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GENERAL & APPLIED ECONOMICS | RESEARCH ARTICLE

Contradictory effects of religiosity on subjective well-being

Ayse Y. Evrensel^{1*}

Abstract: This article provides empirical evidence for the contradictory effects of religiosity on subjective well-being (SWB). While a number of empirical studies demonstrate that higher religiosity is associated with higher happiness at the level of the individual, the published lists of happiest countries indicate that these countries are not religious. In this article, the empirical analysis is conducted at the level of the individual using a respondent-based dataset with 347,947 subjects in 96 countries as well as at the level of the country using a cross-section dataset including the same 96 countries. The empirical results at the respondent level indicate that happier people are likely to be female, younger, and healthier with higher social status and a stronger sense of control over their lives. Additionally, higher religiosity is associated with higher levels of SWB. At the country level, while religiosity tends to lose its statistical significance or negatively affect SWB, institutional quality emerges as a positive covariate of SWB. However, the country-level results are sensitive to alternative measures of SWB and religiosity.

Subjects: Development Studies; Culture & Development; Development Economics

Keywords: subjective well-being; happiness; religiosity; institutional quality

JEL Classification: D03; I30; Z12



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PUBLIC INTEREST STATEMENT

Subjective well-being or happiness may seem a rather personal subject that could be of interest to mental health professionals. Often Economics is perceived to be all about national income, unemployment, inflation, etc. However, a movement toward the collection of social indicators started in the 1970s in the advanced European countries based on the belief that democracies should pay attention to the well-being of their citizens. This perspective implies that policy makers should consider policy options using the benchmark of whether a certain policy will increase people's satisfaction with their lives. Against this background, this article examines the issue of subjective well-being and tries to juxtapose religiosity and institutional quality with respect to their effects on subjective well-being. The results indicate that while religiosity contributes to subjective well-being at the respondent-level, it is not effective in raising a country's average subjective well-being. By lowering corruption and increasing government effectiveness policy makers may be able to increase countries' subjective well-being.

1. Introduction

Subjective well-being (SWB) is quite important in social sciences, because especially in democracies policy makers should understand the reasons for personal as well as the socioeconomic sources of their citizens' contentment. Such an understanding would help policy makers to design and implement policies that are desired by their public (Frey & Stutzer, 2012). This article's premise stems from the seemingly contradictory results regarding the effects of religiosity on SWB at the level of the individual and the country. The majority of the empirical studies indicate that religiosity has a positive association with SWB at the level of the individual (Binswanger, 2006; Chen, 2010; Dehejia, DeLeire, & Luttmer, 2007; Di Tella, Haikens-De New, & MacCulloch, 2010; Dolan, Peasgood, & White, 2008; Eichhorn, 2012; Okulicz-Kozaryn, 2010; Popova, 2014). However, when the media publishes the list of the happiest countries, usually the top positions are taken by the Scandinavian or the Western European countries (Coy, 2015; Rayman, 2015). The source of these media reports is the World Happiness Report published by the Sustainable Development Solutions Network for the United Nations and the 2016 report ranks the top-10 happiest countries as (from the top): Denmark, Switzerland, Iceland, Norway, Poland, Canada, Netherlands, New Zealand, Australia, and Sweden (Helliwell, Layard, & Sachs, 2013).

This article addresses the apparent contradiction regarding the effects of religiosity on SWB by conducting an empirical analysis both at the level of the individual and the country. The respondent-based analysis uses the World Values Survey where responses of 347,947 subjects in 96 countries are recorded. The cross-section dataset includes the same 96 countries with the means of SWB and religiosity measures as well as the country level institutional quality-related variables. This article's main contribution to the existing literature is its attempt to juxtapose the respondent- and country-level results and demonstrate the diminishing relevance of religiosity for SWB from the respondent- to the country-level analysis. Second, alternative definitions of the relevant variables are used for robustness check. For example, the estimations use three alternative definitions of SWB, two alternative specifications of religiosity and six institutional quality-related explanatory variables. It turns out that alternative survey measures of religiosity and especially SWB may have a different connotation. Third, the article addresses the possibility of religiosity being endogenous.

The respondent-level results confirm those of the existing empirical studies in that female, younger, and healthier people in a relationship and of higher social status are happier. Feeling of having control over one's life emerges as an important covariate having the strongest effect on SWB. Higher religiosity is also positively associated with SWB. At the country-level, however, the relevance of religiosity weakens in most of the estimations or completely disappears or its effect on SWB becomes negative. Additionally, the country-level estimations include institutional quality-related variables such as corruption control, executive constraints, economic freedom, government effectiveness, regulatory quality and rule of law, some of which emerge as positive covariates of SWB. The article also provides the ranking statistics associated with the sample countries and shows that countries with higher religiosity and lower institutional quality are generally lower in SWB rankings.

The rest of the article is organized as follows. Section 2 provides a discussion on SWB and its covariates including religiosity to establish the research questions that guide the methodology and the empirical analysis of this article. Section 3 introduces the methodology of the article where the literature reviewed in Section 2 is used to identify the relevant variables and determine the empirical approach to the respondent- and country-level analysis. Sections 4 and 5 provide the results of the respondent- and country-level empirical analysis, respectively. Section 6 concludes the article.

2. Respondent- and country-level covariates of SWB

SWB is defined in a variety of ways. It can imply happiness as having a momentarily positive cognitive judgment about one's life (Inoguchi, 2007). Others state that all happiness related terms (SWB, life satisfaction or happiness) describe the degree to which an individual positively evaluates

the overall quality of her life (Blanchflower & Oswald, 2004; Frey & Stutzer, 2002; Hayo, 2007; Veenhoven, 2000). Most data about SWB are gathered through interviews with subjects, where respondents are likely to incorporate in their reply negative or positive events around the survey day, which would taint their answers regarding SWB. Additionally, social appearance and ego protection may reduce the validity of self-reports (Diener & Suh, 2000; Frey & Stutzer, 2002; Veenhoven, 2000). Other issues associated with the definition of SWB-related terms are addressed in Kahneman et al. (1999), Diener and Suh (2000), Frey and Stutzer (2002), Di Tella and MacCulloch (2006) and White (2013). Despite the diverse SWB terminology and possible issues associated with the survey setting, most empirical research uses SWB as an umbrella term for happiness. When there are issues with the meaning and the content of a concept, it is prudent to use alternative specifications of the concept. As the next section shows, this article uses three different measures of SWB to check the robustness of the results to alternative definitions of SWB.

There is a consensus in terms of the covariates of SWB. Dolan et al. (2008) provides a comprehensive survey of the determinants of SWB. At the level of the respondent, higher relative income and socioeconomic status are positively associated with SWB (Easterlin, 1995; Frey & Stutzer, 2002; Hayo, 2007; Verme, 2009). Higher levels of education also tend to be positively associated with SWB (Hayo, 2007). SWB seems to be nonlinearly associated with age, where it decreases until 50s and slightly increases afterwards (Easterlin, 2006; Hayo, 2007; Verme, 2009). Being in a steady relationship or married is positively associated with SWB (Frey & Stutzer, 2012). There is a strong positive relationship between SWB and health (Dolan et al., 2008). Sometimes the individual-level variables are integrated into an index, as in the case of Good Life Index (GLI) proposed by Delhey and Steckermeier (2016). Their GLI is based on seven components of life in different domains where health and financial security are among the domains.

Based on the survey of over 100 research articles, Okulicz-Kozaryn (2010) finds that about 70% of the empirical research indicates a positive relationship between religiosity and SWB. The positive nature of the relationship is explained based on the ability of religiosity helping people to cope with life's challenges and remain positive in difficult times (Binswanger, 2006; Di Tella et al., 2010; Dolan et al., 2008; Eichhorn, 2012; Verme, 2009). In fact, the positive contribution of religiosity to SWB remains intact for different religious affiliations (Cohen, 2002; Ferris, 2002). There are interesting extensions of the basic function of religiosity in dealing with life's challenges. One line of research examines the effects of religiosity on SWB during political and economic transition (Hayo, 2007; Popova, 2014). Another line of research implies that not only spirituality but also religious organizations' provision of necessities in economic crises improves SWB (Chen, 2010; Dehejia et al., 2007). In addition to religiosity, other cultural characteristics at the level of the individual are added as covariates of SWB. Conzo, Aassve, Fuochi, and Mencarini (2017), for example, uses self-determination or control over one's life and observes that the lack of it is detrimental to SWB.

