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How Does Average Protein Consumption Affect Happiness?

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1. Introduction

Over the past few decades, economists have taken an interest in happiness studies. An important assumption in economics is utility maximization, and happiness surveys now provide us with a closer proxy than previously available. Happiness Studies now allow us to examine factors that may increase utility, and thus better inform policy makers as to which policies might best increase the utility of their constituents.

While there are still some doubts as to the validity of this measure of utility, large samples across countries and over time have found remarkably similar determinants of happiness, increasing the validity of this form of measurement (Graham, 2005). Additionally, psychologists have shown that other measures of happiness, such as specific brain activity and the number of times a person exhibits genuine (Duchenne) smiles, corroborate the answers given in these happiness surveys (Diener and Seligman, 2004 as cited by Graham, 2005). Others have also found that individuals who report themselves as happy are also reported to be happy by their friends and family members (Sandvik et al. 1993)

The study of happiness important because it has deep roots in welfare economics. In fact, the term "welfare" has often been equated to happiness, and this usage can be traced back to Little (1950). While the distinction between economic welfare, referring only to a country's economic level and growth, and social welfare (welfare at large) referring to a myriad of circumstances, not only economic, that contribute to a country's welfare, has always been clearly defined, it is a common assumption that economic and social welfare at least move in the same direction, if not by the same degree. (Easterlin 1974). In 1967 Warner Wilson presented his research on the subject of what constitutes a

happy individual. He concluded that youth, good health, a high level of education, a well-paying, enjoyable job, an outgoing and optimistic personality, religious beliefs, and marriage were what made up a happy person (Diener et al. 1999). Characteristics of a happy individual, as well as the relationship between social welfare and economic welfare, have remained the main focuses of study throughout the history of the literature (Borooah 2006, Diener et al. 1999, Graham 2008).

Easterlin (1974) was one of the first economists to empirically evaluate the assumption that positive changes in economic welfare indicate positive changes in social welfare. He found that while economic factors, followed by family and then health factors, were the most common determinants of happiness, the theory that a higher income indicates greater happiness held true only for intra-country comparisons. In performing inter-country comparisons he found virtually no correlation between average income and average happiness. Wealthy countries were not significantly happier than poor countries. This became known as the Easterlin paradox, and has been the subject of much continued research.

More recent studies support Easterlin's findings that there is no correlation between absolute income and happiness across countries. Diener et al. (1995) and Knies et al. (2008) have studied the effect of the income of an individual or country relative to its neighbors on the happiness of that individual or country, and find no support for social comparisons across countries or between individuals. In other words, nations with relatively poorer neighbors were not any happier than nations with relatively wealthier neighbors. In fact, they found the opposite correlation; countries with positive qualities, such as high income, were indicative of higher levels of happiness in neighboring

countries. However, this could be the result of the fact that wealthy countries tend to have wealthy neighbors. This discovery prompted researchers to search for additional determinants. For example, Diener et al. (1995) find country-level characteristics such as individualism, equality, and human rights positively correlated with happiness. They also found a positive correlation with happiness for individual-level characteristics, such as positive personality, achievement of goals, and genetics (Diener & Lucas 2009, Diener 1984, Austin and Vancouver 1996, Cantor and Sanderson 1999, Tellegen et al. 1988, in Diener et al. 1999). Recent studies (Frey and Stutzer 2005, Borooah 2006) also find correlations between physical and mental health, social status, family life and happiness in individuals.

There are studies examining happiness and its determinants across individuals and across space, and there are others who have also examined variation over time. Changes in happiness over time are debated in theory and empirics. Along with the expansion of known factors of happiness came a competing hypothesis to the theory that happiness levels can change (i.e., an increase in income leads to an increase in happiness). The 'setpoint' theory holds that every individual has a 'set' level of happiness determined by genetics. This theory, popular among psychologists, implies that there is no point trying to create policies that improve social welfare as everyone will eventually adapt to their new circumstances and return to their original level of happiness (Easterlin 2003, Graham 2008). The setpoint theory contrasts sharply with economic theories that suggest that happiness can change with circumstances. Research has shown that these two theories apply to different factors that determine an individual's happiness. Setpoint theory is not applicable to non-pecuniary factors such as health and family life (Easterlin 2003).

People who have experienced a significant decrease in health have, on average, significantly lower happiness levels. Conversely, people who experience a significant positive impact in their lives, for example getting married, have significantly higher levels of happiness than those who do not. For pecuniary factors, such as the accumulation of material goods, evidence suggests that the setpoint theory applies (Easterlin 2003).

This implies that the economic prediction of the ever-positive relationship between social and economic welfare is false, and indeed studies have shown that there is a limit: increases in income only lead to increases in happiness until annual income is approximately $75,000[1] (Graham 2005, Kahneman and Deaton 2010). New research, however, gives evidence to suggest that people with higher happiness levels tend to perform better in the labor market and thus earn higher wages (Graham 2005). Thus causality could run from happiness to income, and not only from income to happiness.

Although material factors may not increase happiness, food - as an indicator and determinant of physical health - might be different. Graham (2008) examines this hypothesis using self-reported health data from the United States, Latin America and Russia, and finds a strong relationship between reported health and happiness - even stronger than the relationship between income and happiness. Although, like the relationship between income and happiness, the causality is ambiguous: healthier people tend to be happier, and happier people tend to be healthier. Dolan et al. (2008) find a similar relationship between health and happiness.

Because health, both mental and physical, has such a significant effect on well-

[1] Measured in U.S. 2009 dollars.

being, it is important to understand what variables affect health, and how these variables, through health, affect well-being. Adequate protein consumption has long been known to be an important factor in determining health (United States Department of Agriculture 2011, World Health Organization et al. 2007), and thus it is important to know if it has a significant effect on well-being as well.

Macht and Dettmer (2006) conducted microeconomic studies examining the relationship between food and well-being, specifically the different effects of eating either chocolate or an apple on one's mood. Results indicated that the mood of the individual was improved after eating either the apple or the chocolate, but that chocolate improved their mood to a greater extent. While these results and those of similar studies (Stradberg 2008) focusing on such specific foods are interesting, they have not been generalized to larger food groups. No research thus far has been conducted specifically addressing the relationship between protein consumption and happiness across countries. My research will attempt to fill the gap by examining the link between protein, a determinant of health, and happiness.

This paper attempts to study one of the possible factors of utility, food and health in the form of protein consumption. It is organized into the following 4 sections: Section 2 outlines the general economic theory used in this paper, Section 3 examines the main variables of interest and their distributions, Section 4 outlines the estimation issues, main results and robustness checks, and Section 5 concludes with an outline of the implications of these results and suggestions for future research.

2. Theory

Most economic models begin with optimizing behavior, and in the instance of consumer choice, consumers are assumed to maximize utility. The implications of this are derived and often tested. Here, rather than test a derivation of the model, I focus on the utility function directly. To model happiness I begin with Maslow's hierarchy of needs, which has often been used as a framework for measuring and determining quality-of-life for individuals and across countries (Sirgy 1986, Hagerty 1999, Veenhoven and Ehrhardt 1995). Within his pyramid of needs Maslow specifies five different levels, in which the fulfillment of each level requires that the needs of the immediately preceding level be met; the more needs that are met, the happier the individual is likely to be.

