

# Association Between Happiness and Individual Perspective toward Income Inequality: Evidence from World Values Survey

Department of Economics, University of Rochester

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## Abstract

The relationship between happiness and income inequality has been a debatable issue for a long time. Using individual-level data from the seventh wave of the World Values Survey and ordered logistic regression, this paper estimates the association between happiness and individual perspective toward income inequality. The empirical results suggest that individuals with extremely positive attitudes toward income inequality are more likely to be happier than others. Besides, positive attitudes toward income inequality have a larger positive effect on individual happiness for those low-income individuals than those high-income individuals.

# 1 Introduction

The increase in income inequality has led to a growing worldwide concern about the societal impact of income inequality. For example, it is proven that people's opinions on income inequality have a great impact on their political behaviors (Garand and Nguyen, 2008; Galbraith and Hale, 2008a, as cited in Xu & Garand, 2010) and policy attitudes (Bartels, 2008, as cited in Xu & Garand, 2010). In recent years, the impact of income inequality on subjective well-being has become a common concern, especially when the concept of "subjective well-being" has gained popularity as a determining factor for policy-making.

Economists have conducted various studies to explore the relationship between income inequality and happiness, endeavoring to determine a causal relationship between these two attributes (Bjørnskov et al., 2008; Easterlin, 1974; Hirschman & Rothschild, 1973; Oishi et al., 2011). Previous empirical studies showed both positive and negative correlations between income inequality and happiness. Scholars also developed multiple theories to explain these mixed results. For example, the relative deprivation theory provides a possible justification for the negative effect of income inequality on happiness, suggesting that individuals feel deprived of happiness when they compare their situation with a reference group with higher income. In contrast, the tunnel effect attributes the positive influence of income inequality on happiness to individuals' high tolerance of income inequality, which is caused by their belief that the high income of the rich is a signal of their own improvement in life. However, no determinant conclusion has been agreed upon up to this point.

This research investigates the association between happiness and individual perspective toward income inequality on a micro-level. This study is different from previous work studying the relationship between happiness and income inequality since instead of using aggregate-level data and objective measures to represent individual sensitivity to income inequality, it employs self-reported happiness and subjective perspectives of income inequality data derived from the seventh wave of the World Values Survey. The individual-level variable would help us better understand the relationship between subjective happiness and individual perspectives of income inequality. Moreover, despite the extensive research on the influence of income inequality on happiness, there has been little information on how individuals understand income inequality affects their happiness.

Moreover, despite extensive research about the influence of income inequality on happiness, there has been little information on how individuals' understanding of income inequality affects their happiness. Aiming to resolve this problem, this research investigates the association between happiness and individual perspective toward income inequality on a micro-level. Instead of using aggregate-level data and objective measures to represent individual sensitivity to income inequality like previous studies,

this study employs self-reported happiness and subjective perspectives of income inequality data derived from the seventh wave of the World Values Survey. The individual-level variable would help us better understand the relationship between subjective happiness and individual perspectives of income inequality.

The remainder of this paper is organized as follows. Section 2 will review previous literature related to happiness and income inequality. Section 3 will describe the dataset and the variables used in this paper. Section 4 will describe an empirical study using ordered logistic regression to determine the association between individual perspectives toward income inequality and happiness. Section 5 will present a discussion and conclusion about the results and their applications and limitations.

## 2 Literature review

The correlation between wealth and well-being has been a longstanding and consistent point of interest for economists. Well-being consists of the combination of feeling good and functioning well and is frequently approximated by the study of happiness in economics (Ruggeri et al., 2020). As a measurement of social welfare, happiness serves as a determining factor for successfully evaluating economic growth and formulating meaningful governmental policies. Piekalkiewicz emphasized that happiness has the power to influence economic outcomes including productivity, an individual's future income, and labor market performance (Piekalkiewicz, 2017).

To adequately measure individual happiness, economists, historically, relied on studying observed behaviors under the blanket assumption that human beings consistently maximize their well-being when making decisions. This methodology introduced an immeasurable concept known as utility. Utility theory estimates the satisfaction human beings garner from their behaviors of consumption of goods and services. Using utility theory, economists draw inferences about the preferences of individuals by observing their choices between goods and generating representations of their preferences theoretically using utility functions. For instance, if an individual prefers option A over option B, economists may conclude that the individual achieves higher well-being by choosing option A under the assumption that individuals always maximize their well-being when executing decisions.

