0.013 (-0.69)	-0.007 (-0.39)	-0.007 (-0.39)
Unemployment	-0.046*** (-4.69)	-0.057*** (-5.65)	-0.056*** (-5.52)	-0.054*** (-5.18)	-0.056*** (-5.44)	-0.057*** (-5.69)	-0.058*** (-5.62)	-0.057*** (-5.47)	-0.056*** (-5.26)	-0.057*** (-5.48)
Inflation	0.001 (0.07)	0.000 (0.02)	0.000 (0.05)	0.001 (0.10)	0.000 (0.07)	0.002 (0.23)	-0.000 (-0.01)	0.001 (0.10)	0.001 (0.19)	0.001 (0.16)
Inequality	0.028*** (3.01)	0.029*** (3.09)	0.028*** (3.05)	0.025*** (2.60)	0.030*** (3.08)	0.036*** (3.15)	0.029*** (3.09)	0.030*** (3.14)	0.033*** (2.79)	0.033*** (2.82)
Growth		-0.045*** (-4.29)	-0.102 (-1.42)	-0.122* (-1.71)	-0.105 (-1.46)	-0.120 (-1.62)	-0.096 (-1.28)	-0.113 (-1.54)	-0.133* (-1.75)	-0.045*** (-4.21)
Growth + Growth*ln(GDPpc)			0.006 (0.78)	0.007 (1.06)	0.006 (0.84)	0.007 (1.01)	0.005 (0.66)	0.007 (0.94)	0.009 (1.15)	
Clubs and Associations				1.681** (2.25)					1.582** (2.16)	1.524** (2.10)
Intergroup Cohesion					1.438 (1.38)				1.095 (0.85)	1.058 (0.82)

Interpersonal Safety and Trust						1.831 (1.51)			1.329 (1.03)	1.310 (1.02)
Gender Equality							0.645 (0.79)		0.361 (0.40)	0.445 (0.51)
Inclusion of Minorities								1.805 (1.45)	0.235 (0.15)	0.107 (0.07)
Wald chi-squared	427.34	631.41	632.61	591.26	623.07	628.73	638.25	628.04	626.43	635.82
Observations	230	230	230	230	230	230	230	230	230	230
Number of groups	88	88	88	88	88	88	88	88	88	88

Notes: The z-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

The coefficients for unemployment are negative in all the columns across the three tables and are significant in all cases except for Column 1 of Table 4.2. The level of significance of unemployment in the Fixed Effects Model is lower than in the other two models, remain at 10% and 5% level. In the Pooled OLS and Random Effects Models, unemployment is strongly significant at 1% level. Such results reported in these tables suggest that unemployment consistently and markedly lowers happiness. One percentage point increase in unemployment rate is associated with a decrease from 0.046 to 0.058 in the subjective well-being score.

While the literature in Chapter 2 suggests an unemployment-inflation tradeoff, the estimated results in this section show no significant effects of inflation on happiness, except for those in Table 4.1 (the Pooled OLS Model). The sign of inflation rate is inconsistent among the three models: while the Pooled OLS Model gives negative coefficient, the other models suggest otherwise. Remarkably, the coefficients for inflation in Table 4.3 are very small and closed to zero. Hence, this paper finds no strong and consistent evidence of a negative association between inflation and a nation's well-being.

Contrary to expected sign, the coefficients for income inequality are positive in all three models and strongly significant in the Pooled OLS and Random Effects Models. It seems that the findings of this paper are in line with those of Ohtake and Tomioka (2004), Clark (2003), and Tomes (1986). An increase of one percentage point in the GINI coefficient increases happiness score by around from 0.025 to 0.036 in the Random Effects Model and from 0.029 to 0.045 in the Pooled OLS Model. In both models, the coefficients are strongly statistically significant regardless of adding more independent variables.

The economic growth variables and its combination with log of GDP per capita (Growth + Growth*ln(GDPpc)) are added to the model as an attempt to test the Easterlin paradox. In the Fixed Effects Model, economic growth is highly significant and negatively affects happiness while the combination variable shows the opposite effect. However, in the other two models, when the social development variables are added in alternative order, economic growth loses its significance though the sign remain negative. Besides, the term of 'Growth + Growth*ln(GDPpc)' is not

statistically significant and its coefficients are relatively small. Such estimated coefficients for growth and its combination term have failed to provide any strong and consistent evidence supporting the argument of whether economic growth enhance or undermine the level of happiness.

Among five social development variables, in addition to the relatively small magnitude, gender equality shows no relation to happiness; its estimated coefficients are statistically insignificant and are not consistent in terms of sign across the three models. Meanwhile, I find that intergroup cohesion and inclusion of minorities have positive and strong effects on happiness only in the Pooled OLS Model. Their effects turn out to have no statistical meaning in the other two models and the magnitudes of these two variables notably drop, the sign of inclusion of minorities even change to negative in the Fixed Effects Models. So, gender equality, intergroup cohesion, and inclusion of minorities prove to have no stable relationship with happiness, which implies that when reporting their own level of life satisfaction, people appear to be not affected by the extent to which women obtain equal opportunities as men; nor the extent to which there is social cohesion between religious, ethnic, and linguistic groups, without raising any civil unrest or violence; nor the level of discrimination against vulnerable minorities.

Interpersonal safety and trust is significant in the Pooled OLS and Fixed Effects Models but not in the Random Effect Model. In the formers, this social development variable shows positive effect with big difference in the magnitude between the two models: 1.901 in Column 6 of Table 4.1; and 6.558 in Column 6 of Table 4.2. Therefore, I believe that the social cohesion between strangers does have some positive effects on happiness but not systematically and markedly strong in all cases.

Finally, clubs and associations variable has a positive and significant relation with happiness in the Pooled OLS and Random Effects Models but the opposite relationship in the Fixed Effects Model. In Column 4 of Table 4.3, an increase of one percentage point in the membership in local voluntary associations would increase happiness by 1.681 point. The coefficient for clubs and associations is almost unaffected in the full-length regressions in Column 9 and 10 of Table 4.3.

4.1.2 Happiness regressions with HDI

This section aims to ensure the consistency of the models using an alternative of GDP per capita – Human Development Index. Table 4.4 and 4.5 displays the regression results of the Fixed Effects and Random Effects Models where log of GDP per capita is replaced by Human Development Index while all other independent variables are held the same as previous section. As expected, similar to log GDP per capita, Human Development Index shows positive and significant effects on happiness through the Random Effects Model. It is noteworthy that coefficients for government expenditure are statistically insignificant in both models and remain very small in terms of magnitude. This result strengthens the findings in previous section that government expenditure has no direct effect on the level of happiness.