At the base of the pyramid lies the most basic level: physiological needs. These consist of breathing, food, water, sleep, sex, homeostasis, and excretion, and must be fulfilled before any higher level needs can be met. The second level represents safety needs: the need for security of body, employment, resources, mortality, family, health and property. The satisfaction of these needs provides the individual with a safe and predictable world, allowing them to move on and focus on the next level: needs of love and belonging. This level consists of fulfilling friendships, family, and sexual intimacy. After these needs have been met one can focus on achieving the needs outlined in the esteem level, including the need for self-esteem, confidence, achievement, respect of others, and respect of oneself by others. If these needs are met one can advance to the final and highest level of need: self-actualization. Within this level are the needs for morality, creativity, spontaneity, problem solving, lack of prejudice, and acceptance of facts. Diet composition, the component I am most interested in, lies within the category

of food in the first level.

From this hierarchy we can devise a set of equations that lead us to our individual utility equation:

$$\textbf{Physiological Needs} = P = a_0 + a_1*breathing + a_2*food + a_3*water + a_4*sleep + a_5*sex + a_6*homeostasis + a_7*excretion \quad (1)$$

$$\textbf{Safety Needs} = S = b_0 + b_1*body + b_2*employment + b_3*resources + b_4*mortality + b_5*family + b_6*health + b_7*property \quad (2)$$

$$\textbf{Love and Belonging Needs} = L = c_0 + c_1*family + c_2*friendship + c_3*sexual\ intimacy \quad (3)$$

$$\textbf{Esteem Needs} = E = d_0 + d_1*self\text{-}esteem + d_2*confidence + d_3*achievement + d_4*respect\ for\ others + d_5*respect\ by\ others \quad (4)$$

$$\textbf{Self-Actualization Needs} = SA = e_0 + e_1*morality + e_2*creativity + e_3*spontaneity + e_4*problem\ solving + e_5*lack\ of\ prejudice + e_6*acceptance\ of\ facts \quad (5)$$

Our individual utility equation is a function of all of the different levels of need, where U_{ijt} represents the utility for individual *i* in country *j* time *t*. I choose to use a linear model, as others have done (Frey and Stutzer, 2005), because the range of answers in the data used is large enough to be considered continuous.

$$U_{ijt} = \alpha_0 + P_{ijt} + S_{ijt} + LB_{ijt} + E_{ijt} + SA_{ijt} + \varepsilon_{ijt} \quad (6)$$

$$\alpha_0 = a_0 + b_0 + c_0 + d_0 + e_0 \quad (7)$$

$$U_{ijt} = \alpha_0 + a_1*breathing_{ijt} + a_2*food_{ijt} + a_3*water_{ijt} + a_4*sleep_{ijt} + a_5*sex_{ijt} + a_6*homeostasis_{ijt} + a_7*excretion_{ijt} + b_1*body_{ijt} + b_2*employment_{ijt} + b_3*resources_{ijt} + b_4*mortality_{ijt} + b_5*family_{ijt} + b_6*health_{ijt} \quad (8)$$

$$+ b_7 * property_{ijt} + c_1 * family_{ijt} + c_2 * friendship_{ijt} + c_3 * sexual\ intimacy_{ijt}$$

$$+ d_1 * self\text{-}esteem_{ijt} + d_2 * confidence_{ijt} + d_3 * achievement_{ijt} + d_4 * respect\ for\ others_{ijt}$$

$$+ d_5 * respect\ by\ others_{ijt} + e_1 * morality_{ijt} + e_2 * creativity_{ijt} + e_3 * spontaneity_{ijt}$$

$$+ e_4 * problem\ solving_{ijt} + e_5 * lack\ of\ prejudice_{ijt} + e_6 * acceptance\ of\ facts_{ijt} + \varepsilon_{ijt}$$

Because adequate protein consumption is necessary to maintain good physical health, and good physical health is an indicator of happiness in our theory, we would expect an increase in protein consumption to lead to an increase in happiness up to a point. Additionally tryptophan, an essential amino acid contained in most protein-based foods, is known to increase serotonin levels. A deficiency in serotonin is thought to be a contributing factor to low moods (Young and Leyton, 2002), and so we would expect an increase in protein consumption to lead to a decrease in low moods. After the optimal amount of consumption, any increased consumption may result in a decrease in happiness, as overconsumption of protein can lead to poor physical health. This suggests that the coefficient β_1 may have a positive sign until it reaches a certain threshold, after which it will have a negative sign.

3. Summary Statistics

The available data come from the World Value Surveys (WVS), European Value Surveys (EVS) and the Food and Agriculture Organization (FAO) of the United Nations. The WVS/EVS data consist of survey results from 97 countries across five different time periods ranging from 1981 to 2008. These surveys were first created with the intention of

providing social scientists and policy-makers the tools to better understand the "beliefs, values and motivations of people throughout the world" (World Values Survey). They are now conducted by a Principal Investigator, who is a member of the World Value Survey Association (WVSA) and chosen by the World Value Survey Executive Committee (WVSEC), of each participating country. These individuals are responsible for carrying out the surveys in their country, and surveys are conducted in one-on-one interviews with a representative sample of the population.

These surveys ask questions that reveal the beliefs, attitudes, and thoughts – including life satisfaction – of the individual respondents. As previously discussed, life satisfaction can be used as a measurement of subjective well-being (SWB), which is a proxy for utility. While these surveys do give us tremendous insight into the lives of these individuals, we are limited by several factors. First, the surveys were not carried out in the same year in every country; secondly, as this is a survey it is subject to biases, such as interviewer bias, and the fact that some individuals may interpret, and thus answer, the questions differently.

In order to see if the type of food consumed has an effect on utility, we need to be able to measure utility. In an ideal situation we would be able to match up self-reported happiness with food consumption on an individual level, as well as have access to data that reveal each individual's physiological needs, safety needs, love and belonging needs, esteem needs, and self-actualization needs as outlined in the theory. Data this specific, however, do not exist. Therefore we must look at this relationship from the aggregate level by substituting the average protein consumption for a country into each individual's utility equation within that country, as well as survey data covering values, ideals, current

life satisfaction and situation are a viable alternative. These data sets can be combined with comprehensive country consumption data that include the amount of food available per person in a given country.

The aggregate food data come from the FAO and consist of the diet composition of 217 countries/regions from 1961-2007. They are further broken down into the food supply (kcal/capita/day) and protein supply quantity (g/capita/day) for over 100 different types of food items. While it would be ideal to have actual food consumption data, such data do not exist, and therefore food supply is used as a proxy for consumption.

The FAO data were combined with the WVS/EVS data resulting in survey and food consumption data for 87 countries between the years of 1981 and 2007. Table 1 lists the years each country participated in the survey. We see that Spain participated most, and has survey results for 6 different years within this time period. Following Spain, the countries with the largest number of surveys are Argentina, Finland, Japan, Mexico, Poland, the Republic of Korea, South Africa, Sweden, and the United States of America, each of which have survey results for five different years between 1981 and 2007. The majority of countries, fifty-two, have survey results for only one or two years within this time period.

The survey includes two possible measures of utility: happiness and life satisfaction. Table 2 reports findings depicting the mean reported happiness by country. The range of happiness ratings runs from 1 (“Very Happy”) to 4 (“Not Happy at All”). We can see by examining the data that there appear to be significant differences in average happiness between countries. Table 3 contains the mean satisfaction level reported by country, where 1 indicates highly dissatisfied and 10 indicates highly

satisfied. Psychologists have suggested that asking an individual to answer the question "How satisfied are you with your life right now?" gives a more accurate representation of their SWB than does asking that individual to report how happy they are with their life (Graham, 2008). This is because using the word "happy" is more likely to cause the individual to examine their current emotional state, whereas the word "satisfied" is more likely to cause them to assess their life as a whole. It is interesting to note that while Tanzania has the lowest reported mean happiness value, indicating that they are the happiest country, they also have the lowest reported mean satisfaction, indicating that they are the least satisfied country. These conflicting results bear further investigation. The results of the other countries remain fairly consistent: average satisfaction by country and average happiness by country have a correlation coefficient of -0.7931. Table 4 reports the mean happiness and life satisfaction by year. There is no significant time trend in reported happiness or satisfaction levels[2]. This confirms the findings of other happiness studies, which use 'setpoint' theory (Easterlin 2003) to explain why happiness has not increased over time, even with an increase in the GDP of most countries.