However, there are several constraints with using the utility to accurately estimate an individual's well-being. The first constraint is that simply calculating an estimation for happiness using utility is purely theoretical and may not be consistently applicable under real-world circumstances. One of the most controversial assumptions underlying the utility theory is that all consumers and individuals are rational. Under this notion of rationality, people should consistently rank their choices based on their

underlying utility functions to achieve their optimal level of well-being. If an individual prefers option A over option B and prefers option B over option C, they will never prefer option C over option A. While this assumption appears logical in nature, it underestimates the complexity of personal feelings and choices that occur during real-world situations.

Additionally, over the last century, the meanings of the words “utility” and “happiness” have been clarified and refined by psychologists and economists, referring to logically distinct concepts. Kimball and Willis (2006) summarized both the plethora of economic and psychological studies and concluded that utility represents “the extent to which people get what they want, where what they want is indicated by their choices” (p.50) while happiness refers to “how positive people’s feelings are at a given time” (p.7). Kimball and Willis (2006) also highlighted that choices and feelings should not be equivalent across the board when measuring welfare. One example is that parents often sacrifice their own happiness to benefit their children. The authors argued that:

in standard economic models, the benefits to one’s children show up in one’s own utility function, but it is not clear that the benefits to others show up in one’s own effect [happiness] in the same proportion as in utility. (pp.56–57)

According to the utility theory, the utility would be affected permanently by the exogenous impact, while the impacts on happiness are gradually attenuated, suggested by the Hedonic Adaptation (Kahneman et al., 2003). The combination of this research suggests that happiness is not equivalent to the utility measured in economics.

Psychologists have focused on refining the measurement of happiness and developed reliable methods for adequately measuring happiness. The most frequently used measurement of happiness is self-reporting. Questions, such as the one in the World Values Survey, estimate the happiness level of each respondent in the following way: “Taking all things together, would you say you are: 1) Very happy, 2) Quite happy, 3) Not very happy, 4) Not at all happy.” Many psychologists have conducted extensive research using self-reported happiness to predict various types of cognition and behaviors in the laboratory and have successfully conveyed the self-reported happiness to impressionistic observer ratings of happiness (Kimball & Willis, 2006). As a result of these efforts, self-reported happiness provides a valid and robust method of measuring subjective welfare in the field of economics.

Early economists of happiness were primarily focused on the analysis of consumer well-being under the utility theory by considering consumer behaviors within the social-economic environment (Edwards, 2010). The economic analysis of subjective happiness data has become increasingly intensive since the 1970s. This type of economic study, known as Happiness Economics, utilizes methods such as

surveying to reveal the individual level of well-being. Over the past forty years, many economic studies were conducted to establish determinant factors for happiness, including economic forces (Juster and Stafford, 1985, as cited in Lyubomirsky & Lepper, 1999), activity levels (Cummings and Henry, 1961; Lemon et al., 1972; see also Csikszentmihalyi, 1975, 1990; as cited in Lyubomirsky & Lepper, 1999), adaptation levels (Brickman and Campbell, 1971; see also Michalos, 1985; Parnucci, 1984; as cited in Lyubomirsky & Lepper, 1999), goals (Emmons, 1986; Omodei & Wearing, 1990; as cited in Lyubomirsky & Lepper, 1999), life events (Headey & Wearing, 1989; as cited in Lyubomirsky & Lepper, 1999), and dispositional factors (Costa and McCrae, 1980, 1984; as cited in Lyubomirsky & Lepper, 1999). Each of these studies has been regarded as a pivotal determinant of happiness (Lyubomirsky & Lepper, 1999).

As it relates to economic research regarding happiness, the association between happiness and wealth has become a longstanding and highly controversial topic. During the 1970s, the Easterlin Paradox suggested that although those with higher incomes exemplified higher levels of self-reported happiness than those with lower incomes within the same nation, happiness did not increase when national income increased (Easterlin, 1974). Essentially, the Easterlin Paradox showed that although income is a significant indicator of an individual level of happiness, it is irrelevant to the aggregate level of happiness.