Other independent variables including unemployment, income inequality, and economic growth maintain their significance and sign: unemployment rate and economic growth have negative effect while income inequality has positive effect. Inflation, intergroup cohesion, gender equality, and inclusion of minorities are insignificant which is consistent with the prior results. Likewise, coefficients for the 'Growth + Growth*ln(GDPpc)' variable, clubs and associations, and interpersonal safety and trust are still positive but failed to be significant in both Fixed Effects and Random Effects Models which repeats the situation of these variables reported in Section 4.1.1.

By using a substitute of GDP per capita, I check the consistency and reliability of the model in this research. The similarity in terms of sign, magnitude, and significance of all the independent variables recommends that the model is appropriate and its results are relevant and stable. The next section takes one step further in the investigation of determinants of happiness by analyzing the factors that affect the changes in happiness. It is based on the idea that not only the level of happiness itself is important but also the dynamic movements of happiness.

Table 4.4 Happiness regressions with HDI – Fixed Effects model

Dependent variable: Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	5.032	5.601	6.160	6.613	6.064	2.379	5.616	7.436	3.994	3.155
Human Development Index	-1.283 (-0.19)	-1.161 (-0.19)	-2.245 (-0.38)	-2.459 (-0.41)	-2.245 (-0.38)	-0.661 (-0.12)	-1.875 (-0.30)	-2.524 (-0.42)	-0.866 (-0.15)	0.233 (0.04)
Government Expenditure (as percentage of GDP)	0.031 (1.09)	0.012 (0.41)	0.010 (0.34)	0.010 (0.33)	0.010 (0.36)	-0.006 (-0.22)	0.009 (0.32)	0.010 (0.31)	-0.007 (-0.27)	-0.007 (-0.28)
Unemployment	-0.035** (-2.47)	-0.056*** (-3.55)	-0.049*** (-3.23)	-0.048*** (-3.23)	-0.049*** (-3.25)	-0.048*** (-3.15)	-0.052*** (-3.47)	-0.045*** (-2.83)	-0.044*** (-2.97)	-0.050*** (-3.33)
Inflation	0.010 (0.90)	0.007 (0.68)	0.008 (0.80)	0.009 (0.84)	0.008 (0.80)	0.007 (0.76)	0.008 (0.76)	0.008 (0.79)	0.007 (0.76)	0.006 (0.62)
Inequality	0.039 (1.34)	0.040 (1.42)	0.045 (1.62)	0.047* (1.69)	0.045 (1.63)	0.035 (1.31)	0.043 (1.58)	0.046* (1.67)	0.037 (1.41)	0.032 (1.18)
Growth		-0.038*** (-3.14)	-0.207*** (-3.02)	-0.213*** (-3.16)	-0.207*** (-3.01)	-0.179** (-2.53)	-0.199*** (-2.71)	-0.211*** (-3.04)	-0.182** (-2.41)	-0.042*** (-3.58)
Growth + Growth*ln(GDPpc)			0.016** (2.46)	0.017** (2.60)	0.016** (2.46)	0.013* (1.95)	0.015** (2.15)	0.017** (2.48)	0.014* (1.84)	
Clubs and Associations				-0.789 (-0.56)					-0.936 (-0.63)	-0.760 (-0.51)
Intergroup Cohesion					0.160 (0.09)				-0.006 (0.000)	-0.136 (-0.07)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interpersonal Safety and Trust						6.131** (2.59)			6.101** (2.52)	6.466*** (2.73)
Gender Equality							0.559 (0.53)		0.636 (0.53)	0.782 (0.65)
Inclusion of Minorities								-2.315 (-0.88)	-3.033 (-1.14)	-3.023 (-1.14)
F-statistic	19.08	23.95	22.59	21.35	21.34	20.81	22.39	22.04	17.78	18.90
Observations	230	230	230	230	230	230	230	230	230	230
Number of groups	88	88	88	88	88	88	88	88	88	88

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.5 Happiness regressions with HDI – Random Effects model

Dependent variable: Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.164	0.780	0.930	-0.031	0.360	0.041	0.719	0.257	-1.121	-1.250
Human Development Index	6.671*** (11.2)	6.436*** (10.63)	6.248*** (10.14)	6.099*** (10.28)	5.813*** (8.06)	5.689*** (7.33)	6.094*** (9.64)	5.939*** (8.56)	5.343*** (6.63)	5.590*** (7.02)
Government Expenditure (as percentage of GDP)	0.008 (0.46)	-0.005 (-0.27)	-0.005 (-0.27)	-0.001 (-0.07)	-0.004 (-0.25)	-0.004 (-0.24)	-0.006 (-0.34)	-0.007 (-0.40)	-0.001 (-0.05)	-0.001 (-0.04)
Unemployment	-0.052*** (-5.71)	-0.062*** (-6.52)	-0.061*** (-6.29)	-0.057*** (-5.96)	-0.061*** (-6.14)	-0.062*** (-6.38)	-0.062*** (-6.4)	-0.061*** (-6.14)	-0.058*** (-5.85)	-0.060*** (-6.20)
Inflation	-0.000 (-0.02)	-0.000 (-0.06)	-0.000 (-0.01)	0.000 (0.04)	0.000 (0.00)	0.001 (0.16)	-0.001 (-0.09)	0.000 (0.03)	0.001 (0.11)	0.001 (0.07)
Inequality	0.037*** (4.18)	0.038*** (4.09)	0.037*** (4.01)	0.033*** (3.45)	0.038*** (4.02)	0.044*** (3.91)	0.037*** (4.04)	0.038*** (4.01)	0.039*** (3.38)	0.039*** (3.44)
Growth		-0.043*** (-4.06)	-0.134** (-1.98)	-0.150** (-2.24)	-0.136** (-2.00)	-0.150** (-2.13)	-0.128* (-1.80)	-0.143** (-2.08)	-0.160** (-2.17)	-0.043*** (-3.99)
Growth + Growth*ln(GDPpc)			0.009 (1.32)	0.010 (1.57)	0.009 (1.35)	0.010 (1.50)	0.008 (1.16)	0.010 (1.45)	0.011 (1.57)	
Clubs and Associations				2.215*** (2.94)					2.105*** (2.82)	2.051*** (2.77)
Intergroup Cohesion					1.498 (1.37)				1.227 (0.93)	1.203 (0.92)