Tables 5 and 6 report mean protein consumption in grams per capita per day by country and by year, respectively. We can see from Table 5 that there is much variation between countries in this regard: protein consumption ranges from 43.975 g/capita/day in

[2] Two time series regressions examining the effect of Year on Mean Satisfaction and Mean Happiness were performed. The coefficients of Year were -.0332129 and -.0022685, respectively, neither of which are statistically significant.

Bangladesh to 122 g/capita/day in Israel. Table 6 depicts the average protein consumption by year, and here we see a significant downward trend[3].

Table 7 contains the summary statistics of the variables used in my final equation. Satisfaction was chosen to be the dependent variable because it has been suggested by psychologists that using the word "satisfied" as opposed to "happy" is more likely to elicit a comprehensive response, as the word "happy" is more closely liked with the individual's current emotional state (Graham, 2008). I performed a robustness check, however, using happiness as the dependent variable and obtained similar results. Satisfaction is measured on a scale of 1 – 10, 1 indicating highly dissatisfied, and 10 indicating highly satisfied. Protein is measured in grams/capita/day, as previously stated. Food in kilocalories/capita/day was also included as another measure of consumption, and a ratio of the two after protein has been transformed into kilocalories/capita/day was also included.

Job Satisfaction and Employment Status were included as proxies for safety of employment (within the "safety needs" level) and achievement (within the "esteem needs" level). Job Satisfaction was measured on a scale of 1 to 10, with 1 indicating that the respondent is dissatisfied with his/her job, and 10 indicating that the respondent is satisfied with his/her job. Employment Status consisted of 8 different options, including full-time, part-time, self-employed, retired, housewife, student, unemployed, and other. Subjective Health was included as a proxy for safety of body and health (within the "safety needs" level), as well as many of the physiological needs (although most of these

[3] A time series regression examining the effect of Year on Mean Protein Consumption was performed, and a coefficient for Year of -.6705865 was found to be statistically significant at the 1% level.

needs are assumed to be met, as they are necessary conditions for being alive, and thus for taking part in the survey). This variable was measured on a scale of 1 – 5, with 1 indicating very good health and 5 indicating very poor health. Income level was also included as a proxy for "physiological needs", because as income increases one is able to meet more of one's basic needs. Income is measured through a self-reporting method in which the individual places themselves in one of 11 different levels, with level 1 indicating the lowest level of income and level 11 indicating the highest. While it is not stated explicitly in the survey question, I believe it is safe to assume that the individual will use their own country's income distribution as their reference point, and therefore that the income levels reported here will be relative to other incomes within that individual's country.

Trust in People, Homosexuality is Justifiable, and Confidence in Police were included to serve as proxies for respect for others (within the "esteem needs" level), lack of prejudice (within "self-actualization needs") and safety of body, property, and family (within the "safety needs" level), respectively. Trust in People was measured as either 1 or 2, 1 indicating "most people can be trusted", and 2 indicating "one can't be too careful". Homosexuality is Justifiable was measured on a scale of 1 – 10, 1 indicating the respondent views homosexuality as never justifiable, and 10 indicating they believe it is always justifiable. Confidence in Police was measured as a range from 1 – 4, 1 indicating the respondent had a great deal of confidence in the police, and 4 indicating they had no confidence at all in the police.

Marital Status and Religious Status were included as proxies for the "love and belonging needs". Marital Status consisted of 8 different options; married, living together

as married, divorced, separated, widowed, single/never married, divorced or separated or widowed, and living apart but in a steady relationship. Religious Status was measured through 4 options; respondents could indicate that they were a religious person, not a religious person, a convinced atheist, or other.

Using the available data, the estimation equation is:

$$Satisfaction_{ijt} = \alpha + \beta_1\, protein_{ijt} + \beta_2\, kilocalories_{ijt} + \beta_3\, job\ satisfaction_{ijt} \quad (9)$$
$$+ \beta_4\, employment\ status_{ijt} + \beta_5\, subjective\ health_{ijt} + \beta_6\, income\ level_{ijt}$$
$$+ \beta_7\, trust\ others_{ijt} + \beta_8\, confidence\ in\ police_{ijt} + \beta_9\, religious_{ijt}$$
$$+ \beta_{10}\, homosexuality\ is\ justifiable_{ijt} + \beta_{11}\, marital\ status_{ijt} + \beta_{12}\, gender_{ijt}$$
$$+ \beta_{13}\, year_{ijt} + \varepsilon_{ijt}$$

Where *i* represents and individual in country *j* in time *t.* The expected signs for β_1 and β_2 are positive, as both protein and kilocalories consumed provide increases in nutrition and health, and therefore are expected to increase satisfaction. The expected signs for β_3, β_6, and β_{10} are positive, and the expected signs for β_5, β_7, and β_8 are negative. Employment Status, Religious, Marital Status, and Gender are represented with separate dummy variables, and thus their coefficients have no predicted signs.

4. Analysis

The following sections describe the estimation issues, main results, and robustness checks that I performed. In section 4.1 I check for and address multicollinearity and heterosckedasticity among the variables. Section 4.2 discusses the results from my main equation, and section 4.3 outlines several robustness checks including treating several variables as dummy variables instead of continuous variables,

using another objective measure of health, taking Satisfaction instead of Health as the dependent variable, and collapsing the data.

4.1 Estimation Issues

The pairwise correlation coefficients for Equation (9) indicate that only food in kilocalories per capita per day and protein in grams per capita per day have significant multicollinearity, with a correlation coefficient of 0.9731. This is confirmed by a calculation of the variance inflation factors (VIF), for which the VIF of protein is 5.9101. The pairwise correlation coefficient between average Satisfaction and average Job Satisfaction, however, is 0.8661, suggesting that the latter might be a dominant variable. This is addressed further in Section 4.3 (Robustness). To correct for the multicollinearity between food in kilocalories per capita per day and protein in grams per capita per day, I transformed the protein variable from grams per capita per day to kilocalories per capita per day[4], and then used a ratio of protein to food in place of using protein and food as separate variables. This ratio represents the percentage of one's daily intake of kilocalories that come from protein. It is also probable that this ratio represents the quality of food, or amount of food choice that is available to an individual. As the amount of protein in their diet increases, the availability of protein to them also increases. The new estimating equation is now:

$$Satisfaction_{ijt} = \alpha + \beta_1 \, protein_{ijt} / kilocalories_{ijt} + \beta_2 \, job\ satisfaction_{ijt} \qquad (10)$$

[4] There are 4 kilocalories in 1 gram of protein (USDA National Nutrient Database). Protein in grams per capita per day was multiplied by 4 to obtain protein in kilocalories per capita per day.

$$+ \beta_3\, employment\ status_{ijt} + \beta_4\, subjective\ health_{ijt} + \beta_5\, income\ level_{ijt}$$

$$+ \beta_6\, trust\ others_{ijt} + \beta_7\, confidence\ in\ police_{ijt} + \beta_8\, religious_{ijt}$$

$$+ \beta_9\, homosexuality\ is\ justifiable_{ijt} + \beta_{10}\, marital\ status_{ijt} + \beta_{11}\, gender_{ijt}$$

$$+ \beta_{12}\, year_{ijt} + \varepsilon_{ijt}$$

The residuals were then visually examined for heteroskedasticity by graphing them against each independent variable. It appears from the graphs that Job Satisfaction, Employment Status, Homosexuality is Justifiable, Year, and Marital Status might be causing heteroskedasticity. A Park test with each of the independent variables finds that all independent variables except Religious are driving the heteroskedasticity. Using the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity results in a χ^2 value of 897.32, confirming that there is strong evidence for heteroskedasticity. This is corrected for using the heteroskedasticity-corrected standard errors.[5]

Additionally, because I do not have ideal data, and it is impossible to find proxies for all of the needs outlined in the guiding equation, omitted variable bias is inevitable.