The self-contradictory finding in the Easterlin Paradox spurred many studies to reassess the challenge and propose alternative explanations. Many empirical studies were postulated by more recent economists, revisiting the positive correlation between individual income and happiness. A majority of these studies have found Easterlin's conclusion questionable. Layard's study, which implies a positive association between absolute income and happiness, is upheld for lower-income respondents (Layard, 2005, as cited in Stevenson & Wolfers, 2008). Stevenson and Wolfers attributed the failure of identifying a robust GDP-happiness link in Easterlin's work as he failed to "isolate statistically significant relationships between average levels of happiness and economic growth through time." With analysis of both recent and early data, they discovered a remarkably robust and significant positive relationship between subjective happiness and absolute income across countries, within countries, and over various periods of time (Stevenson & Wolfers, 2008). In 2012, a publication by Booth returned to the criticisms of the Easterlin Paradox with new statistical findings by using a data set of 126 countries. The new results confirmed a robust positive relationship between happiness and income, which was relatively constant and maintained between countries, within countries, and over various periods of time. This relationship also holds both at higher levels of income and at lower levels of income (Booth, 2012).

Although the core of the Easterlin Paradox has been numerously rejected by many studies that proved the relationship between trends in happiness and income, there are still areas of uncertainty. Easterlin emphasized that when people judge their happiness, they tend to make comparisons with a

reference group. However, the dispersion across reference norms is less than the difference in the actual incomes of rich and poor (Easterlin, 1974). Although Easterlin's empirical results provided no indication of the correlation between happiness and income distribution, he proposed a plausible hypothesis that one's sensitivity to income differences may have a significant effect on an individual's happiness (Easterlin, 1974).

To adequately understand the effect of an individual's sensitivity to income differences on happiness, there are two primary approaches applied by economists. The first method uses the relative income, which is defined as the magnitude of the gap between the individual's income and the average income, approximating the individual perception of income disparity. In 1997, Andrew Oswald presented abundant evidence in support of the relationship between relative income and happiness. Layard discovered that a majority of people do not simply care about their absolute income level but are also concerned about their relative income (Layard, 2005, as cited in Stevenson & Wolfers, 2008). On the contrary, in Stevenson and Wolfers' work (2008), although a robust correlation between well-being and absolute income has been developed, they identified no sufficient evidence for concluding the role of relative income in forming subjective happiness.

Nonetheless, many studies have provided evidence showcasing that relative income may not be a sufficient measure for the dispersion in reference norms. For instance, Shifa and Leibbrandt (2017) suggested that the comparison between individual financial conditions, asset holdings, and social relations cannot be adequately captured by only studying income data.

An alternative method to measure the individuals' sensitivity to the income gaps is by focusing on the index of income inequality. In assessing income inequality, researchers have been led to use region-level data, Gini coefficients, to represent individuals' sensitivity to income differences. Analyzing General Social Survey data from 1972 to 2008, Oishi, Kesebir, and Diener (2011) discovered that income inequality is negatively correlated to happiness when individual income is low, and this correlation is evidenced by the perceived notion of unfairness and lack of trust rather than the lower household income. Using a combination of data that encapsulates happiness levels from World Values Surveys and aggregated Gini coefficients at the country level, Bjørnskov, Dreher, and Fischer (2008) were unable to identify a robust correlation between national-level income inequality and individual happiness. In reassessing the Easterlin Paradox, Booth (2012) also explored the relationship between happiness and income inequality using the Gini coefficient and discovered no evidence that equality is related to happiness. Moreover, Wang, Pan, and Luo (2015) analyzed the Chinese General Social Survey data and concluded that there is an inverted U-shaped association at the county level. Their findings suggested that individual happiness is positively correlated to income inequality when county-level inequality measured by the Gini coefficient is less than 0.405, and it decreases with inequality for areas with a more substantial

Gini coefficient (Wang et al., 2015). Although extensive research has been conducted regarding the relationship between income inequality and happiness, no determinant or universal conclusion has been agreed upon.

One reasonable interpretation for the absence of a conclusive result is that the Gini coefficient is not a perfect indicator of the individuals' sensitivity to the income difference. Graham & Felton (2006) concluded that the analysis of individual thoughts and revealed preferences are impractical for understanding macroeconomic variables, such as the Gini coefficient. Another deficiency is that the aggregate data is highly vulnerable to the ecological fallacy. The ecological fallacy pertains to the aggregate data being used to create inferences regarding individual characteristics. The false inferences about individual behavior are drawn due to the variability of individual means that are not properly captured by the variability encompassing the aggregate means (Pollet et al., 2015). During the process of aggregating and averaging units within various groups, individual information is frequently lost and leads to a decreased likelihood of meaningful conclusions. Due to this revelation, it is nearly impossible to adequately capture the nuances of personal perceptions of income inequality by solely using the regional-aggregated variable.