At the country level, macroeconomic variables such as growth and inflation rates as well as social and political factors such as democracy, economic freedom, the structure and the scope of government, gender equality, etc. are among the factors that are associated with SWB (Lane, 2000; Blanchflower and Oswald, 2004). Higher growth rates, higher income equality and lower inflation rates as well as economic freedom and democracy tend to be positively associated with SWB (Veenhoven, 2000; Di Tella, MacCulloch, & Oswald, 2003; Bjørnskov et al., 2010). However, a recent study using a dataset with 68 developed and developing countries finds that while income equality increases SWB in developing countries, it has no effect on SWB in developed countries (Kelley & Evans, 2017). Additionally, existing studies suggest that SWB is not just a function of income at a point in time. While the relationship between SWB and income is positive, the SWB increases with income at a higher rate in lower-income countries and at a lower rate in higher-income countries (Di Tella & MacCulloch, 2006; Frey & Stutzer, 2002; Gasper, 2005; Inglehart & Welzel, 2005; Ovaska & Takashima, 2006; Veenhoven, 2000).

Among the institutional quality-related variables, economic freedom is the most frequently used variable. It is positively correlated with SWB, because economic freedom provides a larger set of economic opportunities to people (Inglehart, Foa, Peterson, & Welzel, 2008; Ovaska & Takashima, 2006; Stroup, 2007; Veenhoven, 2000; Verme, 2009). Other research shows that economic freedom affects SWB via income, where greater economic freedom is causally prior to income (Welsch, 2003). Given the expected positive relationship between income and economic freedom, Gropper, Lawson, and Thorne (2011) find that the inclusion of both GDP per capita and economic freedom diminishes their effects on SWB especially in developed countries. In less developed countries, however, both GDP per capita and economic freedom have explanatory power for SWB. Also, considering the fall of the socialist regimes in the former Soviet Union as well as in Central and Eastern Europe, Nikolova (2016) examines the SWB gap between post-socialist and advanced countries and find that both macroeconomic factors and the rule of law explain the SWB differential between the advanced and transition societies.

3. Methodology

As mentioned in Introduction, this article's main question is whether religiosity contributes to happiness at the level of the individual and, if it does, whether its effect on SWB remains intact at the country level. The motivation for this research question lies in the possibly contradictory role of religiosity for SWB in that despite the well-known positive effect of religiosity on SWB at the respondent level, the published rankings of happiest countries do not seem to confirm the relevance of religiosity at the country level. Because the article's premise requires an empirical analysis both at the respondent- and country-level, which involves different datasets as well as different estimation techniques, this section is divided into the respondent- and country-level methodology.

3.1. Methodology: respondent-level

The article utilizes two alternative measures of SWB as dependent variables: *feeling of happiness* (hereafter, *happiness*) and *satisfaction with life* (hereafter, *life satisfaction*). The reason is that alternative measures of SWB may have a different connotation in an interview situation. While feeling of happiness may have the undertone of being happy momentarily, satisfaction with life may be interpreted as a condition that transcends the moment. Therefore, having alternative measures of SWB would help to examine whether the explanatory variables are associated in a similar fashion with these measures. In terms of the explanatory variables, this article uses similar control variables to the existing research such as respondents' *gender*, *age*, *marital status*, *social class*, and *subjective health*. Age is often included in estimations as age square to account for the quadratic effect of age on SWB. Considering the fact that this study focuses on the religiosity-SWB relationship, it uses two alternative religiosity-related variables which measure the extent of religious devotion: *religious person* and *relevance of religion in life*.

Finally, the last explanatory variable, *freedom of choice and control over life* (hereafter, *freedom*) measures the extent of one's perceived control over life decisions. The Self Determination Theory (SDT) that was developed by Deci and Ryan (2000) states that SWB stems from three basic psychological needs, namely autonomy, relatedness, and competence. Conzo et al. (2017) empirically verifies the basic tenants of the SDT using a dataset of 30 European countries. This article focuses on the autonomy aspect of the SDT because of its focus on religiosity. Autonomy can be defined as one's ability to behave and experience life according to one's interests and beliefs. Religiosity, on the other hand, may interfere with autonomy or freedom. However, it is an empirical question whether both freedom and religiosity contribute to SWB.

The respondent-level analysis utilizes five waves of the World Values Survey (WVS): Wave 2 (1990–1994), Wave 3 (1995–1998), Wave 4 (1999–2004), Wave 5 (2005–2009), and Wave 6 (2010–2014) (Inglehart et al., 2014). The dataset includes 347,947 respondents in 96 countries. Table 1 list the sample countries and the waves in which they are included. The names and the response categories of the WVS variables are provided in Table 2. In all the mentioned variables, higher values indicate higher representation of the characteristic in question.

Table 1. Sample countries and the world values survey (WVS) waves

Albania (4)	Estonia (3, 6)	Lithuania (3)	Slovenia (3, 6)
Algeria (4)	Ethiopia (5)	Macedonia (3, 5)	S. Africa (all 5 waves)
Argentina (all 5 waves)	Finland (3, 5)	Malaysia (5, 6)	S. Korea (all 5 waves)
Armenia (3)	France (5)	Mali (5)	Spain (all 5 waves)
Australia (3, 6)	Georgia (3, 5, 6)	Mexico (all 5 waves)	Sweden (3, 4, 5, 6)
Azerbaijan (3, 6)	Germany (3, 5, 6)	Moldova (3, 4, 5)	Switzerland (2, 3, 5)
Bahrain (6)	Ghana (5, 6)	Morocco (4, 5, 6)	Taiwan (3, 4, 6)
Bangladesh (3, 4)	Guatemala (5)	Netherlands (5, 6)	Tanzania (4)
Belarus (2&3)	Hong Kong (5, 6)	New Zealand (4, 5, 6)	Thailand (5, 6)
Bosnia & Herz. (3, 4)	Hungary (3)	Nigeria (2, 3, 4, 6)	Trinidad & Tobago (5, 6)
Brazil (2, 3, 5, 6)	India (all 5 waves)	Norway (4, 5)	Tunisia (6)
Bulgaria (5)	Indonesia (4, 5)	Pakistan (3, 4, 6)	Turkey (all 5 waves)
Burkina Faso (5)	Iran (4, 5)	Peru (3, 4, 5, 6)	Uganda (4)
Canada (4, 5)	Iraq (4, 5, 6)	Philippines (3, 4, 6)	Ukraine (3, 5, 6)
Chile (all 5 waves)	Israel (4)	Poland (2, 3, 5, 6)	UK (3, 5)
China (all 5 waves)	Italy (5)	Puerto Rico (3, 4)	Uruguay (3, 5, 6)
Colombia (3, 5, 6)	Japan (all 5 waves)	Qatar (6)	USA (3, 4, 5, 6)
Croatia (3)	Jordan (4, 5, 6)	Romania (4, 5, 6)	Uzbekistan (6)
Cyprus (5, 6)	Kazakhstan (6)	Russian Fed. (2, 3, 5, 6)	Venezuela (3, 4)
Czech Republic (2)	Kuwait (6)	Rwanda (5, 6)	Vietnam (4, 5)
Dominican Rep. (3)	Kyrgyzstan (4, 6)	Saudi Arabia (4)	West Bank & Gaza (6)
Ecuador (6)	Latvia (3)	Serbia (3, 4, 5)	Yemen (6)
Egypt (4, 5, 6)	Lebanon (6)	Singapore (4, 6)	Zambia (5, 6)
El Salvador (3)	Libya (6)	Slovakia (2, 4, 5)	Zimbabwe (4, 6)

Note: The article uses the following five waves of the WVS: Wave 2 (1990–1994), Wave 3 (1995–1998), Wave 4 (1999–2004), Wave 5 (2005–2009), and Wave 6 (2010–2014). The numbers in parentheses indicate the wave numbers in which the sample countries are included.