4.2 Main Results

After running the final regression, Equation (10), with heteroskedasticity-corrected standard errors, and correcting for multicollinearity, the results in Table 8 show that all variables except for year and gender are statistically significant and have the expected signs.

[5] Because usually time series problems such as serial correlation and stationarity depend on sequence, and I have cross-section data, I do not conduct tests for serial correlation or stationarity.

Protein as a percentage of daily kilocalories consumed has a statistically significant and positive effect on reported satisfaction, as was predicted. An increase in Protein/Food (kcal/capita/day) consumption of one standard deviation (0.013) would cause Satisfaction to increase by approximately 3.037% of its standard deviation (2.460), which translates into an increase in reported Satisfaction of 0.0747, holding all else constant. For comparison we can see that an increase of one standard deviation in Income (2.45) causes Satisfaction to increase by approximately 2.092% of its standard deviation, whereas an increase of one standard deviation in Job Satisfaction causes Satisfaction to increase by 30.522% of its standard deviation, holding all else constant.

F-Statistics were calculated for Employment Status, Confidence in Police, Religious, and Marital Status. The F-Statistics were all significant, indicating that these variables all have a significant effect on Satisfaction. The reference level for Employment Status is “full time”, for Trust-Most People Can Be Trusted is “can’t be too careful”, for Confidence in Police is “a great deal”, for Religious is “a religious person”, for Marital Status is “married”, and for gender the reference level is male. The dummy variables “religious-other answer”, “marital-divorced, separated or widowed”, and “marital-living apart but steady relationship (married, cohabitation)” were all dropped due to lack of observations.

4.3 Robustness

I performed several checks for robustness to address several different concerns regarding the quantification of certain variables, the fact that the ratio of Protein/Food is the only measure of objective health included in my equation, the decision to use

Satisfaction as the dependent variable, and the number of observations and variance in data. These robustness checks include: (i) running the regression with Job Satisfaction, Subjective Health, Income Level, and Homosexuality is Justifiable as dummy variables as well, (ii) including Infant Mortality Rate as another measure of objective health, (iii) using Happiness as the dependent variable instead of Satisfaction, and (iv) running the regression with collapsed means of each variable by country and year without including Protein / Food, and then running a regression examining the effect of Protein / Food on the leftover variation in Satisfaction.

Transforming Job Satisfaction, Subjective Health, Income Level, and Homosexuality is Justifiable into dummy variables resulted in similar coefficients and levels of statistical significance as the original equation. This makes sense as very little in the equation is changed.

Including another measure of objective health, such as the Infant Mortality Rate, taken from the CIA World Factbook, of each country during each year, would help to control for the fact that the only measures of objective health included in the original model are protein and calorie consumption. By incorporating this additional measure of health, we can see if protein as a proportion of total calorie consumption has a significant effect on satisfaction other than being the sole measure of objective health. The results show that Protein/Food is *not* statistically significant when another measure of objective health is included. However, this could be explained by the fact that the average protein consumption within a country is correlated with the infant mortality rate of that country. Indeed, the pairwise correlation coefficient between Protein / Food and Infant Mortality Rate is -0.5823, which is enough to cause concern for multicollinearity. With the

inclusion of Infant Mortality Rate, the coefficient on Year increases in magnitude and becomes statistically significant; otherwise the statistical significance of the variables and the magnitude of their coefficients remain about the same.

The third check for robustness consisted of substituting Happiness as the independent variable instead of Satisfaction. Because smaller values of Happiness indicate a happier individual, and the reverse is true for Satisfaction, we would expect the signs of all the variables to switch. The regression results show that this is indeed the case, however, the employment dummy variables are no longer significant when using Happiness as the dependent variable. The coefficient for Protein/Food (-4.036) remains statistically significant at the one percent level, and is now negative, as was expected. The coefficient -4.036 indicates that an increase of one standard deviation in Protein/Food (0.013) is associated with a decrease in Happiness of approximately 6.092% of its standard deviation. This translates into a 0.052 decrease in reported happiness levels, indicating a happier individual.

In order to address the large number of observations and the difference in variation between the country level FAO data and the individual level WVS/EVS data, I perform the fourth robustness check. For this check I explore the relationship between all of the variables after collapsing them to their mean values for each country-year combination, and determining the remaining variation in Satisfaction after controlling for all variables except Protein/Food. This robustness check is performed in order to match the variation in the dependent variable, Satisfaction, to the variation in the main variable of interest, Protein/Food. This provides us with a more realistic number of observations,

as there are only 218 different country-year combinations of Protein/Food. The smaller number of observations will reduce the t-statistics.

In performing this robustness check I first collapse all variables used in Equation 10, transforming them into their mean values for every country-year combination. I then check the variables again for multicollinearity. I find that average Job Satisfaction is highly correlated with the dependent variable, Satisfaction averaged by country and year. The correlation coefficient between the two is 0.8661, suggesting that Job Satisfaction is a dominant variable. Additionally, as can be seen in Table 7, including Job Satisfaction dramatically reduces the sample size. When including Job Satisfaction in the calculation of CFX the number of observations is 24,583, when not including Job Satisfaction the number of observations rises to 173,968.

I then create a new variable, CFX, representing the remaining variation in satisfaction for each country-year combination after controlling for all of the variables used in Equation 10. This is done by running a regression on Satisfaction consisting of all of the variables included in Equation 10 except for Protein/Food, and including a dummy variable for every country-year combination.

$$
\begin{aligned}
&Satisfaction_{ijt} \qquad (11)\\
&= \alpha + \sum_{j=1}^{218} (\beta_j\ country_j) + \beta_2\ job\ satisfaction_{ijt} + \beta_3\ \ employment\ status_{ijt}\\
&+ \beta_4\ subjective\ health_{ijt} + \beta_5\ income\ level_{ijt} + \beta_6\ trust\ others_{ijt}\\
&+ \beta_7\ confidence\ in\ police_{ijt} + \beta_8\ religious_{ijt}\\
&+ \beta_9\ homosexuality\ is\ justifiable_{ijt} + \beta_{10}\ marital\ status_{ijt} + \beta_{11}\ gender_{ijt}\\
&+ \beta_{12}\ year_{ijt} + \varepsilon_{ijt}
\end{aligned}
$$

Where i represents an individual in country j in time t, $country_j$ is a vector of dummy variables representing every country-year combination, from $j = 1$ to $j = 218$.