The studies of many other scholars further support this argument, providing evidence that individuals within the same geographical areas differ in their levels of awareness and tolerance of inequality. Alesina, DiTella, and MacCulloch (2004) highlighted that countries significantly differ in their underlying tolerance of the degree of income inequality, even during similar stages of development. In a study that delved into the level of inequality and effects of perceptions of income inequality within the context of various states in the United States, Xu and Garand (2010) concluded that individuals with lower incomes were more likely to feel a sense of income inequality within their perceptions compared to those with higher incomes. These findings suggest that even individuals from the same region may have different perceptions.

To examine the awareness people have of income inequality, several studies have been conducted that focus on the changes in the actual income gap and individual perspectives. McCall (2005) discovered that while the actual level of income inequality consistently grew between 1987 and 2000, fewer Americans were aware of the rising inequality (McCall 2005). Xu and Garand, using data from the Harris Poll, also emphasized that although the actual income gap between rich and poor households increased significantly since the 1970s, the aggregate percentage of perceptions regarding the inequality gap remained relatively stable and even decreased after 1995 (Bartels, 2008, as cited in Xu & Garand 2010). The inconsistency between actual income inequality and the awareness of income inequality in the late 1990s suggests that the effects of individuals' perspectives toward inequality may have been inaccurately captured by the Gini coefficient (Bartels, 2008, as cited in Xu & Garand 2010).

To adequately capture the association between income inequality and happiness, more in-depth research needs to be done. Analyzing the association between happiness and inequality in the United States and Europe, Alesina, Tella, and MacCulloch (2004) argue that Americans tend to report themselves happier than Europeans when there are similar levels of inequality in their society. They attribute this difference to the more mobile social structure in the United States, where individuals perceive income inequality not as a permanent threat but as an incentive for the individual effort that can move people up and down the income ladder (Alesina et al., 2004). It tells that absolute income and individual perceptions of income inequality are not the decisive factors affecting the impact of income inequality on happiness.

People build their perspectives by transforming their perception of the world into personal understandings. Individual perspectives toward income inequality may more accurately reflect their understandings of income inequality rather than their perception of the existence of income inequality. As a result, this research studies the influence income inequality has on individual perspectives of happiness using their reported opinions toward income inequality.

There is a clear gap in the previous literature on the measurement of individual perspectives toward income differences, as many authors and researchers applied the relative income or Gini coefficients in their examinations of individual sensitivity to income inequality. Therefore, the relationship between individual perspectives toward income inequality and actual happiness must be reassessed using more accurate and modern measures of perception. The aim of this paper is to fill this gap. Based on the information gathered thus far, this paper serves as the first instance of exploring the effect of attitudes toward income differences on happiness, using the individuals' subjective perspectives toward income inequality rather than quantitative, aggregate measures such as Gini coefficients and relative income for approximation. The measure of income inequality in this paper is an individual-level indicator rather than an aggregate and universal variable. A more universal and widespread variable would garner more precise conclusions with respect to individual behavior and causality relations between perspectives toward income inequality and subjective happiness.



## 3 Method and Data

### 3.1 Participants

The dataset used in this paper was collected in the seventh wave of the World Value Survey (WVS-7) that took place worldwide from 2017 to 2021. The seventh wave of the WVS collected data in various ways, including face-to-face interviews, postal surveys, self-administered online surveys, and interviews through phone calls (Haerpfer et al., 2022). The WVS-7 questionnaire is elaborated with the inclusion of topics such as cultural values, education, income inequality, social tolerance and trust, demographic characteristics, and self-assessment happiness (Haerpfer et al., 2022). The dataset consists of 84,638 respondents from 57 countries and territories (Haerpfer et al., 2022).

### 3.2 Variables

#### 3.2.1 Happiness

The dependent variable of this study, self-reported happiness, is measured on a four-point scale ranging from 1 (not at all happy) to 4 (very happy). The WVS-7 questionnaire focuses on investigating individuals' subjective happiness. Specifically, the question asks the following: “*Taking all things together, would you say you are: 1) Very happy, 2) Quite happy, 3) Not very happy, 4) Not at all happy*” (Haerpfer et al., 2022). Based on the way the question was asked, the dependent variable, subjective happiness, can be viewed as a categorical variable with each category representing a different level of happiness. The label of the four-point scale for the measure of happiness has been reversed in the original data analysis, meaning that 1) represents *Very happy* in the questionnaire but represents *Not at all happy* in the actual dataset.