At the respondent-level, the estimation strategy involves three considerations. First, as Table 2 indicates, the dependent variables measuring SWB are of ordinal nature. Therefore, there is the issue of selecting the appropriate estimation technique. At the one extreme, the OLS treats the response categories as having the same distance between them. At the other extreme, the multinomial logistic regression views the categories associated with the outcome variable as nominal, which means that the categories have no order. Even though both the OLS and the multinomial logistic regression produce unbiased estimations, the loss of efficiency may lead to unwarranted acceptance of the null hypothesis. Therefore, the ordered logistic regression emerges as the appropriate estimation method that accounts for the ordinal nature of the dependent variable, where the distances between the categories are unknown.

However, in ordered logistic regressions the assumption of proportional odds is often violated. In fact, the results of the initial ordered logistic regression (not included in the article) showed that almost all explanatory variables violated this assumption in most models. It means that instead of having the same coefficient for all response categories of the dependent variable (except for the intercepts), the size and the sign of the coefficients associated with a given explanatory variable changes among the response categories. While the tests for proportional odds tend to reject the null too often and, therefore, sometimes these violations are ignored, doing so may lead to information loss.

Table 2. Description of the variables from the world values survey (WVS)

Variable name	Description
Feeling of happiness	1: not at all happy 2: not very happy 3: quite happy 4: very happy
Satisfaction with life	1: not at all satisfied 2: somewhat satisfied 3: satisfied
Subjective health	1: poor 2: fair 3: good 4: very good
Freedom of choice and control over life	1: none at all 2: some 3: a great deal
Religious person	1: atheist 2: not a religious person 3: religious person
Relevance of religion in your life	1: not important at all 2: not very important 3: rather important 4: very important
Gender	1: Female 0: Male
Age	Two-digit number
Marital status	1: divorced/separated/widow 2: single 3: in a relationship 4: married
Social class	1: lower class 2: working class 3: lower middle class 4: upper middle class 5: upper class

Note: The data are available at <http://www.worldvaluessurvey.org>. In some of the variables, the number of categories is reduced based on the histograms of these variables. In other variables, the categories are recoded so that in all variables higher values indicate higher representation of the characteristic in question for easier interpretation.

Alternatively, in a generalized ordered logistic regression, the explanatory variables do not have to meet the proportional odds assumption. Additionally, the generalized ordered logistic regression is able to identify which explanatory variables meet the assumption of proportional odds and which variables' association with SWB is not uniform over the response categories. In the latter case, the estimations also show the different effects of the explanatory variables on the response categories of SWB and their statistical significance. Clearly, our understanding of SWB's covariates is enhanced, if we know about the effects of the explanatory variables on the response categories of the dependent variables. Therefore, the respondent-level analysis uses the following generalized ordered logistic regression function (Williams, 2006):

$$P(Y_i > j) = g(X_i\beta_j) = \frac{\exp(\alpha_j + X_i\beta_j)}{1 + \{\exp(\alpha_j + X_i\beta_j)\}}, \quad j = 1, 2, \dots, M - 1 \quad (1)$$

where M is the number of categories associated with the ordinal dependent variable. Equation (1) represents both the parallel lines model and the generalized ordered logistic regression model with one difference. In the latter model, θ 's or the slope coefficients are not the same for all values of j .

Second, because there are 96 countries in the sample data, it is possible that SWB and therefore the residuals within each country are not independent. Therefore, countries are identified as clusters so that the observations may be correlated within countries, but are independent between countries. Defining countries as clusters also implies the use of the robust estimator that addresses possible problems with non-normality, heteroskedasticity, and outliers.

Third, the estimated coefficients are presented in the ordered log-odds format. Based on Equation (1), the probabilities that the dependent variable Y will take on the values 1, ..., M are:

$$\begin{aligned} P(Y_i = 1) &= 1 - g(X_i\beta_1) \\ P(Y_i = j) &= g(X_i\beta_{j-1}) - g(X_i\beta_j) \quad j = 2, \dots, M - 1 \\ P(Y_i = M) &= g(X_i\beta_{M-1}) \end{aligned} \quad (2)$$

In terms of the interpretation of the estimated coefficients, a positive coefficient indicates that for one unit change in the explanatory variable, the level of the response variable changes in the

ordered log-odds scale. In other words, a positive coefficient implies an increased chance that a subject with a higher (lower) category in the independent variable will be observed in a higher (lower) category of the dependent variable. A negative coefficient means an increased chance that a subject with a higher (lower) category on the independent variable will be observed in a lower (higher) category of the dependent variable (Williams, 2006).

3.2. Methodology: country-level

Rather than macroeconomic performance data such as GDP growth, unemployment and inflation, country-level SWB studies examine the relationship between the institutional quality-related variables such as corruption and SWB. The relevance of the institutional quality-related variables lies in the fact that these variables may have information about the hedonic well-being, which implies as to how people experience their daily life in relation to other people as well as government (Graham & Nikolova, 2015).

Delhey and Steckermeier (2016) argues that higher quality institutions improve SWB by increasing the quality of the social fabric that affects both citizen-to-government and citizen-to-citizen relations. Good institutions reduce the uncertainty and transaction costs associated with these relations by promoting trust among citizens as well as between citizens and government (Bjørnskov et al., 2010). In other words, institutional quality reflects the quality of the social contract between the stakeholders of a country (Helliwell et al., 2018). On the other hand, bad institutions such as corruption and government inefficiency may have high psychological costs, because people experience the consequences of such institutions in their daily life (Welsch, 2003). While good institutions such as corruption control and government effectiveness are often hailed for their contributions to economic growth, they also make people happier above and beyond higher incomes (Helliwell, 2018).

The empirical evidence regarding positive effects of institutional quality on SWB has been strong. Rule of law, accountability and corruption control are found to be important covariates of SWB (Helliwell et al., 2018). When comparing the relevance of democratic quality with that of government, the results are more nuanced in that the effects of institutional quality on SWB depend on the development/income level of countries. While economic and judicial institutions matter for SWB in low-income countries, political institutions are more relevant in middle- and high-income countries (Bjørnskov et al., 2010; Dorn et al., 2007; Gehring, 2013; Nikolaev, 2016).

In order to examine the relationship between SWB and religiosity at the country level, the respondent-based dataset has to be transformed into a cross-section dataset. Therefore, the WVS dataset is collapsed by country means, which resulted in a cross-section dataset with 96 countries. This dataset uses the country means of the two alternative SWB-related dependent variables, *happiness* and *satisfaction with life* and adds a third measure of SWB. As an attempt to check the robustness of the country-level estimation results, the cross-section estimations also use the World Happiness Report's (WHR) happiness index as an alternative measure of SWB (Helliwell et al., 2013). In terms of the explanatory variables, religiosity-related variables (*relevance of religion in life* and *religious person*) as well as *freedom* are included in the cross-section data as country means of the respondent-based WVS data.

Other country-level explanatory variables indicate the quality of institutions in the sample countries. Table 3 lists six institutional quality-related variables: *executive constraints*, *corruption control*, *economic freedom*, *government effectiveness*, *regulatory quality*, and *rule of law*. Higher values of these variables indicate the presence of check and balances rather than unlimited executive power, limited nepotism and bribes and protection of property rights. Additionally, the sample countries' GDP per capita and percent of the relevant age group enrolled in *tertiary education* are added to the cross-section dataset.