I then transform all β_j's into the difference between the coefficient for each country-year dummy variable and the average of all the coefficients for all country-year dummy variables[6]. These values tell us the effect on reported Satisfaction of being in a particular country in a given year on the average reported Satisfaction for all countries in all years, holding all else constant. The variable CFX is the value of the coefficient for each country-year dummy. This variable represents the remaining variation in satisfaction, with respect to the mean reported satisfaction of all countries in all time periods, within that country after controlling for all other variables.

I then run a regression examining the relationship between Protein/Food for each country-year and the CFX value for that country-year.

$$CFX_{ijt} = \alpha + \beta_1 \, protein_{ijt} / kilocalories_{ijt} \quad (12)$$

When including Job Satisfaction in the initial equation to determine the CFX values, the coefficient for Protein/Food is 0.780 with a p-value of 0.444. There is no statistically significant relationship between Protein/Food and CFX when including Job Satisfaction. However, because including the variable Job Satisfaction reduces the sample size by nearly 86%, I run Equation (11) again, this time without the variable Job Satisfaction. After completing the process of determining the new CFX values from this equation, I then run Equation (12) again and find that the coefficient for Protein/Food is 13.352 with a p-value of 0.003. After removing the dominant variable, Protein/Food has a statistically significant effect on the remaining variation in Satisfaction. The coefficient 13.352

[6] This is done with the grand2 command in STATA.

implies that an increase of one standard deviation in Protein / Food (kcal/capita/day) causes the remaining unexplained variation in satisfaction to increase by approximately 20.37% of its standard deviation.

The results of these four robustness checks are shown in Table 9. ‘i’ indicates results from the robustness regression after transforming Job Satisfaction, Subjective Health, Income Level, and Homosexuality is Justifiable into dummy variables, ‘ii’ indicates results from the robustness regression including Infant Mortality Rate, ‘iii’ indicates results from the regression including Happiness as the dependent variable, and ‘iv’ indicates results from Equation (12) not including Job Satisfaction. The reference levels remain the same for all dummy variable categories.

5. Conclusion

In conclusion, the results of this study show that protein consumption as a percentage of total calorie consumption appears to be at least statistically significant, it is unclear as to whether or not an increase 0.0747 has any economic significance, as that is only approximately 3% of the standard deviation of Satisfaction. When controlling for other measures of objective health, such as the infant mortality rate, issues of multicollinearity arise, which must be addressed before any conclusions about the significance of protein consumption as a percentage of total calorie consumption can be reached. After collapsing all observations to their means we still see a statistically significant effect of protein as a percentage of total calories consumed on reported average satisfaction. The next step in this area of research would be to collect data

measuring all the independent variables and protein consumption on an individual level, and see if these results still hold.

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TABLE 1 - Years In Which The Survey Was Conducted

Country	Year	Country	Year
Albania	1998, 2002	Latvia	1996, 1999
Algeria	2002	Lithuania	1997, 1999
Argentina	1984, 1991, 1995, 1999, 2006	Malaysia	2006
Armenia	1997	Mali	2007
Australia	1981, 1995, 2005	Malta	1983, 1991, 1999
Austria	1990, 1999	Mexico	1981, 1990, 1996, 2000, 2005
Azerbaijan	1997	Morocco	2001, 2007
Bangladesh	1996, 2002	Netherlands	1981, 1990, 1999, 2006
Belarus	1996, 2000	New Zealand	1998, 2004
Bosnia and Herzegovina	1998, 2001	Nigeria	1990, 1995, 2000
Brazil	1991, 1997, 2006	Norway	1982, 1990, 1996
Bulgaria	1990, 1997, 1999, 2006	Pakistan	1997, 2001
Burkina Faso	2007	Peru	1996, 2001
Canada	1982, 1990, 2000, 2006	Philippines	1996, 2001
Chile	1990, 1996, 2000, 2006	Poland	1989, 1990, 1997, 1999, 2005
China	1990, 1995, 2001, 2007	Portugal	1990, 1999
Colombia	1997, 1998, 2005	Republic of Korea	1982, 1990, 1996, 2001, 2005
Croatia	1996, 1999	Republic of Moldova	1996, 2002, 2006
Cyprus	2006	Romania	1993, 1998, 1999, 2005
Czech Republic	1998, 1999	Russian Federation	1995, 1999, 2006
Denmark	1981, 1990, 1999	Rwanda	2007
Dominican Republic	1996	Saudi Arabia	2003
Egypt	2000	Serbia	2006
El Salvador	1999	Serbia and Montenegro	1996, 2001
Estonia	1996, 1999	Slovakia	1998, 1999
Ethiopia	2007	Slovenia	1992, 1995, 1999, 2005
Finland	1981, 1990, 1996, 2000, 2005	South Africa	1982, 1990, 1996, 2001, 2006
France	1981, 1990, 1999, 2006	Spain	1981, 1990, 1995, 1999, 2000, 2007
Georgia	1996	Sweden	1982, 1990, 1996, 1999, 2006
Germany	1990, 1997, 1999, 2006	Switzerland	1989, 1996, 2007
Ghana	2007	Thailand	2007
Greece	1999	The former Yugoslav Republic of Macedonia	1998, 2001
Guatemala	2004	Trinidad and Tobago	2006
Hungary	1982, 1991, 1998, 1999	Turkey	1990, 1996, 2001, 2007
Iceland	1984, 1990, 1999	Uganda	2001
India	1990, 1995, 2001, 2006	Ukraine	1996, 1999, 2006
Indonesia	2001, 2006	United Republic of Tanzania	2001
Iran (Islamic Republic of)	2000, 2007	United States of America	1982, 1990, 1995, 1999, 2006
Ireland	1981, 1990, 1999	Uruguay	1996, 2006
Israel	2001	Venezuela (Bolivarian Republic of)	1996, 2000
Italy	1981, 1990, 1999, 2005	Viet Nam	2001, 2006
Japan	1981, 1990, 1995, 2000, 2005	Zambia	2007
Jordan	2001, 2007	Zimbabwe	2001
Kyrgyzstan	2003		

NOTES: 27 countries conducted the survey once during this time period, 25 countries conducted the survey twice during this time, 13 countries conducted it three times, 13 countries conducted it four times, 9 countries conducted it five times, and 1 country conducted the survey six times between 1981 and 2007.