	1	2	3	4	5	6	7	8	9	10
Interpersonal Safety and Trust							1.889 (1.47)		1.199 (0.91)	1.175 (0.89)
Gender Equality								0.523 (0.66)	0.152 (0.18)	0.268 (0.32)
Inclusion of Minorities								1.718 (1.27)	0.083 (0.05)	-0.093 (-0.06)
Wald chi-squared	379.33	533.60	552.25	570.47	554.54	552.05	561.68	567.77	618.35	613.46
Observations	230	230	230	230	230	230	230	230	230	230
Number of groups	88	88	88	88	88	88	88	88	88	88

Notes: The z-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

4.1.3 Regressions on the changes in happiness

Table 4.6 Changes in happiness regressions – Fixed Effects model

Dependent variable: Changes in Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	634.724	301.630	248.189	238.885	349.944	379.944	265.526	322.765	445.907	444.565
Ln(GDPpc)	-69.164* (-1.93)	-36.883 (-1.02)	-29.793 (-0.78)	-30.668 (-0.78)	-29.936 (-0.76)	-39.894 (-1.06)	-28.015 (-0.79)	-34.146 (-0.89)	-37.486 (-1.02)	-40.504 (-1.15)
Government Expenditure (as percentage of GDP)	1.120 (0.66)	0.810 (0.57)	0.524 (0.38)	0.620 (0.44)	0.021 (0.02)	0.670 (0.47)	0.868 (0.63)	0.732 (0.52)	0.828 (0.59)	0.828 (0.56)
Unemployment	-1.906** (-2.20)	-2.366** (-2.56)	-2.077** (-2.27)	-2.110** (-2.27)	-2.361** (-2.54)	-2.299** (-2.54)	-1.494 (-1.59)	-1.802* (-1.78)	-1.699 (-1.56)	-2.176** (-2.14)
Inflation	-0.204 (-0.49)	-0.447 (-1.30)	-0.485 (-1.52)	-0.525 (-1.58)	-0.493 (-1.48)	-0.442 (-1.43)	-0.433 (-1.48)	-0.434 (-1.36)	-0.434 (-1.39)	-0.449 (-1.27)
Inequality	0.605 (0.48)	1.514 (1.14)	1.268 (1.03)	0.852 (0.66)	1.105 (0.90)	1.405 (1.16)	1.262 (1.13)	1.204 (0.99)	0.679 (0.57)	0.751 (0.59)
Growth		-1.371*** (-3.06)	-7.891 (-1.53)	-6.228 (-1.12)	-6.620 (-1.33)	-9.370* (-1.89)	-11.530** (-2.06)	-8.473 (-1.58)	-9.700* (-1.70)	-1.149** (-2.50)
Growth + Growth*ln(GDPpc)			0.625 (1.30)	0.458 (0.88)	0.502 (1.09)	0.776* (1.67)	1.016* (1.90)	0.689 (1.37)	0.841 (1.53)	
Clubs and Associations				63.681** (2.28)					76.941** (2.46)	90.157*** (2.77)

	1	2	3	4	5	6	7	8	9	10
Intergroup Cohesion					-141.008* (-1.92)				-100.967 (-1.27)	-124.157* (-1.73)
Interpersonal Safety and Trust						-90.887 (-1.22)			-49.542 (-0.72)	-14.545 (-0.23)
Gender Equality							-57.437* (-1.90)		-56.054* (-1.71)	-35.696 (-1.27)
Inclusion of Minorities								-74.671 (-1.09)	-47.421 (-0.55)	-38.416 (-0.49)
F-statistic	16.75	19.18	24.10	24.35	18.69	20.55	22.31	20.35	18.32	13.18
Observations	134	134	134	134	134	134	134	134	134	134
Number of groups	78	78	78	78	78	78	78	78	78	78

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.7 Changes in happiness regressions – Random Effects model

Dependent variable: Changes in Happiness	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	20.336	29.940	48.658	55.843	63.396	53.010	58.919	57.647	75.345	55.072
Ln(GDPpc)	-0.788 (-0.34)	-1.809 (-0.89)	-3.219 (-1.57)	-2.573 (-1.26)	-1.731 (-0.74)	-1.780 (-0.85)	-2.722 (-1.30)	-2.356 (-1.12)	-0.224 (-0.10)	0.518 (0.22)
Government Expenditure (as percentage of GDP)	0.333 (0.82)	-0.002 (-0.00)	0.045 (0.14)	-0.005 (-0.02)	0.021 (0.06)	0.007 (0.02)	0.100 (0.29)	0.113 (0.35)	-0.026 (-0.08)	-0.122 (-0.36)
Unemployment	-0.387 (-1.32)	-0.714*** (-2.67)	-0.719*** (-2.84)	-0.847*** (-3.32)	-0.722*** (-3.13)	-0.669*** (-2.60)	-0.708*** (-2.74)	-0.720*** (-2.87)	-0.801*** (-3.25)	-0.836*** (-3.36)
Inflation	0.118 (0.55)	0.124 (0.65)	0.118 (0.62)	0.050 (0.27)	0.081 (0.48)	0.134 (0.76)	0.095 (0.51)	0.113 (0.66)	0.023 (0.14)	0.033 (0.21)
Inequality	-0.279 (-1.63)	-0.151 (-0.92)	-0.248 (-1.55)	-0.191 (-1.24)	-0.318** (-2.01)	-0.375** (-2.25)	-0.290* (-1.73)	-0.269* (-1.72)	-0.362** (-2.03)	-0.248 (-1.51)
Growth		-1.374*** (-3.99)	-11.003*** (-2.97)	-9.210** (-2.32)	-11.276*** (-3.02)	-10.440*** (-2.80)	-12.304*** (-3.27)	-10.805*** (-2.96)	-9.961** (-2.43)	-1.420*** (-4.17)
Growth + Growth*ln(GDPpc)			0.931*** (2.62)	0.764** (2.01)	0.945*** (2.63)	0.879** (2.46)	1.059*** (2.92)	0.902*** (2.57)	0.830** (2.11)	
Clubs and Associations				-27.401** (-2.47)					-25.397** (-2.15)	-30.877*** (-2.91)
Intergroup Cohesion				-43.731** (-2.00)					-36.282* (-1.71)	-37.925* (-1.80)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Interpersonal Safety and Trust						-28.898** (-2.16)			-20.139 (-1.27)	-20.603 (-1.35)
Gender Equality							-18.764 (-1.13)		-11.305 (-0.73)	11.141 (0.72)
Inclusion of Minorities								-36.634* (-1.80)	5.858 (0.28)	-2.768 (-0.12)
Wald chi-squared	72.69	100.22	129.17	153.86	131.93	134.93	144.90	130.66	182.18	146.71
Observations	134	134	134	134	134	134	134	134	134	134
Number of groups	78	78	78	78	78	78	78	78	78	78