According to the table 1, which shows a summary of the distribution of happiness from the WVS-7 responses, most people answered being happy (*Very happy* or *Quite happy*) rather than being not happy (*Not very happy* or *Not at all happy*): more than half of the respondents reported being *Quite happy* and about one-third of respondents answered *Very happy*. One thing to notice is that the sample size for those who reported being not at all happy is only 1,893, which accounts for 2.25% of the entire sample. Therefore, the statistical power of the study of *Not at all happy* group may be limited due to the relatively small sample size.

Table 1. Descriptive Summary of Happiness

Category	Status	Frequency	Percent
1	Not at all happy	1,893	2.25%
2	Not very happy	10,424	12.28%
3	Quite happy	45,629	54.21%
4	Very happy	26,231	31.16%

### 3.2.2 Individual Perspectives toward Income Inequality (IPII)

The Individual Perspectives toward Income Inequality (IPII) is approximated by the feelings individuals expressed about the statement related to income inequality. Participants were asked to answer the following question:

How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between; Statement on the left: Incomes should be made more equal; Statement on the right: There should be greater incentives for individual effort. (Haerpfer et al., 2022)

At first, it may be ambiguous to connect the statement on the right to individual attitudes toward income inequality. However, the context of the question provides an interpretation for this ambiguity. By contrasting the left-side statement, the “incentives” mentioned in the statement should refer to the larger income inequality. The description in the codebook of the WVS-7 also supports this interpretation of the data. In their codebook, this variable is described as “1.- *Income more equal* ... 10.- *Larger income difference*” (Haerpfer et al., 2022). In summary, if respondents choose 1, it means that they believe that incomes should be made more equal and, thus, strongly support more equality in income distribution. On the other hand, if respondents choose 10, it means that they want larger income differences as incentives for individual effort and, as a consequence, strongly support larger income inequality. Moving upwards from a score of one, each subsequent category represents less sympathy towards income equality. Therefore, through collecting the scores in respondents’ answers, we are able to analyze their perspectives with respect to income inequality in a quantitative way.

According to the way the question was structured, the IPII is defined as an ordinal categorical variable that measures individual perspectives toward income inequality. The frequency distribution of the IPII is included in Table 2 below. There were 49,995 valid responses for this attribute. Among those, less than half (38.94%) of the respondents showed a supportive attitude to an equal distribution of income, choosing a number less than or equal to 5. Meanwhile, the majority (61.06%) of respondents believed that there should be larger income differences as incentives for individual effort, choosing a number greater than five. About one-fifth (21.84%) of the respondents chose ten on this question, showing that they strongly support larger income inequality and believe there would be no need to make income more equal. This result suggests that a large proportion of individuals regard income inequality as an incentive for individual effort, being supportive of greater disparity between rich and poor groups.

Table 2. Descriptive Summary of Individual Perspective Toward Income Inequality

Category	Frequency	Percent	Cum. Percent
1 (Income more equal)	9,369	11.21%	11.21%
2	3,560	4.26%	15.47%
3	4,652	5.57%	21.03%
4	4,656	5.57%	26.60%
5	10,310	12.33%	38.94%
6	7,368	8.81%	47.75%
7	9,018	10.79%	58.54%
8	10,599	12.68%	71.22%
9	5,798	6.94%	78.16%
10 (Larger income differences)	18,256	21.84%	100.00%
Total	49,995	100.00%	100.00%

### 3.2.3 Control Variables

The WVS-7 also collects demographic information from each respondent. The demographic data includes gender, age, marital status, education, employment, subjective social class, income scale, and countries. To accurately estimate the association between individual acceptance of income inequality and

happiness, all of these variables are used as control variables. The descriptive statistics of these control variables are shown in Appendix 1.

These control variables have been proved to be closely related to our dependent variable, happiness. Controlling for the age of the individual will eliminate the impact of age on happiness. Specifically, many economic researchers have reported a U-shaped relationship between age and happiness, suggesting that people reach a low point in happiness being at their middle ages (Blanchflower, 2020; Rauch, 2018). Recent research which used various data from 145 countries has confirmed the existence of the U-shaped relationship between age and happiness as well, showing that people have the lowest level of happiness at the age of 48.3 (Blanchflower, 2020). To prevent the possible bias incurred by the age, individual age is controlled in the model for this study.