In terms of the estimation strategy, the OLS framework constitutes the benchmark approach to estimating the effects of religiosity, freedom, and institutional quality on SWB:

Table 3. Definition of country-level economic, social and institutional variables

Variable name	Definition	Source
Happiness-WHR (World Happiness Report)	An index number between 1 to 10 where higher values indicate higher levels of happiness; 2013	(Helliwell et al., 2013)
Corruption control	Perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as “capture” of the state by elites and private interests; values range between –2.5 and 2.5 where higher numbers indicate greater corruption control; 1996–2014 average	WGI
Government effectiveness	Perceptions of the quality of public service, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of government’s commitment to such policies; values range between –2.5 and 2.5 where higher values indicate higher government effectiveness; 1996–2014 average	WGI
Regulatory quality	Perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development; values range between –2.5 to 2.5 where higher values indicate higher regulatory quality; 1996–2014 average	WGI
Rule of law	Perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence; values range between –2.5 to 2.5 where higher values indicate higher confidence in law enforcement; 1996–2014 average	WGI
Executive constraints	Characteristics of the political decision-making process grouped in 7 categories, involving measures of constitutional restrictions as well as the severity of attempts to circumvent the rules; values range between 1 and 7 where higher numbers indicate stronger constraints on the executive; 1990–2014 average	Polity IV
Economic freedom	Based on 10 categories of freedom, including property rights, freedom from corruption, trade freedom, etc.; values range between 1 and 100 where higher numbers indicate a greater extent of economic freedom; 2010	Heritage Foundation
Tertiary Enrolment	Percent of relevant age group enrolled in tertiary education; 1990–2014 average	WDI
Income	GDP per capita (PPP); 1990–2014 average	WDI

Note: The World Happiness Report is available at <http://unsdsn.org/resources/publications/world-happiness-report-2013>. WGI stands for the Worldwide Governance Indicators and is available at <http://info.worldbank.org/governance/wgi/index.aspx#home>. Polity IV Project is available at <http://www.systemicpeace.org/inscrdata.html>. Economic freedom index is available at <http://www.heritage.org/index/>. WDI stands for the World Development Indicators (World Bank) and is available at <https://data.worldbank.org/products/wdi>.

$$SWB_i = \beta_1 + \beta_2 F_i + \beta_3 R_i + \beta_4 I_i + \varepsilon_i \quad (3)$$

where F , R , I and ε indicate freedom, religiosity, institutional quality, and the error term with known properties, respectively. However, there are potential problems such as measurement error and omitted variables that correlate with the error term, which would render the estimated OLS coefficients as biased and inconsistent. In addition to these potential issues, religiosity may not be an exogenous explanatory variable. Some of the existing studies suggest that higher income or education in a country decreases religiosity (Hungerman, 2014; Sacerdote & Glaeser, 2008). The

two-stage least square estimation (TSLS) provides a solution to the mentioned problems, as long as suitable instruments are used for the endogenous explanatory variable. In this article, countries' GDP per capita and tertiary enrollment is used as instruments for religiosity. The suitability of the instrument is tested based on the instrument relevance (the instrument correlates with the endogenous explanatory variable) and instrument exogeneity (the instrument does not correlate with the error term) conditions. The results of these tests are discussed in Section 5.

4. Empirical results at the respondent-level

As Table 2 indicates, the only continuous variable in the dataset is age, while all other variables are categorical variables. Therefore, the descriptive statistics associated with age is not included in Table 4, where the response frequencies associated with the categorical variables are shown. With 338,145 valid responses to the question of age, the mean age is almost 41 (40.78) with a standard deviation of 16.09. In Table 4, in terms of happiness and life satisfaction among all respondents, less than 20% of respondents are in the unhappy or unsatisfied category. About 71% and 72% of respondents describe themselves as religious and attach a rather important or very important place to religion in life, respectively. About 85% of respondents express having some or great deal of control over their choices in life. In terms of the control variables, about 65% describe their health in a good or very good condition, 21% belong to upper-middle or upper class, 49% are female and 64% are either in a relationship or married.

Table 4. Category frequencies of the relevant variables

Variables and response categories	All respondents	Variables and response categories	All respondents
Feeling of happiness (N = 339,909)		Subjective health (N = 336,251)	
Not at all happy	3.05	Poor	7.36
Not very happy	16.30	Fair	27.09
Quite happy	52.40	Good	42.20
Very happy	28.25	Very good	23.35
Satisfaction with life (N = 342,450)		Social status (N = 290,581)	
Not at all satisfied	18.35	Lower class	13.63
Quite satisfied	35.56	Working class	28.04
Satisfied	46.06	Lower middle class	37.39
		Upper middle class	19.07
Religious person (N = 317,398)		Upper class	1.86
Atheist	4.76	Gender (N = 347,856)	
Not a religious person	24.49	Male	49.04
Religious person	70.76	Female	50.96
Relevance of religion in life (N = 328,209)			
Not important at all	11.07	Marital status (N = 343,116)	
Not very important	16.76	Divorced/separated/widowed	11.01
Rather important	23.38	Single	24.90
Very important	48.78	In a relationship	6.06
		Married	58.03
Freedom of choice & control over life (N = 327,554)			
Not at all	15.34		
Some	39.83		
A great deal	44.83		

Note: Age, the only continuous variable, at the respondent-level data is not included in the table. With 338,145 valid responses to the question of age, the mean age is almost 41 (40.78) with a standard deviation of 16.09.

Table 5. Spearman correlation coefficients between happiness, life satisfaction and other categorical variables (N = 249,326)

	Happiness	Life satisfaction
Life satisfaction	0.42*	
Freedom	0.23*	0.36*
Relevance of religion	0.09*	−0.02*
Religious person	0.04*	−0.02*
Gender	0.01*	0.01*
Marital status	0.07*	0.03*
Social class	0.17*	0.21*
Health	0.37*	0.28*

Note: * indicates 5% level of statistical significance.
 See Table 2 for variable description.

Table 5 shows the correlation coefficients among the relevant variables for all respondents. All Spearman correlation coefficients shown in the table are statistically significant at 5% level. While these correlation coefficients do not indicate the direction of influence, it is informative to examine the nature of the relationship among the relevant variables. First, the strongest positive relation exists between happiness and life satisfaction (0.42). While not perfect substitutes, there is nonetheless a positive relationship between these two alternative measures of SWB. Another positive association takes place between happiness and freedom as well as life satisfaction and freedom (0.23 and 0.36, respectively). While the correlation coefficients between happiness- and religiosity-related variables (relevance of religion and religious person) are mostly positive (0.09 and 0.04), the correlation coefficients between life satisfaction and religiosity are negative (both −0.02). This result justifies having two alternative measures of SWB as well as two alternative religiosity-related variables, because the association between SWB and religiosity may depend upon how these variables are defined. As suggested in the literature, the rest of the correlation coefficients have the expected signs as indicated by the positive association between the two measures of SWB and being female, healthier and in a higher social class.

Table 6 summarizes the results of the generalized ordered logistic regressions. The table includes two models where the two alternative measures of SWB are happiness and life satisfaction. Additionally, because the results associated with the relevance of religion in life were similar to those that were obtained when using religious person, Table 6 only includes religious person as a measure of religiosity. Both models in Table 6 include gender, age, age square, marital status, social class, health, freedom, and religiosity. In terms of diagnostics, p -values associated with Wald χ^2 test indicate that the null hypothesis of all regression coefficients being zero is rejected in all models. In the following, the mentioned coefficients are statistically significant unless indicated otherwise.

In Table 6, one of the common results in Model I (dependent variable: happiness) and Model II (dependent variable: life satisfaction) is that age does not violate the proportional odds assumption so that there is one estimated coefficient indicating the effect of age on SWB. While SWB slightly decreases with age, there is a small but statistically significant increase in SWB in older ages, as the positive coefficient associated with the *age square* indicates. Other similarities between Model I and II are that being *female* as well as describing oneself in higher categories of *health* increases the odds of being in a higher category of SWB. Marital status, social class, and freedom seem to violate the proportional odds assumption mostly in Model I. In terms of *marital status*, Model I shows that diminishing but positive effects of marital status on happiness occur, when the “divorced/separated/widow” status changes to the “in a relationship or married” status as well as when the “divorced/separated/widow” or the “single” status changes to “in a

Table 6. Generalized ordered logistic regression estimations using the WVS data

Explanatory variables	Dependent variable: Happiness		Dependent variable: Life satisfaction	
	k-1 categories	Model I	k-1 categories	Model II
Gender		0.17***		0.20***
Age		-0.03*		-0.02***
Age square		0.0004***		0.0004***
Marital status	1	0.24***		0.09***
	2	0.23***		
	3	0.14***		
Social class	1	0.44***	1	0.38***
	2	0.34***	2	0.28***
	3	0.12***		
Health		0.89***		0.58***
Freedom	1	0.57***		0.96***
	2	0.54***		
	3	0.44***		
Religious person	1	-0.04		-0.09*
	2	-0.01		
	3	0.28***		
N		253,575		254,138
Wald χ^2 (p-val)		0.00		0.00

Note: All estimations use generalized ordered logit regressions with the robust variance estimator. ***, **, and * indicate 1, 5, and 10% level of significance based on the z statistic. Constants are not shown. k-1 categories refer to the number of response categories minus one (See Table 2 for response categories). The dependent variable *happiness* has 4 response categories so that 1 refers to contrasting Category 1 with Categories 2, 3, and 4. Similarly, 2 contrasts Categories 1 and 2 with categories 3 and 4, while 3 contrasts Categories 1, 2, and 3 with Category 4. The alternative dependent variable is *satisfaction with life* that has 3 response categories. In this case, 1 contrasts Category 1 with 2 and 3, while 2 contrasts Categories 1 and 2 with 3.

relationship” or “married” status. The coefficient associated with the change from the previous three categories to the fourth category of being married is still positive but smaller. In Model II, the positive coefficient associated with marital status implies that being in higher categories of marital status increases the odds of being in higher categories of life satisfaction. The results regarding age, gender, marital status, and health confirm the results of the existing empirical studies (for example, Hayo, 2007; Peiro, 2006; Verme, 2009).