Notes: The z-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.6 and 4.7 present the results obtained when regressing the changes in happiness on the set of independent variables using Fixed Effects and Random Effects Model, respectively. Due to the availability of happiness data, the changes in happiness, with 282 observations, is limited to the changes in happiness in two period: between 2009 and 2006, and between 2012 and 2009. The average change in happiness in the whole sample is about -3.2% whereas Zimbabwe has one period of largest improve in happiness for 71.4% while Tanzania accounts for the most decreasing period of changes in happiness when its happiness score declines by 56.4%. The Hausman test suggests that the Fixed Effects Model is preferred in this analysis (see Appendix 2).

In the relation with changes in happiness, log of GDP per capita show little importance. Its coefficient is significant at 10% only in Column 1 of Table 4.6, when economic growth and social development variables are added into the regressions; log of GDP per capita becomes insignificant. In Table 4.7 there is no significance for this variable. Such estimated results in both tables imply that GDP per capita might not be a key factor that could drive the dynamic changes in happiness.

The unemployment rate tends to affect the changes in happiness negatively. In Table 4.6, the coefficient for unemployment is significant at 5%, 10%, 12%, and 13% level and has negative sign. In Table 4.7, its coefficient is strongly significant in all columns except for Column 1, though the magnitude is quite small; the sign is consistent with the prior table. An increase in the unemployment rate of one percentage point decreases the changes in happiness by 1.8 to 2.4 percentage point, based on the results from the Fixed Effects Model.

As suggested by the regression results, government expenditure has no significant effect, in sum, on the changes in happiness in the long run. The coefficients for government expenditure and inflation are statistically insignificant in both tables. Besides, the coefficient for income inequality is also insignificant in the Fixed Effects Model with relatively small in size. Though being significant at 10% and 5% level in Column 5-9 of Table 4.7, its magnitude is very small and the sign is opposite to which in Table 4.6.

The similar situation is found in the case of interpersonal safety and trust, and inclusion of minorities: insignificant in Table 4.6 but have statistical meaning in Table 4.7 at 5% and 10% level, respectively. While gender equality is negatively related to the changes in happiness at 10% level of significance in Table 4.6, it is insignificant in Table 4.7. In sum, the assumptions that government expenditure, inflation, inequality, gender equality, inclusion of minorities, or interpersonal safety and trust affect the changes in happiness have been dismissed for lack of firmly evidence.

The coefficients for both intergroup cohesion and clubs and associations are significant in both models. However, while the negative effect of intergroup cohesion is consistent between the two models, the sign of the coefficient for clubs and associations change with the form of model that is used in analyzing. Hence, I believe that intergroup cohesion have negative effect on the changes in happiness while clubs and associations seems to have effect without a clear direction.

Economic growth has negative effect while its combination term (Growth + Growth*ln(GDPpc)) has positive effect in Column 6 and 7 of Table 4.6 and in all columns of Table 4.7. Therefore, economic growth tends to reduce the changes in happiness, but such effect is totally counter when GDP per capita reaches a certain level. According to Column 6 and 7 of Table 4.6, when GDP per capita is higher than a certain level such as 46630.028 USD (Column 6) or 36315.503 USD (Column 7), the negative effect of economic growth would disappear.

4.2 Findings and interpretation of the transmission channels model

To analyze the dependence of other explanatory variables on government expenditure, the OLS Model is used in the first step. Table 4.8 reports the basic regressions of changes in happiness on other independent variables using a sub-sample that covers 141 countries (see Appendix 5 for list of countries). I first start with the simplest model where log of GDP per capita and government expenditure are the only explanatory variables. Then more explanatory variables are gradually added in the next columns. In Column 1, the results point out that government expenditure has a strongly significant and positive effect on the changes in happiness. An increase of

one percentage point in government expenditure increases the changes in happiness by about 0.836 percentage point. Meanwhile, the coefficient for log of GDP per capita is highly significant and negative: an increase of 1% in GDP per capita decreases the changes in happiness by about $5.131*\ln(1.01)=0.051$ percentage point. In the next columns, unemployment, inflation, inequality, economic growth, and social development variables are included gradually. When more variables are added into the regressions, the coefficients for log of GDP per capita and government expenditure lose their significance but the signs maintain unchanged. Hence, increasing in GDP per capita appears to be an obstacle to the changes in happiness while government expenditure gives positive effects.

Table 4.9 displays the coefficients for log of GDP per capita and government expenditure in each channel regression following Equation (3). Due to small sample size, not all of these estimated coefficients are highly significant. As reported in Appendix 3, when running regressions using the largest possible sample size for each transmission channel, the level of significance is greatly improved in the regressions of unemployment, intergroup cohesion, and gender equality. Besides, the signs and magnitudes are robust against the sample size. Table 4.10 presents the relative importance of each transmission channel in the contribution to positive effect of government expenditure on changes in happiness.

As shown in Table 4.8, government expenditure, in the short run, has positively significant impact on the changes in happiness in some cases until inequality, economic growth, and social development are taken into account. Hence, in short term, government might be able to improve or worsen citizens' well-being through public spending while all other variables are held the same.