Gender could affect happiness as a consequence of gender inequality. Stevenson and Wolfers (2009) pointed out that in the 1970s, women were more likely to report being “very happy” than men, and this was inverted between the two genders in the 1990s. According to Stack and Eshleman (1998), who tested the relationship between marital status and happiness using data from 16 countries, being married is positively associated with happiness. Higher education is also positively related to happiness. Chen pointed out in his research that education may improve people’s happiness by extending their social networks (Chen, 2012). Different employment statuses could also influence the level of happiness. For example, unemployed individuals may encounter greater living pressure and therefore become less happy than those with jobs. Besides, an empirical study showed that subjective social class, which is the individual's perception of their relative social standing, is positively related to happiness since those with higher subjective social classes reported being happier than those with lower subjective social classes (Kim, Lim, & Falci, 2020). The income scale was also included as a control variable, and its significant impact on happiness has been discussed in the previous section. Lastly, because happiness level varies among different countries, country-fixed effects are also included in the model.

Among all the variables, marital status, employment status, subjective social class, and scale of income are categorical variables. Each respondent is given multiple choices when answering the questions. To summarize the distribution of these control variables, Table 3 to 7 show the frequency distribution of each variable.

### **Marital status**

According to Table 3, married and single individuals consist of more than 80% of the population. More than half (56.40%) of the respondents are married, while around one-fourth of them (24.15%) are single.

Table 3. Frequency Distribution of Marital Status

Marital status	Frequency	Percent	Cum. Percent
Married	47,531	56.40	56.40
Living together as married	6,490	7.70	64.10
Divorced	3,402	4.04	68.13
Separated	1,879	2.23	70.36
Widowed	4,625	5.49	75.85
Single	20,355	24.15	100.00
Total	84,282	100.00	100.00

Table 4. Frequency Distribution of Education Level

Highest educational level	Frequency	Percent	Cum. Percent
Primary education	10,533	13.26	13.26
Lower secondary education	11,466	14.43	27.69
Upper secondary education	21,943	27.62	55.31
Post-secondary non-tertiary education	7,748	9.75	65.06
Short-cycle tertiary education	7,248	9.12	74.19
Bachelor or equivalent	14,567	18.34	92.52
Master or equivalent	4,979	6.27	98.79
Doctoral or equivalent	954	1.20	99.99
Other	6	0.01	100.00
Total	79,444	100.00	100.00

## Education

Table 4 shows the distribution of the education level of the respondents. Among all the respondents, the majority of them (74.19%) have not received a college-level or higher-level education. 18.34% of the respondents have received a college degree or equivalent. Only very few individuals have received a master's degree or doctoral degree.

Table 5. Frequency Distribution of Employment Status

Employment status	Frequency	Percent	Cum. Percent
Full-time (30 hours a week or more)	30,053	35.88	35.88
Part-time (less than 30 hours a week)	7,060	8.43	44.31
Self-employed	12,659	15.12	59.43
Retired/pensioned	9,650	11.52	70.95
Homemaker not otherwise employed	11,830	14.13	85.08
Student	4,965	5.93	91.00
Unemployed	6,652	7.94	98.95
Other	882	1.05	100.00
Total	83,751	100.00	100.00

## Employment status

Table 5 shows the distribution of respondents' employment status. Full-time employers consist of the largest proportion (35.88%) of the survey population. The percentage frequency of self-employed individuals, homemakers, and retired/pensioned individuals are approximately at the same level, which is from 10% to 15%. Moreover, only 7.94% of the respondents are unemployed, which is relatively a small percentage of the entire population.

## Social Class

Table 6 shows the frequency distribution of respondents' subjective social classes. It suggests that the majority (86.41%) of respondents consider themselves to be in the working or middle class (including

lower middle class and upper middle class). The number of individuals who place their social class on the two extreme sides of the distribution is relatively small: only less than 1.61% of the respondents report their social class as upper class, and 11.97% of the respondents consider themselves to be in the lower class.