TABLE 1 - Years In Which The Survey Was Conducted

Country	Year	Country	Year
Albania	1998, 2002	Latvia	1996, 1999
Algeria	2002	Lithuania	1997, 1999
Argentina	1984, 1991, 1995, 1999, 2006	Malaysia	2006
Armenia	1997	Mali	2007
Australia	1981, 1995, 2005	Malta	1983, 1991, 1999
Austria	1990, 1999	Mexico	1981, 1990, 1996, 2000, 2005
Azerbaijan	1997	Morocco	2001, 2007
Bangladesh	1996, 2002	Netherlands	1981, 1990, 1999, 2006
Belarus	1996, 2000	New Zealand	1998, 2004
Bosnia and Herzegovina	1998, 2001	Nigeria	1990, 1995, 2000
Brazil	1991, 1997, 2006	Norway	1982, 1990, 1996
Bulgaria	1990, 1997, 1999, 2006	Pakistan	1997, 2001
Burkina Faso	2007	Peru	1996, 2001
Canada	1982, 1990, 2000, 2006	Philippines	1996, 2001
Chile	1990, 1996, 2000, 2006	Poland	1989, 1990, 1997, 1999, 2005
China	1990, 1995, 2001, 2007	Portugal	1990, 1999
Colombia	1997, 1998, 2005	Republic of Korea	1982, 1990, 1996, 2001, 2005
Croatia	1996, 1999	Republic of Moldova	1996, 2002, 2006
Cyprus	2006	Romania	1993, 1998, 1999, 2005
Czech Republic	1998, 1999	Russian Federation	1995, 1999, 2006
Denmark	1981, 1990, 1999	Rwanda	2007
Dominican Republic	1996	Saudi Arabia	2003
Egypt	2000	Serbia	2006
El Salvador	1999	Serbia and Montenegro	1996, 2001
Estonia	1996, 1999	Slovakia	1998, 1999
Ethiopia	2007	Slovenia	1992, 1995, 1999, 2005
Finland	1981, 1990, 1996, 2000, 2005	South Africa	1982, 1990, 1996, 2001, 2006
France	1981, 1990, 1999, 2006	Spain	1981, 1990, 1995, 1999, 2000, 2007
Georgia	1996	Sweden	1982, 1990, 1996, 1999, 2006
Germany	1990, 1997, 1999, 2006	Switzerland	1989, 1996, 2007
Ghana	2007	Thailand	2007
Greece	1999	The former Yugoslav Republic of Macedonia	1998, 2001
Guatemala	2004	Trinidad and Tobago	2006
Hungary	1982, 1991, 1998, 1999	Turkey	1990, 1996, 2001, 2007
Iceland	1984, 1990, 1999	Uganda	2001
India	1990, 1995, 2001, 2006	Ukraine	1996, 1999, 2006
Indonesia	2001, 2006	United Republic of Tanzania	2001
Iran (Islamic Republic of)	2000, 2007	United States of America	1982, 1990, 1995, 1999, 2006
Ireland	1981, 1990, 1999	Uruguay	1996, 2006
Israel	2001	Venezuela (Bolivarian Republic of)	1996, 2000
Italy	1981, 1990, 1999, 2005	Viet Nam	2001, 2006
Japan	1981, 1990, 1995, 2000, 2005	Zambia	2007
Jordan	2001, 2007	Zimbabwe	2001
Kyrgyzstan	2003		

NOTES: 27 countries conducted the survey once during this time period, 25 countries conducted the survey twice during this time, 13 countries conducted it three times, 13 countries conducted it four times, 9 countries conducted it five times, and 1 country conducted the survey six times between 1981 and 2007.

TABLE 2 - Mean Reported Happiness by Country

Country	Mean	Std. Dev.	Freq.	Country	Mean	Std. Dev.	Freq.
United Republic of Tanzania	1.496	0.639	1,153	Jordan	1.971	0.669	2,417
El Salvador	1.533	0.671	1,252	Israel	1.982	0.788	1,182
Venezuela (Bolivarian Republic of)	1.550	0.692	2,390	Uganda	1.994	0.732	1,001
Iceland	1.598	0.563	2,576	Burkina Faso	1.994	0.749	1,523
Ireland	1.633	0.598	3,163	Germany	2.017	0.636	9,197
Netherlands	1.640	0.595	4,259	India	2.017	0.792	8,462
Saudi Arabia	1.648	0.654	1,499	Italy	2.032	0.636	6,276
Trinidad and Tobago	1.659	0.769	1,002	Algeria	2.036	0.670	1,237
Nigeria	1.659	0.820	5,002	Pakistan	2.037	0.734	2,707
Denmark	1.665	0.587	3,189	Bangladesh	2.041	0.638	3,017
Colombia	1.673	0.738	6,013	China	2.042	0.721	5,461
Switzerland	1.674	0.592	3,826	Republic of Korea	2.043	0.558	4,835
Australia	1.675	0.607	4,675	Rwanda	2.049	0.577	1,503
Thailand	1.676	0.624	1,530	Bosnia and Herzegovina	2.054	0.680	2,377
Sweden	1.676	0.588	4,983	Peru	2.067	0.829	2,699
New Zealand	1.689	0.555	2,137	Czech Republic	2.070	0.548	3,035
Malaysia	1.689	0.571	1,201	Poland	2.078	0.658	4,981
Canada	1.695	0.659	7,029	Greece	2.086	0.725	1,098
Philippines	1.708	0.661	2,397	Portugal	2.098	0.666	2,165
United States of America	1.709	0.630	8,079	Iran (Islamic Republic of)	2.118	0.801	4,965
Cyprus	1.746	0.744	1,049	Ethiopia	2.118	0.900	1,494
Viet Nam	1.748	0.602	2,470	Azerbaijan	2.120	0.598	1,964
Ghana	1.755	0.882	1,533	Croatia	2.160	0.638	2,175
Guatemala	1.769	0.784	999	Slovenia	2.160	0.691	3,985
Austria	1.773	0.642	2,907	Hungary	2.177	0.713	4,061
Norway	1.778	0.572	3,402	The former Yugoslav Republic of Macedonia	2.183	0.751	2,030
Mali	1.797	0.775	1,516	Serbia and Montenegro	2.199	0.685	3,677
France	1.808	0.612	4,779	Zambia	2.224	0.756	1,341
Indonesia	1.826	0.533	2,983	Slovakia	2.256	0.652	2,392
Mexico	1.828	0.791	8,674	Georgia	2.281	0.735	1,999
Finland	1.861	0.574	4,585	Serbia	2.310	0.727	1,189
South Africa	1.864	0.843	13,177	Estonia	2.323	0.651	1,967
Malta	1.876	0.678	1,838	Zimbabwe	2.329	0.891	1,000
Japan	1.885	0.630	5,483	Latvia	2.330	0.640	2,142
Chile	1.905	0.761	4,673	Lithuania	2.331	0.625	1,773
Argentina	1.918	0.735	5,296	Armenia	2.446	0.725	1,929
Uruguay	1.923	0.688	1,986	Russian Federation	2.447	0.742	6,378
Turkey	1.931	0.881	8,881	Romania	2.467	0.724	5,211
Brazil	1.934	0.690	4,421	Ukraine	2.472	0.737	4,795
Egypt	1.939	0.573	2,994	Belarus	2.499	0.708	2,923
Dominican Republic	1.949	0.785	410	Bulgaria	2.514	0.795	3,953
Kyrgyzstan	1.960	0.606	1,035	Republic of Moldova	2.531	0.744	2,967
Spain	1.964	0.614	11,097	Albania	2.570	0.767	1,960
Morocco	1.966	0.734	3,457				
				Total	1.967	0.741	300,443

NOTES: Happiness is measured on a scale of 1-4, 1 indicating "Very Happy", and 4 indicating "Not Happy at All".