Table 4.8 Change in happiness (2009-2012) regressions – OLS

Dependent variable: Changes in Happiness (2009 – 2012)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	27.717	30.659	28.685	20.591	24.114	34.361	42.647	44.010	45.337	42.295
Ln(GDPpc)	-5.131*** (-5.31)	-5.286*** (-5.82)	-5.623*** (-5.97)	-2.644** (-2.22)	-2.730** (-2.28)	-2.370** (-2.07)	-1.746 (-1.32)	-1.495 (-1.09)	-1.036 (-0.69)	-0.682 (-0.45)
Government Expenditure (as percentage of GDP)	0.836*** (3.69)	1.171*** (5.18)	1.363*** (5.83)	0.577** (2.25)	0.470 (1.66)	0.431 (1.60)	0.403 (1.49)	0.405 (1.49)	0.462 (1.64)	0.457 (1.62)
Unemployment		-0.782*** (-4.34)	-0.703*** (-3.79)	-0.600*** (-3.04)	-0.667*** (-3.16)	-0.835*** (-3.99)	-0.836*** (-4.00)	-0.819*** (-3.86)	-0.815*** (-3.84)	-0.798*** (-3.76)
Inflation			0.216 (1.42)	-0.027 (-0.20)	-0.036 (-0.26)	-0.097 (-0.73)	-0.109 (-0.82)	-0.107 (-0.80)	-0.106 (-0.79)	-0.099 (-0.74)
Inequality				-0.255* (-1.98)	-0.244* (-1.88)	-0.222* (-1.80)	-0.267** (-2.02)	-0.307** (-2.12)	-0.319** (-2.18)	-0.365** (-2.42)
Growth					-0.319 (-0.91)	-0.398 (-1.19)	-0.435 (-1.29)	-0.421 (-1.24)	-0.369 (-1.06)	-0.115 (-0.28)
Clubs and Associations						-24.635*** (-2.78)	-24.776*** (-2.79)	-23.539** (-2.59)	-25.058*** (-2.69)	-27.380*** (-2.88)
Intergroup Cohesion							-17.033 (-0.95)	-15.303 (-0.84)	-9.920 (-0.51)	-17.292 (-0.85)
Interpersonal Safety and Trust								-8.966 (-0.68)	-9.904 (-0.75)	-20.639 (-1.28)

Gender Equality									-10.575 (-0.80)	-15.355 (-1.12)
Inclusion of Minorities										32.562 (1.17)
Adjusted R-squared	0.181	0.277	0.312	0.190	0.188	0.270	0.268	0.262	0.257	0.262
Observations	137	137	132	67	67	67	67	67	67	67

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.9 Indirect transmission channels

Dependent variable	Constant	Ln(GPDpc)	Government Expenditure (% of GDP)	Adjusted R-squared	Observations
Unemployment	0.428	0.417 (0.55)	0.234 (1.50)	0.060	67
Inflation	14.046	-0.475 (-0.43)	-0.275 (-1.21)	0.029	67
Inequality	58.827	-1.424 (-1.24)	-0.534** (-2.27)	0.192	67
Growth	12.578	-0.394 (-0.88)	-0.396*** (-4.34)	0.379	67
Clubs and Associations	0.391	0.013 (0.78)	-0.002 (-0.50)	-0.022	67
Intergroup Cohesion	0.289	0.041*** (4.91)	0.001 (0.47)	0.405	67
Interpersonal Safety and Trust	0.028	0.044*** (3.61)	0.002 (0.91)	0.306	67
Gender Equality	0.206	0.059*** (4.87)	0.005* (1.86)	0.497	67
Inclusion of Minorities	0.206	0.024*** (2.98)	0.004** (2.43)	0.375	67

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.10 Indirect effect regression

Dependent variable: Happiness	Coefficient
Constant	4.956
Ln(GDPpc)	-2.518** (-2.25)
Government Expenditure (as percentage of GDP)	0.580** (2.54)
$\mu_{Unemployment}$	-0.798*** (-3.76)
$\mu_{Inflation}$	-0.099 (-0.74)
$\mu_{Inequality}$	-0.365** (-2.42)
μ_{Growth}	-0.115 (-0.28)
$\mu_{Clubs\ and\ Associations}$	-27.380*** (-2.88)
$\mu_{Intergroup\ Cohesion}$	-17.292 (-0.85)
$\mu_{Interpersonal\ Safety\ and\ Trust}$	-20.639 (-1.28)
$\mu_{Gender\ Equality}$	-15.355 (-1.12)
$\mu_{Inclusion\ of\ Minorities}$	32.562 (1.17)
Adjusted R-squared	0.262
Observations	67

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Table 4.11 Relative importance of transmission channels

Transmission channels	α_3 (Table 4.8 – Column 10)	β_2 (Table 4.9)	Contribution to $\alpha_2 + \alpha_3\beta_2$	Relative contribution
Government Expenditure			0.457	78%
Unemployment	-0.798	0.234	-0.187	-32%
Inflation	-0.099	-0.275	0.027	5%
Inequality	-0.365	-0.534	0.195	33%
Growth	-0.115	-0.396	0.046	8%
Clubs and Associations	-27.380	-0.002	0.055	9%
Intergroup Cohesion	-17.292	0.001	-0.017	-3%
Interpersonal Safety and Trust	-20.639	0.002	-0.041	-7%
Gender Equality	-15.355	0.005	-0.077	-13%
Inclusion of Minorities	32.562	0.004	0.130	22%
Total			0.588	100%

According to Table 4.11, unemployment and inequality appear to be the two most important transmission channels. Notably, all the negative impact through unemployment is countered by the positive effect through inequality alone. Meanwhile, in the group of social development channels, the negative impacts through intergroup cohesion, interpersonal safety and trust, and gender equality are mostly counter by the positive channel of inclusion of minorities. The rest of the transmission channels, including

inflation, economic growth, and clubs and associations, account for about 22% of the positive impact of government expenditure on the changes in happiness, in short term. These heterogeneous transmission channels are, to some extent, remarkably important findings since they seem to encourage public spending while rising cautious on how the governments should spend their budget so that the citizens would be better-off in terms of happiness.

CHAPTER 5

CONCLUSION

This research aims to find empirical evidence of the relationship between government expenditure and happiness, in both direct and indirect ways. In order to provide robust and adequate analysis, this paper investigating the relationship not only in short term but also in long term, using different methodologies and models on both panel data and cross-sectional data. Besides, when analyzing the determinants of happiness, this research takes into account not only traditional macroeconomic determinants but also social development variables.

To investigate the direct effect of government expenditure on happiness, this research paper applies three methods of panel data analysis: Pooled OLS, Fixed Effects, and Random Effects, on a sample of 183 countries, in a period from 1990 to 2016 (happiness data is available only in 1990, 1995, 2000, 2006, 2009, 2012, and 2016). All data used in this study is secondary data, obtained from different sources, including Gallup World Poll (happiness), World Bank's World Development Indicators (macroeconomic variables), and Indices of Social Development database (social development variables). Regression results of the direct effect model provide no consistent and significant evidence, in long term, of the direct effects of government expenditure on the level of happiness as well as the changes in happiness. In order to test for robustness, I replace log of GDP per capita by the Human Development Index and find the majority of results remain almost the same. Besides, direct effect model's results suggest that unemployment and economic growth lower subjective well-being while inequality and social development (dimension of clubs and associations only) improve happiness.