Regarding *social class*, in both models, higher categories of social class increase the odds of being in higher categories of SWB. However, the largest positive effect occurs in lower categories of social class. Assuming higher social class implies higher income or higher education, our results are comparable to those of the existing studies (Frey & Stutzer, 2002; Hayo, 2007). The effects of *freedom* and control over one’s life on happiness remains positive and quite large despite the slight decline in the coefficient (Model I). Regarding the relationship between *religiosity* and SWB, the estimations violate the proportional odds assumption in Model I. The results indicate that respondents who describe themselves as religious are expected to be in a higher happiness category. When life satisfaction is considered (Model II), the estimated coefficient is negative, which indicates lower odds of life satisfaction for the respondents who are in higher categories of religiosity.

5. Empirical results at the country-level

Table 7 shows the descriptive statistics associated with the country-level variables. An interesting aspect of Table 7 is that while the variation in measures of SWB and religiosity is rather small, the

Table 7. Descriptive statistics (cross-section data)

Variables	Number of obs.	Mean	Standard deviation	Minimum	Maximum
Happiness—WVS	96	3.06	0.27	2.43	3.61
Satisfaction with life—WVS	96	2.26	0.29	1.57	2.79
Happiness—WHR	95	5.65	0.99	3.72	7.67
Relevance of religion—WVS	95	3.11	0.66	1.61	3.99
Religious person—WVS	95	2.66	0.24	1.88	2.97
Freedom—WVS	95	2.29	0.21	1.83	2.69
Corruption control	96	0.09	1.01	−1.37	2.31
Government effectiveness	96	0.22	0.96	−1.51	2.25
Regulatory quality	96	0.17	0.95	−2.15	1.89
Rule of law	96	−0.07	0.99	−1.97	1.98
Executive constraints	92	4.34	2.02	1	7
Economic freedom	94	62.91	11.77	16.2	90.1
Tertiary enrolment	94	26.02	19.94	0.32	95.21
GDP per capita	95	18,486	17,026	559	102,211

Note: WVS indicates that the variables represent country means based on the WVS data. WHR stands for the World Happiness Report. Tables 2 and 3 define the WVS variables and the country-level variables, respectively.

variation in the institutional quality-, income-, and education-related variables is quite large. Table 8 indicates the relevant correlation coefficients associated with the cross-section data. In the following, only the statistically significant correlation coefficients at the 5% level are mentioned, unless indicated otherwise.

As alternative measures of SWB, the correlation coefficient between the WVS measures (happiness and life satisfaction) is 0.76. While the correlation coefficient between the WVS's happiness and WHR's happiness index is 0.47, the correlation between the WVS's life satisfaction and WHR's index is much higher (0.72). The correlations between the three measures of SWB and the country-level subjective freedom felt by respondents imply a positive association (between 0.61 and 0.84). Most correlations between the SWB measures and religiosity are either not statistically significant or negative (between −0.25 and −0.42). The indicators of institutional quality (corruption control, executive constraints, economic freedom, government effectiveness, regulatory quality, and rule of law) have positive correlations with each other (between 0.28 and 0.98). Additionally, all indicators of institutional quality have mostly positive correlations with three alternative measures of SWB, where the correlation coefficients range between 0.22 and 0.69. However, all associations between institutional quality and religiosity are negative (between −0.29 and −0.56).

The first attempt to the cross-section estimations starts with the baseline OLS estimations. Table 9 summarizes the results of these estimations in three panels. Panels A, B and C use the happiness and life satisfaction measures based on the WVS as well as the WHR's happiness index as dependent variables, respectively. Models 1 through 12 in Panels A, B and C repeat the basic model for different measures of religiosity (Models 1–6: relevance of religion and Models 7–12: religious person). Additionally, each model uses a different institutional quality-related variable. The use of the alternative dependent and independent variables should demonstrate whether the results are sensitive to alternative specifications. In all models in three panels, the null hypothesis of all slope coefficients being zero is rejected based on the F statistic. R^2 ranges between 0.49 and 0.77, where the consistently higher numbers are associated with models having the WVS's satisfaction with life as the dependent variable (Panel B). In the following, all mentioned results are statistically significant, unless indicated otherwise.

Table 8. Correlation coefficients (cross-section data)

	1	2	3	4	5	6	7	8	9	10	11	12	13
2. Satisfaction with life	0.76*												
3. Happiness—WHR	0.47*	0.72*											
4. Freedom	0.71*	0.84*	0.61*										
5. Relevance of religion	0.18	-0.11	-0.41*	0.07									
6. Religious person	-0.02	-0.25*	-0.41*	-0.06	0.78*								
7. Corruption control	0.28*	0.49*	0.69*	0.33*	-0.54*	-0.49*							
8. Executive constraints	0.08	0.22*	0.47*	0.17	-0.53*	-0.29*	0.58*						
9. Economic freedom	0.16	0.31*	0.42*	0.21	-0.42*	-0.33*	0.76*	0.45*					
10. Government effectiveness	0.29*	0.49*	0.69*	0.32*	-0.56*	-0.51*	0.95*	0.61*	0.78*				
11. Regulatory quality	0.16	0.39*	0.58*	0.26*	-0.57*	-0.46*	0.89*	0.62*	0.86*	0.93*			
12. Rule of law	0.25*	0.46*	0.66*	0.29*	-0.53*	-0.48*	0.96*	0.61*	0.78*	0.98*	0.93*		
13. GDP per capita	0.31*	0.52*	0.69*	0.34*	-0.41*	-0.41*	0.78*	0.35*	0.58*	0.76*	0.69*	0.77*	
14. Tertiary enrolment	0.03	0.25*	0.43*	0.12*	-0.41*	-0.32*	0.42*	0.38*	0.28*	0.44*	0.38*	0.43*	0.39*

Note: Variable 1 is happiness. * indicates 5% level of significance. See Tables 2 and 3 for variable description.

Table 9. Baseline OLS estimations (using the cross-section data)

	1	2	3	4	5	6	7	8	9	10	11	12
Panel A—Dependent variable: Happiness (WVS)												
Freedom-WVS	0.79 (0.00)	0.91 (0.00)	0.88 (0.00)	0.78 (0.00)	0.87 (0.00)	0.82 (0.00)	0.88 (0.00)	0.94 (0.00)	0.92 (0.00)	0.87 (0.00)	0.92 (0.00)	0.89 (0.00)
Relevance of religion-WVS	0.11 (0.01)	0.07 (0.03)	0.08 (0.02)	0.12 (0.00)	0.08 (0.00)	0.09 (0.01)						
Religious person-WVS							0.07 (0.45)	0.02 (0.84)	0.04 (0.68)	0.09 (0.36)	0.01 (0.88)	0.06 (0.49)
Corruption control	0.06 (0.02)						0.02 (0.27)					
Executive constraints		0.01 (0.51)						−0.01 (0.65)				
Economic freedom			0.002 (0.15)						0.001 (0.68)			
Government effectiveness				0.07 (0.02)						0.03 (0.17)		
Regulatory quality					0.03 (0.31)						−0.01 (0.84)	
Rule of law						0.05 (0.03)						0.02 (0.31)
Constant	0.91 (0.00)	0.73 (0.00)	0.66 (0.01)	0.89 (0.00)	0.99 (0.00)	0.88 (0.00)	0.85 (0.00)	0.88 (0.01)	0.82 (0.02)	0.83 (0.01)	0.91 (0.01)	0.85 (0.01)
N	95	91	93	95	95	95	95	91	93	95	95	95
R ²	0.54	0.52	0.52	0.55	0.52	0.54	0.49	0.49	0.49	0.51	0.49	0.49
F-test (p-val)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Continued)