TABLE 3 - Mean Reported Satisfaction Level by Country

Country	Mean	Std. Dev.	Freq.	Country	Mean	Std. Dev.	Freq.
Colombia	8.306	1.980	9,022	South Africa	6.603	2.629	13,154
Denmark	8.207	1.846	3,215	Poland	6.549	2.339	5,113
Malta	8.158	1.782	1,851	Kyrgyzstan	6.482	2.574	1,043
Switzerland	8.107	1.747	3,836	Croatia	6.409	2.223	2,189
Iceland	8.045	1.599	2,592	Peru	6.405	2.413	2,681
Ireland	7.956	1.889	3,215	Iran (Islamic Republic of)	6.403	2.406	5,171
Austria	7.952	1.882	2,974	Jordan	6.395	2.769	2,413
Guatemala	7.951	2.086	999	Hungary	6.264	2.454	4,076
Mexico	7.830	2.125	8,700	Republic of Korea	6.206	2.259	4,537
Finland	7.827	1.634	4,605	Ghana	6.120	2.630	1,528
Sweden	7.822	1.757	5,013	Turkey	6.106	2.696	8,877
Canada	7.821	1.770	7,063	Bangladesh	6.094	2.237	2,976
New Zealand	7.786	1.959	2,099	Mali	6.092	2.592	1,430
Netherlands	7.764	1.490	4,263	India	6.077	2.454	8,320
Norway	7.738	1.832	3,405	Zambia	6.059	2.497	1,463
United States of America	7.617	1.897	8,125	Slovakia	6.049	2.231	2,411
Australia	7.581	1.833	4,675	Serbia	6.009	2.087	1,175
El Salvador	7.496	2.426	1,229	Morocco	5.781	2.345	3,458
Brazil	7.406	2.394	4,410	Algeria	5.675	2.864	1,269
Cyprus	7.346	2.030	1,050	Uganda	5.651	2.475	1,002
Uruguay	7.296	2.091	1,989	Serbia and Montenegro	5.643	2.423	3,712
Saudi Arabia	7.282	2.274	1,494	Bosnia and Herzegovina	5.613	2.306	2,397
Trinidad and Tobago	7.260	2.225	999	Burkina Faso	5.570	2.181	1,499
Chile	7.242	2.162	4,678	Estonia	5.458	2.277	2,011
Thailand	7.213	1.806	1,532	Romania	5.449	2.517	5,106
Argentina	7.193	2.165	5,305	The former Yugoslav Republic of Macedonia	5.402	2.494	2,031
Dominican Republic	7.127	2.466	410	Azerbaijan	5.393	2.293	1,963
Venezuela (Bolivarian Republic of)	7.122	2.787	2,385	Egypt	5.357	3.353	2,998
Germany	7.066	1.967	9,508	Bulgaria	5.095	2.432	4,008
Italy	7.056	2.140	6,321	Lithuania	5.092	2.638	1,996
Portugal	7.053	2.064	2,168	Latvia	5.068	2.307	2,200
Israel	7.026	2.175	1,190	Russian Federation	5.053	2.613	6,513
Spain	6.970	1.913	11,203	Ethiopia	4.993	2.014	1,490
Indonesia	6.925	2.125	2,896	Albania	4.966	2.055	1,991
Viet Nam	6.863	1.980	2,474	Rwanda	4.965	2.112	1,503
France	6.856	2.000	4,790	Pakistan	4.853	1.464	1,693
Malaysia	6.838	1.789	1,200	Georgia	4.681	2.608	1,997
China	6.837	2.378	5,441	Republic of Moldova	4.595	2.430	3,000
Czech Republic	6.813	2.027	3,040	Belarus	4.497	2.209	3,038
Slovenia	6.809	2.155	4,060	Ukraine	4.482	2.473	4,822
Philippines	6.746	2.443	2,399	Armenia	4.318	2.366	1,989
Nigeria	6.705	2.501	5,008	Zimbabwe	3.945	2.792	1,000
Greece	6.673	2.190	1,133	United Republic of Tanzania	3.866	3.220	1,145
Japan	6.633	1.879	5,537				
				Total	6.650	2.460	303,889

NOTES: Satisfaction is reported on a scale of 1-10, 1 indicating "Dissatisfied" and 10 indicating "Satisfied"

TABLE 4 - Mean Reported Happiness and Satisfaction by Year

	Happiness		Satisfaction	
Year	Mean	Freq.	Mean	Freq.
1981	1.872 (0.630)	13,399	7.354 (2.017)	13,603
1982	1.859 (0.647)	8,526	7.256 (2.189)	9,502
1983	2.046 (0.563)	455	7.952 (1.913)	461
1984	1.844 (0.650)	1,901	7.396 (1.990)	1,900
1989	1.836 (0.573)	2,318	7.673 (2.179)	2,328
1990	1.956 (0.725)	37,966	7.183 (2.163)	38,691
1991	2.052 (0.767)	4,137	7.105 (2.389)	4,142
1992	2.376 (0.711)	986	6.293 (2.210)	1,023
1993	2.373 (0.683)	1,102	5.879 (2.333)	1,095
1995	1.914 (0.747)	15,380	6.583 (2.473)	15,307
1996	2.061 (0.773)	32,729	6.032 (2.661)	31,571
1997	2.178 (0.713)	10,924	6.249 (2.722)	13,324
1998	2.078 (0.756)	11,405	6.533 (2.468)	11,452
1999	2.034 (0.740)	35,750	6.737 (2.441)	36,166
2000	1.813 (0.725)	17,651	6.746 (2.606)	17,870
2001	1.988 (0.783)	30,647	5.777 (2.610)	30,386
2002	2.225 (0.720)	4,707	5.368 (2.468)	4,723
2003	1.775 (0.653)	2,534	6.953 (2.433)	2,537
2004	1.643 (0.536)	945	7.892 (1.860)	927
2005	1.854 (0.716)	16,010	7.353 (2.141)	15,908
2006	1.904 (0.716)	26,746	6.846 (2.177)	26,758
2007	1.918 (0.766)	24,225	6.462 (2.420)	24,215
Total	1.967 (0.741)	300,443	6.650 (2.460)	303,889

NOTES: Happiness is measured on a scale of 1-4, 1 indicating "Very Happy", and 4 indicating "Not Happy at All". Satisfaction is measured on a scale of 1-10, 1 indicating "Dissatisfied" and 10 indicating "Satisfied". Standard deviations are in parentheses.

TABLE 5 - Mean Protein Consumption by Country

Country	Mean	Std. Dev.	Freq.	Country	Mean	Std. Dev.	Freq.
Bangladesh	43.975	3.000	3025	Republic of Korea	83.944	2.119	5870
Zambia	46.000	0.000	1500	Latvia	84.338	3.987	2213
Dominican Republic	48.000	0.000	417	Uruguay	84.500	5.501	2000
Zimbabwe	48.000	0.000	1002	Morocco	84.693	0.952	3464
Rwanda	49.000	0.000	1507	Bulgaria	85.759	6.816	4107
Uganda	50.000	0.000	1002	Kyrgyzstan	86.000	0.000	1043
United Republic of Tanzania	51.000	0.000	1171	Mexico	86.186	4.059	8827
India	54.653	1.326	8543	Egypt	90.000	0.000	3000
Indonesia	54.670	1.885	3019	Russian Federation	90.715	3.748	6573
Philippines	55.000	1.000	2400	Cyprus	91.000	0.000	1050
Nigeria	55.012	3.288	5019	Hungary	92.186	4.988	4113
Ethiopia	56.000	0.000	1500	Belarus	92.766	4.679	3092
Guatemala	56.000	0.000	1000	Czech Republic	92.877	2.422	3055
Thailand	56.000	0.000	1534	New Zealand	93.000	0.000	2155
Pakistan	58.536	0.886	2733	Switzerland	93.098	1.644	3853
El Salvador	59.000	0.000	1254	Japan	93.499	3.269	5727
Ghana	59.000	0.000	1534	Estonia	93.528	3.501	2026
Azerbaijan	60.000	0.000	2002	Albania	94.002	4.001	1999
Armenia	62.000	0.000	2000	Slovenia	94.426	10.377	4085
Peru	62.553	0.497	2712	Germany	95.878	2.792	9563
Croatia	63.912	0.996	2199	Lithuania	96.507	1.500	2027
Colombia	64.000	0.000	9050	Denmark	96.876	7.452	3235
Venezuela (Bolivarian Republic of)	64.000	2.000	2400	Argentina	98.564	4.030	5368
Viet Nam	67.393	4.411	2495	Sweden	99.198	4.171	5028
Georgia	68.000	0.000	2008	Finland	99.249	4.091	4630
Trinidad and Tobago	68.000	0.000	1002	Poland	99.618	2.631	5168
The former Yugoslav Republic of Macedonia	70.456	1.500	2050	Turkey	99.757	2.264	8890
Mali	71.000	0.000	1534	Norway	100.594	2.525	3417
Serbia	74.000	0.000	1220	Romania	100.702	7.760	5264
Republic of Moldova	74.426	3.690	3038	Canada	100.996	4.697	7079
Jordan	74.467	3.501	2423	Netherlands	102.976	4.683	4291
Brazil	75.491	6.867	4431	Spain	104.568	5.835	11270
South Africa	75.603	2.796	13255	Australia	105.175	0.817	4697
Slovakia	76.354	1.493	2426	United States of America	107.088	5.546	8155
Chile	77.574	6.140	4700	Austria	107.104	5.000	2982
Malaysia	78.000	0.000	1201	Portugal	107.407	6.976	2185
Serbia and Montenegro	80.032	7.356	3780	Malta	108.950	9.328	1862
Burkina Faso	81.000	0.000	1534	Italy	110.301	4.039	6378
China	81.200	7.576	5515	Ireland	113.504	3.066	3229
Algeria	82.000	0.000	1282	France	114.300	2.228	4818
Saudi Arabia	82.000	0.000	1502	Greece	117.000	0.000	1142
Ukraine	82.121	3.534	5006	Iceland	119.654	4.679	2597
Bosnia and Herzegovina	83.000	3.001	2400	Israel	122.000	0.000	1199
Iran (Islamic Republic of)	83.513	0.500	5199				
				Total	85.870	18.386	309250