Furthermore, this study analyzes the transmission channels, through which government expenditure affects happiness indirectly, and their relative importance. A cross-sectional analysis implies that, in short term, government expenditure tends to have positive effect on the changes in happiness. In addition, results of indirect regressions indicate that there is heterogeneity among transmission channels in terms of sign and contribution to the total effect. Given such important findings, one would

expect that larger government expenditure is good for improving happiness but only in the short run and the transmission channels through which public spending could affect happiness might somewhat be as much important as the amount of spending itself.

Finally, it is indisputable that empirical analysis on happiness usually suffers data limitation problems. Given the fact that data in this research comes from different sources, of which, the availability of data appears in different years. For example, I have to use the 2005 values of social development in the regressions of the 2006 values of happiness, and do the same for social development in 2010 and happiness in 2012. Hence, although considering a relatively long period and covering a large number of countries, the actual observations that can be used in the empirical analysis remain relatively small, comparing with the potentially full sample size. Therefore, I need to acknowledge that data limitations might, to some extent, hinder the accuracy of the empirical findings. I expect that further research on this topic would be able to address the problems of data availability. Besides, the extension of this study could be investigating different period of time, grouping countries into sub-sample based on countries' characteristics, using different measures of happiness, as well as taking into account different explanatory variables and transmission channels. These extensions would provide a more accurate and insightful picture about the relationship between government expenditure and happiness.

References

Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: are Europeans and Americans different? *Journal of Public Economics, 88*(9), 2009-2042.

Alesina, A., & Glaeser, E. L. (2004). *Fighting poverty in the US and Europe: A world of difference*: Oxford University Press.

Alesina, A., & La Ferrara, E. (2005). Preferences for redistribution in the land of opportunities. *Journal of Public Economics, 89*(5), 897-931.

Belasen, A. R., & Hafer, R. W. (2012). Well-being and economic freedom: Evidence from the states. *Intelligence, 40*(3), 306-316.

Belasen, A. R., & Hafer, R. W. (2013). Do changes in economic freedom affect well-being? *Journal of Regional Analysis & Policy, 43*(1), 56.

Bjørnskov, C., Dreher, A., & Fischer, J. A. (2007). The bigger the better? Evidence of the effect of government size on life satisfaction around the world. *Public Choice, 130*(3-4), 267-292.

Blanchflower, D. G., & Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics, 88*(7), 1359-1386.

Blanchflower, D. G., & Oswald, A. J. (2008). Is well-being U-shaped over the life cycle? *Social science & medicine, 66*(8), 1733-1749.

Clark, A. E. (2003). Inequality-Aversion and Income Mobility: A Direct Test.

Deaton, A. (2005). Measuring poverty in a growing world (or measuring growth in a poor world). *Review of Economics and Statistics, 87*(1), 1-19.

Di Tella, R., & MacCulloch, R. (2006). Some uses of happiness data in economics. *The Journal of Economic Perspectives, 20*(1), 25-46.

Di Tella, R., MacCulloch, R. J., & Oswald, A. J. (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *The American economic review, 91*(1), 335-341.

Di Tella, R., MacCulloch, R. J., & Oswald, A. J. (2003). The macroeconomics of happiness. *Review of Economics and Statistics, 85*(4), 809-827.

Diener, E., & Oishi, S. (2000). Money and happiness: Income and subjective well-being across nations. *Culture and subjective well-being*, 185-218.

Dorn, D., Fischer, J. A., Kirchgässner, G., & Sousa-Poza, A. (2007). Is it culture or democracy? The impact of democracy and culture on happiness. *Social Indicators Research, 82*(3), 505-526.

Easterlin, R. A. (1974). Does economic growth improve the human lot? Some empirical evidence. *Nations and households in economic growth, 89*, 89-125.

Easterlin, R. A. (1995). Will raising the incomes of all increase the happiness of all? *Journal of Economic Behavior & Organization, 27*(1), 35-47.

Easterlin, R. A. (2001). Income and happiness: Towards a unified theory. *The Economic Journal, 111*(473), 465-484.

Frey, B. S. (2008). Happiness: A revolution in economics. *MIT Press Books, 1*.

Frey, B. S., & Stutzer, A. (2000). Happiness, economy and institutions. *The Economic Journal, 110*(466), 918-938.

Frey, B. S., & Stutzer, A. (2010). *Happiness and economics: how the economy and institutions affect human well-being*: Princeton University Press.

Frijters, P., Geishecker, I., Haisken-DeNew, J. P., & Shields, M. A. (2006). Can the large swings in Russian life satisfaction be explained by ups and downs in real incomes? *The Scandinavian Journal of Economics, 108*(3), 433-458.

Frijters, P., Haisken-DeNew, J. P., & Shields, M. A. (2004). Money does matter! Evidence from increasing real income and life satisfaction in East Germany following reunification. *The American economic review, 94*(3), 730-740.

Helliwell, J. F. (2003). How's life? Combining individual and national variables to explain subjective well-being. *Economic Modelling, 20*(2), 331-360.

Jackson, J. (2016). Free to Be Happy: Economic Freedom and Happiness in US States. *Journal of Happiness Studies*, 1-23.

Kenny, C. (1999). Does growth cause happiness, or does happiness cause growth? *Kyklos, 52*(1), 3-25.

Kim, S., & Kim, D. (2012). Does government make people happy?: Exploring new research directions for government's roles in happiness. *Journal of Happiness Studies, 13*(5), 875-899.

Knight, J., Lina, S., & Gunatilaka, R. (2009). Subjective well-being and its determinants in rural China. *China economic review, 20*(4), 635-649.

Kotakorpi, K., & Laamanen, J. P. (2010). Welfare state and life satisfaction: Evidence from public health care. *Economica, 77*(307), 565-583.

Lane, R. E. (1994). The road not taken: Friendship, consumerism, and happiness. *Critical Review, 8*(4), 521-554.

Lane, R. E. (2000). *The Loss of Happiness in Market Democracies*: Yale University Press.

Layard, R. (2005). *Happiness: Lessons from a New Science*: Penguin Press.

Malešević Perović, L. (2009). Subjective economic well-being in transition countries: investigating the relative importance of macroeconomic variables. *Financial theory and practice, 32*(4), 519-537.

Midgley, J. (1995). *Social development: The developmental perspective in social welfare*: Sage.

Mookerjee, R., & Beron, K. (2005). Gender, religion and happiness. *The Journal of Socio-Economics, 34*(5), 674-685.