Table 9. (Continued)

Panel B—Dependent variable: Life satisfaction (WVS)

	1	2	3	4	5	6	7	8	9	10	11	12
Freedom-WVS	1.14 (0.00)	1.26 (0.00)	1.22 (0.00)	1.13 (0.00)	1.19 (0.00)	1.15 (0.00)	1.14 (0.00)	1.21 (0.00)	1.19 (0.00)	1.14 (0.00)	1.17 (0.00)	1.15 (0.00)
Relevance of religion-WVS	-0.02 (0.48)	-0.07 (0.02)	-0.05 (0.06)	-0.01 (0.64)	-0.04 (0.19)	-0.02 (0.39)						
Religious person-WVS							-0.15 (0.04)	-0.24 (0.01)	-0.21 (0.01)	-0.14 (0.06)	-0.19 (0.02)	-0.16 (0.03)
Corruption control	0.06 (0.04)						0.05 (0.01)					
Executive constraints		0.04 (0.06)						0.003 (0.74)				
Economic freedom			0.002 (0.10)						0.002 (0.09)			
Government effectiveness				0.07 (0.01)						0.06 (0.01)		
Regulatory quality					0.05 (0.05)						0.04 (0.07)	
Rule of law						0.06 (0.00)						0.05 (0.01)
Constant	-0.29 (0.14)	-0.39 (0.05)	-0.53 (0.01)	-0.19 (0.37)	-0.36 (0.08)	-0.31 (0.12)	0.05 (0.84)	0.12 (0.69)	-0.06 (0.84)	0.01 (0.96)	0.06 (0.82)	0.04 (0.87)
N	95	91	93	95	95	95	95	91	93	95	95	95
R ²	0.75	0.72	0.73	0.76	0.74	0.75	0.76	0.74	0.75	0.77	0.76	0.77
F-test (p-val)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

(Continued)

Table 9. (Continued)

Panel C—Dependent variable: Happiness (WHR)

	1	2	3	4	5	6	7	8	9	10	11	12
Freedom-WVS	2.35 (0.00)	2.88 (0.00)	2.92 (0.00)	2.37 (0.00)	2.67 (0.00)	2.46 (0.00)	2.15 (0.00)	2.58 (0.00)	2.63 (0.00)	2.18 (0.00)	2.43 (0.00)	2.26 (0.00)
Relevance of religion-WVS	-0.29 (0.02)	-0.52 (0.00)	-0.56 (0.00)	-0.29 (0.03)	-0.41 (0.00)	-0.33 (0.01)						
Religious person-WVS							-0.57 (0.11)	-1.27 (0.00)	-1.19 (0.01)	-0.52 (0.15)	-0.82 (0.03)	-0.64 (0.07)
Corruption control	0.41 (0.00)						0.46 (0.00)					
Executive constraints		0.08 (0.09)						0.13 (0.00)				
Economic freedom			0.01 (0.15)						0.02 (0.03)			
Government effectiveness				0.42 (0.00)						0.48 (0.00)		
Regulatory quality					0.29 (0.00)						0.37 (0.00)	
Rule of law						0.38 (0.00)						0.44 (0.00)
Constant	1.16 (0.14)	-0.31 (0.73)	-0.02 (0.92)	1.02 (0.19)	0.74 (0.34)	1.01 (0.21)	2.19 (0.07)	2.57 (0.08)	1.73 (0.25)	1.92 (0.12)	2.19 (0.09)	2.15 (0.09)
N	94	91	93	94	94	94	94	91	93	94	94	94
R ²	0.66	0.58	0.58	0.66	0.61	0.65	0.65	0.58	0.54	0.65	0.59	0.64
F-test (p-val)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: Numbers in parentheses are *p*-values. All estimations use the robust variance estimator. The variables with “WVS” indicate that they are the country means based on the WVS data. See Tables 2 and 3 for variable description.

In all 3 panels of Table 9, *freedom* is the variable whose positive effect on SWB is the largest compared to other independent variables. Religiosity-related variables do not contribute to SWB in a consistent manner. When Panel A is considered, higher *relevance of religion in life* increases the WVS measure of happiness, albeit to a smaller extent than freedom. While relevance of religion is mostly not statistically significant for life satisfaction (Panel B), it actually decreases happiness measured by the WHR's index (Panel C). An alternative measure of religiosity, *religious person*, does not affect the WVS' happiness measure (Panel A); however, higher religiosity decreases the WVS' life satisfaction and the WHR's happiness measure in most models (Panels B and C). In terms of the institutional quality-related variables, almost all of these variables have a positive association with life satisfaction of the WVS and the WHR's happiness index (Panels B and C). In general, the OLS estimations indicate that religiosity either seems to lose its relevance for SWB or negatively affect SWB, while institutional quality emerges as an important covariate of SWB at the country level.

Based on the potential problems associated with the OLS estimations (Section 3.2), next the results of the TSLS estimations are presented. These estimations use sample countries' GDP per capita and tertiary enrolment as instruments for religiosity. Table 10 summarizes the test results regarding instrument relevance and instrument exogeneity conditions as well as over-identifying restrictions (OIR), because the number of endogenous explanatory variables (only one, which is religiosity defined as religious person or relevance of religion) is less than the number of instruments (per capita income and tertiary enrolment). The first-stage F statistic is an indication of instrument relevance and is obtained from regressing the endogenous variable (religiosity) on the instruments and the exogenous explanatory variables. The results in Table 10 indicate that we reject the null hypothesis of all slope coefficients being zero at 1% significance level in the majority of the models. In other words, the instruments are valid and they explain religiosity. Second, in most models the null hypothesis of religiosity being exogenous is rejected. Third, Sargan's test results for over-identifying restrictions indicate that in most models the null hypothesis of exogenous instruments is rejected.

The TSLS estimations in Table 10 use heteroskedasticity-robust standard errors. As in the case of the OLS estimations, the results are summarized in three panels to make use of three alternative measures of SWB. In Panel A of Table 10, where the WVS-measure of happiness is the dependent variable, relevance of religion maintains its positive impact in some of the estimations (Models 1, 4, and 6). However, when religiosity is measured by religious person, religiosity has no effect on SWB. In terms of the relationship between institutional quality-related variables and SWB, most statistically significant positive coefficients coincide with corruption control and government effectiveness. As in the case of the OLS estimations, the results are similar in Panels B and C where the WVS-measure of life satisfaction and the WHR-measure of happiness are the dependent variables, respectively. Most models in these panels indicate a negative effect of religiosity on SWB. However, the positive effect of higher institutional quality is seen in a few models and mostly with respect to corruption control, government effectiveness and, to a lesser extent, executive constraints. In all panels, perceived personal freedom continues to be a statistically significant covariate of SWB.

To summarize the results at the country level, freedom in the sense of having control over one's life and decisions as well as institutional quality are positive covariates of SWB. When instrumented, religiosity either loses its significance or becomes a negative covariate of SWB.