NOTES: Protein measured in grams per capita per day.

TABLE 6 - Mean Protein Consumption by Year

Year	Mean	Std. Dev.	Freq.
1981	98.324	8.867	13,743
1982	92.250	9.077	9,614
1983	95.000	0.000	467
1984	109.995	12.493	1,932
1989	98.611	4.412	2,338
1990	92.040	17.481	39,017
1991	84.420	14.443	4,176
1992	77.000	0.000	1,035
1993	91.000	0.000	1,103
1995	86.868	20.424	15,517
1996	79.644	16.175	33,175
1997	73.950	14.028	14,173
1998	81.616	12.714	11,522
1999	98.642	15.950	36,492
2000	86.858	15.053	18,029
2001	73.972	18.363	30,890
2002	72.696	19.080	4,790
2003	83.639	1.968	2,545
2004	93.000	0.000	954
2005	89.987	18.057	16,141
2006	85.616	17.629	27,097
2007	75.691	17.207	24,500
Total	85.870	18.386	309,250

NOTES: Protein measured in grams per capita per day.

TABLE 7 - Summary Statistics

Variable	Observations	Mean	Std. Dev.	Min	Max
Satisfaction	303,889	6.650	2.460	1	10
Protein Grams	309,250	85.870	18.386	41	123
Protein kcal / Food kcal	309,250	0.114	0.013	0.081	0.155
Food kcal	309,250	2,983.043	414.930	1,873	3,791
Job Satisfaction	54,562	7.362	2.189	1	10
Employed	297,556	3.274	2.178	1	8
Health	265,026	2.212	0.912	1	5
Income	267,230	4.642	2.450	1	11
Trust People	294,965	1.715	0.452	1	2
Confidence in Police	295,287	2.418	0.923	1	4
Religious	281,928	1.334	0.559	1	4
Homosexuality is Justifiable	280,976	3.201	3.052	1	10
Married	304,306	2.673	2.190	1	8
Year	309,250	1997.451	6.996	1981	2007

Gender	304,532	0.517	0.500	0	1

TABLE 8 - Main Results: Satisfaction With Your Life

Variable	Coefficient	Variable	Coefficient
Protein/Food (kcal/capita/day)	5.882	Confidence in Police - Quite a Lot	-0.150
	(5.66)**		(4.37)**
Job Satisfaction	0.343	Confidence in Police - Not Very Much	-0.361
	(50.71)**		(9.41)**
Subjective Health	-0.476	Confidence in Police - None at All	-0.381
	(31.06)**		(7.16)**
Income Level	0.021	Religious - Not a Religious Person	-0.207
	(4.12)**		(8.21)**
Trust - Most People Can Be Trusted	-0.295	Religious - a Convinced Atheist	-0.180
	(12.89)**		(3.55)**
Homosexuality Is Justifiable	0.016	Marital Status - Living Together as Married	0.104
	(4.05)**		(2.06)*
Year	-0.004	Marital Status - Divorced	-0.396
	(1.12)		(5.68)**
Female	0.006	Marital Status - Separated	-0.653
	(0.26)		(5.93)**
Employment - Part Time	0.111	Marital Status - Widowed	-0.440
	(2.99)**		(4.95)**
Employment - Self Employed	0.007	Marital Status - Single / Never Married	-0.125
	(0.19)		(4.36)**
Employment - Retired	0.214	Constant	12.748
	(1.18)		(1.93)
Employment - Housewife	-0.761		
	(5.30)**	Variable	F-Statistic
Employment - Student	-0.088	Employment Status	6.68
	(0.31)	Confidence in Police	38.86
Employment - Unemployed	-0.253	Religious	35.84
	(0.87)	Marital Status	20.99
Employment - Other	-0.947	Observations	24583
	(2.38)*	R-squared	0.25

Notes: Robust t-statistics in parentheses, * significant at 5%; ** significant at 1%.

TABLE 9 - Robustness Results: Satisfaction With Your Life

	i	ii	iii	iv
Variable	Coefficient			
Protein/Food (kcal/capita/day)	6.115	-0.5098	-4.036	13.352
	(5.78)**	(0.28)	(10.71)**	(3.06)**
Job Satisfaction		0.36	-0.059	
		(41.98)**	(27.08)**	
Subjective Health		-0.484	0.18	
		(23.92)**	(33.90)**	
Income Level		0.022	-0.016	
		(3.31)**	(8.66)**	
Trust - Most People Can Be Trusted	-0.296	-0.259	0.07	
	(12.94)**	(8.63)**	(8.29)**	
Homosexuality Is Justifiable		0.015	-0.004	
		(2.64)**	(3.14)**	
Year	-0.003	-0.179	0.006	
	(0.94)	(6.41)**	(5.77)**	
Female	0.009	-0.032	-0.036	
	(0.39)	(1.02)	(4.10)**	
Infant Mortality Rate (per 1,000 live births)		-0.005		
		(6.51)**		
Constant	11.961	361.576	-10.438	-1.352
	(1.78)	(6.52)**	(4.66)**	(2.67)**
Variable	F-Statistic			
Job Satisfaction	333.1			
Employment Status	7.03	2.79	1.2	
Subjective Health	248.17			
Income Level	4.11			
Confidence in Police	39.06	14.64	37.62	
Religious	33.29	26.04	43.11	
Homosexuality is Justifiable	3.26			
Marital Status	20.94	11.73	46.41	
Observations	24583	15729	24258	218
R-squared	0.26	0.26	0.17	0.04

Notes: Regression i is including all independent variables as dummy variables, regression ii is including Infant Mortality Rate, regression iii is including Happiness as the dependent variable, regression iv includes the collapsed means and the unexplained variation in satisfaction as the dependent variable. Robust t-statistics in parentheses, * significant at 5%; ** significant at 1%.