Musgrave, R. A. (1959). Theory of public finance; a study in public economy.

Myers, D. G. (2000). The funds, friends, and faith of happy people. *American psychologist, 55*(1), 56.

Ohtake, F., & Tomioka, J. (2004). Who supports redistribution? *The Japanese Economic Review, 55*(4), 333-354.

Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological science, 22*(9), 1095-1100.

Oswald, A. J. (1997). Happiness and economic performance. *The Economic Journal, 107*(445), 1815-1831.

Ott, J. (2005). Level and inequality of happiness in nations: Does greater happiness of a greater number imply greater inequality in happiness? *Journal of Happiness Studies, 6*(4), 397-420.

Ott, J. (2015). Impact of size and quality of governments on happiness: Financial insecurity as a key-problem in market-democracies. *Journal of Happiness Studies, 16*(6), 1639-1647.

Papyrakis, E., & Gerlagh, R. (2004). The resource curse hypothesis and its transmission channels. *Journal of Comparative Economics, 32*(1), 181-193.

Papyrakis, E., & Gerlagh, R. (2007). Resource abundance and economic growth in the United States. *European Economic Review, 51*(4), 1011-1039.

Pellegrini, L., & Gerlagh, R. (2004). Corruption's effect on growth and its transmission channels. *Kyklos, 57*(3), 429-456.

Perovic, L. M., & Golem, S. (2010). Investigating macroeconomic determinants of happiness in transition countries: How important is government expenditure? *Eastern European Economics, 48*(4), 59-75.

Pesta, B. J., McDaniel, M. A., & Bertsch, S. (2010). Toward an index of well-being for the fifty US states. *Intelligence, 38*(1), 160-168.

Radcliff, B. (2013). *The political economy of human happiness: how voters' choices determine the quality of life*: Cambridge University Press.

Ram, R. (2009). Government spending and happiness of the population: additional evidence from large cross-country samples. *Public Choice, 138*(3-4), 483-490.

Rehdanz, K., & Maddison, D. (2005). Climate and happiness. *Ecological Economics, 52*(1), 111-125.

Ruprah, I. J., & Luengas, P. (2011). Monetary policy and happiness: Preferences over inflation and unemployment in Latin America. *The Journal of Socio-Economics, 40*(1), 59-66.

Scitovsky, T. (1976). *The joyless economy: an inquiry into human satisfaction and consumer dissatisfaction*: Oxford University Press.

Scully, G. W. (2001). Government expenditure and quality of life. *Public Choice, 108*(1-2), 123-145.

Stevenson, B., & Wolfers, J. (2008). Economic growth and subjective well-being: reassessing the Easterlin paradox: National Bureau of Economic Research.

Tomes, N. (1986). Income distribution, happiness and satisfaction: A direct test of the interdependent preferences model. *Journal of Economic Psychology, 7*(4), 425-446.

Veenhoven, R. (2012). Social development and happiness in nations.

Weimann, J., Knabe, A., & Schöb, R. (2015). *Measuring happiness: The economics of well-being*: Mit Press.

Welsch, H. (2006). Environment and happiness: Valuation of air pollution using life satisfaction data. *Ecological Economics, 58*(4), 801-813.

Wolfers, J. (2003). Is business cycle volatility costly? Evidence from surveys of subjective well-being. *International finance, 6*(1), 1-26.

Appendix 1

Breusch-Pagan Lagrange multiplier test result

```
. quietly xtreg Happiness LnGDPpc GovExp Unemployment Inflation Inequality Growth i.Year, re

. xttest0

Breusch and Pagan Lagrangian multiplier test for random effects

        Happiness[Nation,t] = Xb + u[Nation] + e[Nation,t]

        Estimated results:
                              Var        sd = sqrt(Var)
                       ─────────────────────────────────
            Happiness │    1.413215          1.188787
                    e │    .1876681          .4332067
                    u │    .3933946          .6272117

        Test:   Var(u) = 0
                            chibar2(01) =     80.78
                          Prob > chibar2 =    0.0000
```

Hausman test result (Happiness regressions)

```
. quietly xtreg Happiness LnGDPpc GovExp Unemployment Inflation Inequality Growth i.Year, fe

. estimates store fixed

. quietly xtreg Happiness LnGDPpc GovExp Unemployment Inflation Inequality Growth i.Year, re

. estimates store random

. hausman fixed random
```

| | —— Coefficients —— | | | |
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	fixed	random	Difference	S.E.
LnGDPpc	.6358399	.8453409	-.2095011	.5186986
GovExp	.0186794	-.010692	.0293714	.0212524
Unemployment	-.041183	-.0572518	.0160688	.0175182
Inflation	.0105508	.0001566	.0103942	.0043052
Inequality	.0349247	.0286303	.0062945	.019131
Growth	-.0353075	-.0452349	.0099274	.0060571
Year				
2005	.4710144	.2947871	.1762274	.1707999
2006	-.0660077	-.2347638	.1687561	.2134579
2009	-.0233256	-.3018519	.2785263	.2834694
2012	-.5198696	-.7709841	.2511145	.3596653

```
                 b = consistent under Ho and Ha; obtained from xtreg
        B = inconsistent under Ha, efficient under Ho; obtained from xtreg

   Test:  Ho:  difference in coefficients not systematic

            chi2(10) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                     =        12.26
            Prob>chi2 =      0.2682
            (V_b-V_B is not positive definite)

.
```

Appendix 2

Hausman test result (Changes in Happiness regressions)

```
. quietly xtreg DHappiness LnGDPpc GovExp Unemployment Inflation Inequality Growth i.Year, fe

. estimates store fixed

. quietly xtreg DHappiness LnGDPpc GovExp Unemployment Inflation Inequality Growth i.Year, re

. estimates store random

. hausman fixed random
```

| | —— Coefficients —— | | | |
| | (b) | (B) | (b-B) | sqrt(diag(V_b-V_B)) |
	fixed	random	Difference	S.E.
LnGDPpc	-36.88269	-1.808591	-35.07409	41.32338
GovExp	.8095464	-.0017136	.81126	1.277187
Unemployment	-2.365956	-.7143736	-1.651582	1.039263
Inflation	-.4467341	.1241001	-.5708342	.2534565
Inequality	1.513595	-.1506338	1.664228	1.151056
Growth	-1.37077	-1.37419	.0034198	.4195309
Year				
2012	-2.192301	-8.570025	6.377724	5.270261

```
                    b = consistent under Ho and Ha; obtained from xtreg
          B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

            chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                    =        23.62
            Prob>chi2 =      0.0013
```

.