Table 6. Frequency Distribution of Subjective Social Class

Social class (subjective)	Frequency	Percent	Cum. Percent
Lower class	9914	11.97	11.97
Working class	22173	26.77	38.74
Lower middle class	32433	39.16	77.91
Upper middle class	16963	20.48	98.39
Upper class	1333	1.61	100.00
Total	82816	100.00	100.00

## Scale of Income

The scale of income is measured by asking the following question:

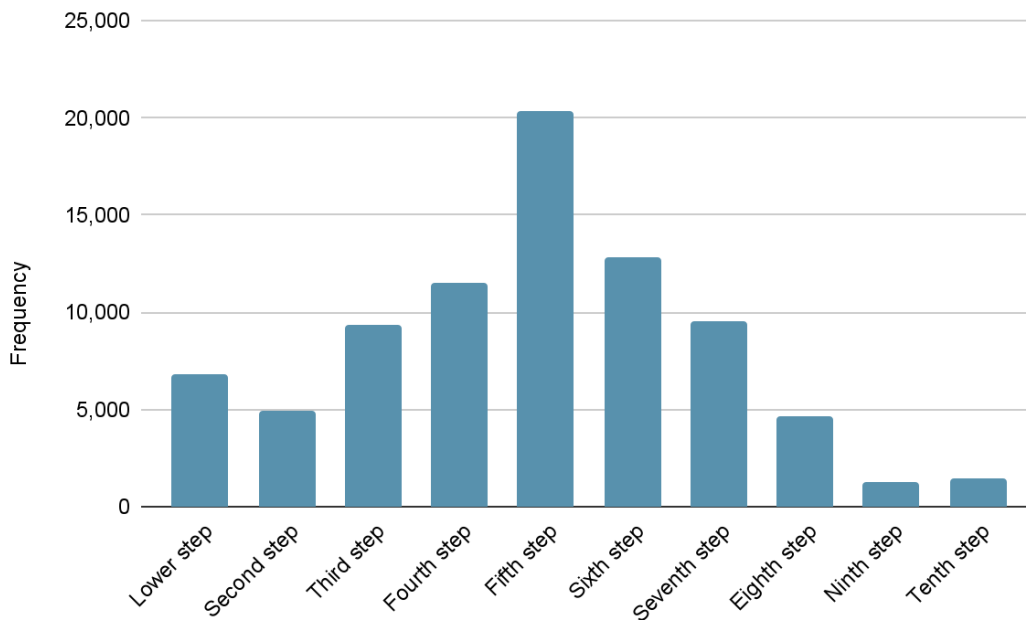
On this card is an income scale on which 1 indicates the lowest income group and 10 the highest income group in your country. We would like to know in what group your household is. Please, specify the appropriate number, counting all wages, salaries, pensions, and other incomes that come in. (Haerpfer et al., 2022)

Table 7 shows the distribution of respondents' incomes. As the table and the figure show, the income distribution shows a bell-curve distribution. A large proportion of respondents (65.53%) reported their income is in the middle range from the third step to the seventh step, while only a small percentage of respondents reported significant high or low income.

Table 7. Frequency Distribution of Scale of Income

Scale of Incomes	Frequency	Percent	Cum. Percent
Lower step	6,823	8.24	8.24
Second step	4,986	6.02	14.27
Third step	9,367	11.32	25.58
Fourth step	11,521	13.92	39.50
Fifth step	20,328	24.56	64.06
Sixth step	12,802	15.47	79.53
Seventh step	9,587	11.58	91.11
Eighth step	4,666	5.64	96.74
Ninth step	1,259	1.52	98.27
Tenth step	1,436	1.73	100.00
Total	82,776	100.00	100.00

Figure 1. Frequency Distribution of Scale of Income





## 4 Model

### 4.1 Baseline Model

As all the input variables have been introduced, the next part is going to introduce the models used in this paper. Since the dependent variable, happiness, is an ordinal categorical variable that takes four values, ordered logistic regression should be the first choice. Therefore, this model controls variables as specified above, fixed-country effects, and other unobserved variables, and demonstrates the individuals' happiness as a function of their perspectives of income inequality. The model is represented as follows:

$$\text{Happiness} = \beta_0 + \beta_1(\text{IPII}) + \beta_2 X + c + \varepsilon$$

Where:

- *IPII* represents the individual perspective on income inequality
- *X* represents all the control variables, including gender, age, marital status, education level, employment status, subjective social class, and scale of income
- $\varepsilon$  is an individual-level error term under the assumption of logistic distribution
- *c* are the fixed effects for the countries

### 4.2 Alternative Model

Besides the association between individual perspectives toward income inequality and happiness, this research is also interested in exploring the moderating effect of absolute income on the relationship. To better understand how different the effect of the individual perspective toward income inequality on the self-reported happiness is at different income levels, the alternative model introduces the intersection term of individual attitudes toward income inequality and their scale of income. The interaction term will help assess the impact of absolute income on the relationship between individuals' perspectives toward inequality and happiness.