In addition to the estimation results, one can also provide statistical analysis regarding the independence of country rankings in SWB, religiosity and institutional quality. Table 11 summarizes the comparison of ranks using Kendall's score. The significance level associated with Kendall's score refers to the null hypothesis of two ranks being independent from each other. In terms of the rankings of the SWB- and religiosity-related variables, Table 11 shows that we cannot reject the null hypothesis of independence between relevance of religion and the WVS-measures of SWB (happiness and life satisfaction). Similarly, the rankings of religious person and the WVS-measure

Table 10. Two-stage least square estimations (using the cross-section data)

	1	2	3	4	5	6	7	8	9	10	11	12
Panel A—Dependent variable: Happiness (WVS)												
Freedom—WVS	0.63 (0.00)	0.86 (0.00)	0.85 (0.00)	0.59 (0.00)	0.78 (0.00)	0.69 (0.00)	0.78 (0.00)	0.96 (0.00)	0.92 (0.00)	0.73 (0.00)	0.93 (0.00)	0.84 (0.00)
Relevance of religion—WVS	0.31 (0.04)	−0.02 (0.97)	0.06 (0.42)	0.34 (0.06)	0.17 (0.14)	0.28 (0.06)						
Religious person—WVS							1.04 (0.22)	−0.07 (0.78)	0.04 (0.87)	1.39 (0.26)	0.08 (0.83)	0.76 (0.24)
Corruption control	0.14 (0.03)						0.18 (0.09)					
Executive constraints		0.02 (0.19)						−0.01 (0.51)				
Economic freedom			0.004 (0.07)						0.001 (0.72)			
Government effectiveness				0.18 (0.02)						0.21 (0.07)		
Regulatory quality					0.08 (0.09)						0.005 (0.91)	
Rule of law						0.13 (0.03)						0.11 (0.15)
Constant	0.65 (0.05)	0.93 (0.01)	0.69 (0.06)	0.59 (0.11)	0.67 (0.04)	0.61 (0.09)	−1.19 (0.49)	1.14 (0.16)	0.79 (0.35)	−2.35 (0.45)	0.71 (0.52)	−0.89 (0.61)
N	93	90	92	93	93	93	93	90	92	93	93	93
1 st stage F-test (p-val)	0.06	0.00	0.00	0.04	0.06	0.05	0.08	0.03	0.01	0.07	0.18	0.36
Hausman endog. test (p-val)	0.04	0.31	0.04	0.07	0.08	0.06	0.03	0.07	0.06	0.05	0.17	0.19
Sargan overid. test (p-val)	0.31	0.01	0.32	0.54	0.14	0.35	0.13	0.18	0.21	0.39	0.06	0.03

(Continued)

Table 10. (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12
Panel B—Dependent variable: Life satisfaction (WVS)												
Freedom—WVS	1.21 (0.00)	1.41 (0.00)	1.31 (0.00)	1.19 (0.00)	1.32 (0.00)	1.25 (0.00)	1.24 (0.00)	1.22 (0.00)	1.21 (0.00)	1.23 (0.00)	1.24 (0.00)	1.23 (0.00)
Relevance of religion—WVS	-0.18 (0.07)	-0.32 (0.00)	-0.22 (0.02)	-0.07 (0.56)	-0.19 (0.08)	-0.13 (0.28)						
Religious							-0.86 (0.07)	-0.99 (0.00)	-0.81 (0.00)	-0.81 (0.27)	-1.03 (0.05)	-0.93 (0.15)
person—WVS							0.16 (0.06)					
Corruption control	0.14 (0.08)											
Executive constraints		0.05 (0.12)						-0.02 (0.16)				
Economic freedom			-0.002 (0.56)						-0.001 (0.53)			
Government effectiveness				0.15 (0.03)						0.13 (0.07)		
Regulatory quality					-0.02 (0.73)						-0.06 (0.32)	
Rule of law						0.02 (0.69)						-0.04 (0.61)
Constant	-0.25 (0.28)	0.27 (0.46)	0.02 (0.95)	-0.27 (0.26)	-0.16 (0.56)	-0.21 (0.41)	1.71 (0.26)	2.27 (0.02)	1.73 (0.03)	1.61 (0.36)	2.18 (0.09)	1.91 (0.22)
N	93	90	92	93	93	93	93	90	92	93	93	93
1 st stage F-test (p-val)	0.04	0.00	0.00	0.09	0.06	0.12	0.03	0.03	0.01	0.04	0.08	0.06
Hausman endog. test (p-val)	0.07	0.00	0.00	0.08	0.09	0.32	0.05	0.00	0.00	0.06	0.00	0.08
Sargan overid. test (p-val)	0.01	0.12	0.09	0.01	0.13	0.03	0.26	0.32	0.39	0.27	0.33	0.34

(Continued)

Table 10. (Continued)

	1	2	3	4	5	6	7	8	9	10	11	12
Panel C—Dependent variable: Happiness (WHR)												
Freedom-WVS	2.91 (0.00)	3.63 (0.00)	3.47 (0.00)	2.94 (0.00)	3.46 (0.00)	3.11 (0.00)	2.81 (0.00)	2.44 (0.00)	2.64 (0.00)	2.91 (0.00)	2.81 (0.00)	2.78 (0.00)
Relevance of religion-WVS	-0.91 (0.07)	-1.91 (0.00)	-1.61 (0.00)	-0.93 (0.08)	-1.47 (0.01)	-1.13 (0.03)						
Religious person-WVS							-5.98 (0.16)	-5.85 (0.00)	-5.59 (0.00)	-6.58 (0.25)	-6.71 (0.04)	-6.29 (0.09)
Corruption control	0.15 (0.47)						-0.21 (0.68)					
Executive constraints		0.18 (0.07)						-0.03 (0.75)				
Economic freedom			-0.02 (0.13)						-0.01 (0.29)			
Government effectiveness				0.14 (0.56)						-0.33 (0.66)		
Regulatory quality					-0.17 (0.47)						-0.33 (0.34)	
Rule of law						0.06 (0.76)						0.24 (0.59)
Constant	1.83 (0.07)	4.07 (0.07)	3.64 (0.02)	1.77 (0.09)	2.31 (0.08)	2.05 (0.07)	15.14 (0.15)	15.78 (0.01)	15.24 (0.00)	16.57 (0.24)	17.09 (0.04)	16.04 (0.12)
N	93	90	92	93	93	93	93	90	92	93	93	93
1 st stage F-test (p-val)	0.07	0.00	0.00	0.09	0.06	0.07	0.43	0.03	0.01	0.55	0.08	0.06
Hausman endog. test (p-val)	0.05	0.00	0.00	0.07	0.02	0.06	0.01	0.00	0.00	0.01	0.00	0.00
Sargan overid. test (p-val)	0.25	0.12	0.13	0.18	0.05	0.16	0.48	0.41	0.65	0.48	0.54	0.56

Notes: The variables with “WVS” indicate that they are the country means of the WVS data. The numbers in parentheses refer to *p* values associated with *z* statistic. Instruments for religiosity are GDP per capita and tertiary education. All estimations use the robust variance estimator. See Tables 2 and 3 for variable description.

Table 11. Tests on country rankings among the relevant variables

	Happiness-WVS	Life satisfaction-WVS	Happiness-WHR
Relevance of religion	483 (0.12)	-347 (0.27)	-1197 (0.00)
Religious person	-35 (0.91)	-901 (0.00)	1449 (0.00)
Corruption control	749 (0.00)	1473 (0.00)	1940 (0.00)
Government effectiveness	836 (0.00)	1554 (0.00)	1963 (0.00)
Rule of law	717 (0.02)	1447 (0.00)	1863 (0.00)
Economic freedom	485 (0.11)	1135 (0.00)	1463 (0.00)
Regulatory quality	610 (0.05)	1396 (0.00)	1847 (0.00)
Executive constraints	298 (0.31)	698 (0.02)	1288 (0.00)

Note: The first number in each cell indicates the Kendall's score. The numbers in parentheses are *p*-values associated with the score. Kendall's scores in each cell refer to the variable in the relevant row and the column and tests whether the two rankings are independent, which is the null hypothesis. See Tables 2 and 3 for variable description.

of happiness (WVS) are independent. For the remaining three rankings (life satisfaction-religious person, WHR happiness-religious person, and WHR happiness-relevance of religion), we can reject the null hypothesis at better than 1% level of significance. We also note that a negative Kendall's score is associated with these rankings. It means that, for example, countries that are highly ranked in religiosity as measured by religious person are likely to be ranked lower in life satisfaction. Table 11 also indicates the rankings between the measures of SWB and institutional quality. We fail to reject the null hypothesis of independence only for two sets of rankings: WVS happiness-economic freedom and WVS happiness-executive constraints. For all other SWB-institutional quality pairs, the rankings are not independent. Considering the fact that Kendall's scores are all positive, countries that are highly ranked in the mentioned measures of institutional quality are expected to be highly ranked in especially life satisfaction and the WHR-measure of happiness.