Appendix 3

Indirect transmission channels with full large sample

Dependent variable	Constant	Ln(GPDpc)	Government Expenditure	Adjusted R-squared	Observations
Unemployment	7.086	-0.081 (-0.20)	0.170** (2.45)	0.024	166
Inflation	19.439	-1.366*** (-3.29)	-0.074 -1.07	0.064	165
Inequality	59.267	-1.491 (-1.35)	-0.523** (-2.33)	0.194	70
Growth	15.719	-1.209*** (-5.46)	-0.067* (-1.83)	0.167	171
Clubs and Associations	0.541	-0.001 (-0.17)	-0.002 (-1.37)	0.000	169
Intergroup Cohesion	0.329	0.033*** (5.99)	0.002** (2.56)	0.208	171
Interpersonal Safety and Trust	0.034	0.045*** (7.78)	0.001 (1.12)	0.272	169
Gender Equality	0.135	0.060*** (7.66)	0.004*** (2.71)	0.291	171
Inclusion of Minorities	0.231	0.024*** (5.98)	0.001* (1.92)	0.194	170

Notes: The t-statistics for the coefficients are in parentheses.
* 10% level of significance.
** 5% level of significance.
*** 1% level of significance.

Appendix 4

List of countries (full sample)

Afghanistan	Belarus	Costa Rica
Angola	Belize	Cuba
Albania	Bolivia	Cyprus
United Arab Emirates	Brazil	Czech Republic
Argentina	Barbados	Germany
Armenia	Brunei Darussalam	Djibouti
Antigua and Barbuda	Bhutan	Dominica
Australia	Botswana	Denmark
Austria	Central African Republic	Dominican Republic
Azerbaijan	Canada	Algeria
Burundi	Switzerland	Ecuador
Belgium	Chile	Egypt, Arab Rep.
Benin	China	Eritrea
Burkina Faso	Cote d'Ivoire	Spain
Bangladesh	Cameroon	Estonia
Bulgaria	Congo, Dem. Rep.	Ethiopia
Bahrain	Congo, Rep.	Finland
Bahamas, The	Colombia	Fiji
Bosnia and Herzegovina	Comoros	France
	Cabo Verde	Gabon
		United Kingdom

Georgia	Jamaica	Maldives
Ghana	Jordan	Mexico
Guinea	Japan	Macedonia, FYR
Gambia, The	Kazakhstan	Mali
Guinea-Bissau	Kenya	Malta
Equatorial Guinea	Kyrgyz Republic	Myanmar
Greece	Cambodia	Montenegro
Grenada	St. Kitts and Nevis	Mongolia
Guatemala	Korea, Rep.	Mozambique
Guyana	Kuwait	Mauritania
Hong Kong SAR, China	Lao PDR	Mauritius
Honduras	Lebanon	Malawi
Croatia	Liberia	Malaysia
Haiti	Libya	Namibia
Hungary	St. Lucia	Niger
Indonesia	Sri Lanka	Nigeria
India	Lesotho	Nicaragua
Ireland	Lithuania	Netherlands
Iran, Islamic Rep.	Luxembourg	Norway
Iraq	Latvia	Nepal
Iceland	Morocco	New Zealand
Israel	Moldova	Oman
Italy	Madagascar	Pakistan

Panama

Peru

Philippines

Papua New Guinea

Poland

Korea, Dem. People's Rep.

Portugal

Paraguay

West Bank and Gaza

Qatar

Romania

Russian Federation

Rwanda

Saudi Arabia

Sudan

Senegal

Singapore

Solomon Islands

Sierra Leone

El Salvador

Serbia

Sao Tome and Principe

Suriname

Slovak Republic

Slovenia

Sweden

Swaziland

Seychelles

Syrian Arab Republic

Chad

Togo

Thailand

Tajikistan

Turkmenistan

Timor-Leste

Tonga

Trinidad and Tobago

Tunisia

Turkey

Tanzania

Uganda

Ukraine

Uruguay

United States

Uzbekistan

St. Vincent and the Grenadines

Venezuela, RB

Vietnam

Vanuatu

Samoa

Yemen, Rep.

South Africa

Zambia

Zimbabwe

Appendix 5

List of countries (sub-sample used in Section 4.2)

Angola	Central African Republic	Spain
Albania	Canada	Estonia
United Arab Emirates	Switzerland	Ethiopia
Argentina	Chile	Finland
Armenia	China	France
Australia	Cameroon	United Kingdom
Austria	Congo, Dem. Rep.	Georgia
Azerbaijan	Congo, Rep.	Ghana
Burundi	Colombia	Guinea
Belgium	Costa Rica	Greece
Benin	Cuba	Guatemala
Burkina Faso	Cyprus	Guyana
Bangladesh	Czech Republic	Hong Kong SAR, China
Bulgaria	Germany	Honduras
Bosnia and Herzegovina	Djibouti	Croatia
Belarus	Denmark	Haiti
Belize	Dominican Republic	Hungary
Bolivia	Algeria	Indonesia
Brazil	Ecuador	India
Botswana	Egypt, Arab Rep.	Ireland

Iran, Islamic Rep.	Macedonia, FYR	Paraguay
Iraq	Mali	West Bank and Gaza
Iceland	Malta	
Israel	Mongolia	Romania
Italy	Mozambique	Russian Federation
Jamaica	Mauritania	Rwanda
Jordan	Malawi	Saudi Arabia
Japan	Malaysia	Sudan
Kazakhstan	Namibia	Senegal
Kenya	Niger	Singapore
Kyrgyz Republic	Nigeria	Sierra Leone
Cambodia	Nicaragua	El Salvador
Kuwait	Netherlands	Serbia
Lao PDR	Norway	Slovak Republic
Lebanon	Nepal	Slovenia
Sri Lanka	New Zealand	Sweden
Lithuania	Pakistan	Syrian Arab Republic
Luxembourg	Panama	
Latvia	Peru	Chad
Morocco	Philippines	Togo
Moldova	Poland	Thailand
Madagascar	Korea, Dem. People's Rep.	Tajikistan
Mexico		Trinidad and Tobago
	Portugal	

Tunisia	Uruguay	Yemen, Rep.
Turkey	United States	South Africa
Tanzania	Uzbekistan	Zambia
Uganda	Venezuela, RB	Zimbabwe
Ukraine	Vietnam	