Finally, Table 12 allows a visual inspection of the top and bottom 20 countries in three measures of SWB, one measure of religiosity (religious person) and one measure of institutional quality (corruption control). In Panel A of Table 12 one can clearly see the same countries under the WVS life satisfaction, WHR happiness and corruption control columns. However, the countries listed under the religious person column are not the same as those under the WVS life satisfaction, WHR happiness and corruption control columns, because the countries under the religious person column are the most religious countries. Happiest countries tend to have higher-quality institutions and most religious countries are not among the happiest countries and they do not have higher quality institutions. Panel B of Table 12 (bottom 20 countries) shows an opposite picture, where many of the least happy countries are also those with weakest corruption control. On the other hand, the least religious countries are not seen in any other column of Panel B. Therefore, Panels A and B of Table 12 visually verify the results of the ranking tests.

6. Conclusion

While a number of empirical studies demonstrate that higher religiosity is associated with happier people at the level of the individual, the published lists of happiest countries indicate that these

Table 12. Top and bottom 20 countries in SWB, religiosity and corruption control

Country	Happiness (WVS)	Country	Satisfaction (WVS)	Country	Happiness (WHR)	Country	Religious person	Country	Corruption control
Panel A: Top 20 countries									
Uzbekistan	3.61	Ecuador	2.79	Norway	7.66	Mali	2.97	Finland	2.31
Qatar	3.54	Qatar	2.76	Switzerland	7.65	Egypt	2.96	New Zealand	2.30
Tanzania	3.51	Uzbekistan	2.74	Netherlands	7.51	Rwanda	2.95	Sweden	2.22
Ecuador	3.49	Netherlands	2.73	Canada	7.48	Nigeria	2.95	Singapore	2.18
El Salvador	3.47	Colombia	2.72	Sweden	7.48	Pakistan	2.95	Norway	2.11
Venezuela	3.46	Switzerland	2.69	Finland	7.39	Ghana	2.95	Netherlands	2.09
Malaysia	3.43	Puerto Rico	2.68	Australia	7.35	Qatar	2.95	Switzerland	2.09
Canada	3.41	Finland	2.66	Israel	7.3	Georgia	2.94	Canada	1.98
Puerto Rico	3.39	Norway	2.64	New Zealand	7.22	Tanzania	2.93	Australia	1.95
Trinidad	3.38	Mexico	2.63	Mexico	7.09	Uganda	2.93	Germany	1.84
Colombia	3.36	Sweden	2.62	USA	7.08	Morocco	2.92	UK	1.83
Saudi Arabia	3.35	New Zealand	2.62	Venezuela	7.04	Yemen	2.91	Hong Kong	1.73
Sweden	3.35	Canada	2.61	UK	6.88	Zimbabwe	2.90	USA	1.52
Nigeria	3.34	Guatemala	2.59	Brazil	6.85	Bangladesh	2.90	Chile	1.46
Kuwait	3.33	Kazakhstan	2.58	France	6.76	B. Faso	2.90	France	1.38
Switzerland	3.32	USA	2.58	Germany	6.67	Poland	2.89	Japan	1.35
Philippines	3.32	Australia	2.58	Qatar	6.67	Zambia	2.89	Spain	1.17
Australia	3.32	Bahrain	2.55	Chile	6.59	Iran	2.88	Uruguay	1.16
Thailand	3.32	Kuwait	2.55	Argentina	6.56	Romania	2.87	Cyprus	1.09
UK	3.32	Singapore	2.54	Singapore	6.55	Jordan	2.86	Israel	0.97
Panel B: Bottom 20 countries									
Macedonia	2.82	Serbia	1.99	Bangladesh	4.81	Algeria	2.51	Dominican R.	-0.72
W. Bank-Gaza	2.79	Russia	1.99	Bosnia	4.81	Uruguay	2.46	Albania	-0.73

(Continued)

Table 12. (Continued)

Country	Happiness (WVS)	Country	Satisfaction (WVS)	Country	Happiness (WHR)	Country	Religious person	Country	Corruption control
Egypt	2.78	Uganda	1.98	Serbia	4.81	Australia	2.45	Ecuador	-0.74
Estonia	2.78	Egypt	1.96	Hungary	4.78	New Zealand	2.43	Lebanon	-0.75
Zambia	2.77	Zimbabwe	1.95	India	4.77	Netherlands	2.40	Indonesia	-0.82
Georgia	2.76	Bosnia	1.94	W. Bank-Gaza	4.70	Norway	2.39	Uganda	-0.88
Croatia	2.75	B. Faso	1.91	Iran	4.64	UK	2.39	Pakistan	-0.97
Serbia	2.75	Macedonia	1.89	Azerbaijan	4.61	Taiwan	2.38	Russia	-0.98
Armenia	2.75	Belarus	1.85	Macedonia	4.57	Hungary	2.35	Ukraine	-0.99
Latvia	2.73	Iraq	1.82	Ethiopia	4.56	Thailand	2.34	Kazakhstan	-1.01
Russia	2.69	Georgia	1.81	Uganda	4.44	France	2.30	Yemen	-1.04
Slovakia	2.68	Ukraine	1.79	Armenia	4.32	Czech Rep.	2.29	Venezuela	-1.09
Ukraine	2.64	Lithuania	1.77	Egypt	4.27	Estonia	2.28	Libya	-1.10
Romania	2.63	Bulgaria	1.72	B. Faso	4.26	Germany	2.27	Bangladesh	-1.12
Bulgaria	2.58	Latvia	1.72	Mali	4.25	Sweden	2.22	Kyrgyzstan	-1.13
Iraq	2.57	Armenia	1.72	Georgia	4.19	Vietnam	2.20	Azerbaijan	-1.16
Lithuania	2.56	Ethiopia	1.69	Yemen	4.05	Japan	2.13	Uzbekistan	-1.16
Belarus	2.54	Albania	1.68	Bulgaria	3.98	South Korea	2.03	Nigeria	-1.18
Moldova	2.47	Moldova	1.66	Tanzania	3.77	Hong Kong	1.97	Zimbabwe	-1.20
Albania	2.43	Tanzania	1.57	Rwanda	3.72	China	1.88	Iraq	-1.37

countries are not as religious but has higher-quality institutions. This article's aim is to provide empirical evidence for the conflicting association between religiosity and SWB at the level of the individual and the country.

The empirical results of this article confirm those of the previous studies in that, at the respondent level, happier people are likely to be female, younger, in good health, in a relationship and of higher social status. Freedom of choice and control over one's life emerges as an important variable that is positively associated with SWB at the respondent level. Additionally, higher religiosity is associated with higher levels of SWB. At the country level, freedom of choice and control over one's life remains as the strongest covariate of SWB. Religiosity, on the other hand, holds on to its positive effect on SWB with difficulty in that it either loses its statistical significance or develops a negative relationship with SWB. The measures of institutional quality such as corruption control and government effectiveness have a positive association with SWB. The ranking tests verify these results and indicate that higher religiosity and lower institutional quality correspond to lower rankings in SWB.

Therefore, the nature of the relationship between religiosity and SWB changes from the respondent- to the country-level. Apparently, religiosity may help individuals to remain content during difficult times; however, as a country, people may need more than religiosity, possibly better institutional quality to be more satisfied with their lives. A social environment that provides transparency as well as checks and balances may be important for SWB at country-level, which is the most important policy implication of this article's results. However, the inclusion of institutional quality into SWB increases the complexity of the subject. First, institutional quality is known as a persistent characteristic of countries. Second, considering the possible negative relationship between religiosity and institutional quality, there may be deeply rooted cultural and historical reasons for the given level of institutional quality in a country. Therefore, it may be difficult to motivate improvements in institutional quality to promote SWB.

There are important challenges to consider in SWB studies and therefore the results should be viewed with caution. While having survey results over a large number of subjects provides researchers with an incredible opportunity, the survey method itself is problematic. There can be a number of country- or culture-specific issues that may taint the response. A more important issue is that alternative questions regarding the same subject may have a different connotation for respondents. This study makes it clear that alternative questions regarding SWB (happiness vs. life satisfaction) and religiosity (relevance of religion vs. religious person) may be understood differently by respondents. At the country level, the challenge is to differentiate between causation and association. When countries are ranked with respect to SWB, religiosity and institutional quality, it is clear that higher SWB, lower religiosity and higher institutional quality (and its opposite) are clustered together. However, somewhat weak estimation results regarding the contribution of institutional quality to SWB should motivate us to think about an important but missing variable.

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