For the simplicity of the interaction term and the significance of the result, respondents are grouped into the high-income group and low-income group: those who reported an income lower than or equal to a number of five are labeled as the low-income group, and the others are labeled as the high-income group. This model excludes the variable for income level and only keeps the income group as a dummy variable. To avoid multicollinearity, both the independent variable, *IPII*, and the moderator variable, income group, are centered before generating the interaction term. The final model is represented as follows:

$$Happiness = \beta_0 + \beta_1(IPII) + \beta_2 X + \beta_3 I + \beta_4 (IPII) * I + c + \varepsilon$$

Where:

- *IPII* represents the individual perspective on income inequality
- *X* represents all the control variables, including gender, age, marital status, education level, employment status, subjective social class, and scale of income
- *I* represents whether the individual is in the high-income group
- $(IPII) * I$  represents the interaction term of individual perspectives toward income inequality and their scale of income
- $\varepsilon$  is an individual-level error term under the assumption of logistic distribution
- *c* are the fixed effects for the countries

### 4.3 Treatment of IPII – Continuous or Categorical

The independent variable of this research, IPII, is an ordinal variable. It is very common to treat the ordinal variable as continuous because it makes the explanation of the model much simpler. However, treating the ordinal variable as continuous should be cautious. It is only reasonable under the assumption that the ordinal variable has linear effects. Therefore, we need to test whether the assumption of linearity is satisfied before performing the actual empirical research.

This research uses the Likelihood Ratio Chi-Square Test to check whether the independent variable could be treated as a continuous variable. Two models are built on the basis of the baseline model for this test. The first model (m1) treats individual perspectives toward income inequality as a continuous variable, while the second model (m2) treats the independent variable as a discrete variable.

Table 8 shows the result of the likelihood-ratio test. The null hypothesis of the test is m2 nested in m1. According to the table, the p-value of this test is close to zero, which means that we could reject the null hypothesis at a significance level of 1%. In consequence, the LR test suggests that the effect of individual perspectives toward income inequality is not continuous. We should treat the independent variable as a categorical variable.

Table 8. Result of the Likelihood-Ratio Test

Likelihood-ratio test  
 (Assumption: m2 nested in m1)  
 Akaike's information criterion and Bayesian information criterion

LR chi2(8) = 127.76  
 Prob > chi2 = 0.0000

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
m2	74771	-7.73e+04	-7.21e+04	77	1.44e+05	1.45e+05
m1	74771	-7.73e+04	-7.20e+04	85	1.44e+05	1.45e+05

Note: N=Obs used in calculating BIC; see [R] BIC note

## 4.4 Test for Multicollinearity

One last step before moving onto the empirical model is to test for multicollinearity. When a perfect or near-perfect linear relationship exists in the predictors, the estimates for a regression model will be inaccurate since they cannot be uniquely computed. The method used for the testing is the variance inflation factor (VIF) and, as a general guideline, variables with VIF values greater than 10 may require further investigation. Appendix 2 shows all the VIF values and none of them exceeds 10. We could conclude that there is not any multicollinearity among the variables in our data.

## 5 Empirical Results

### 5.1 Result of Baseline model

The partial results from the ordered logistic regression are shown in Tables 9 to 12. The p-value of the models (0.0000) indicates that our model as a whole is statistically significant. Country effects are fixed but not reported in the table below. The full result of the ordered logistic regression is appended in Appendix 3.

Table 9 reports the effect of individual perspective toward income inequality on self-reported happiness, given all the other variables are controlled. The reference group is those who strongly advocate for more equal income distribution, and all the coefficients, which are reported in the table, reflect the difference in happiness levels compared to the reference group. The coefficient of a group represents that for a change from the reference group to that group, the dependent variable is expected to change by the corresponding amount in the ordered log-odds scale given that the other variables are held constant. For

example, the coefficient of IPII 2, which is -0.1, means that when individuals become slightly less in favor of income equality, changing ----their IPII from 1 to 2, their ordered log-odds of being in a higher happiness category would decrease by 0.1. This means that individuals in the IPII 2 category are less likely to be happy compared to those in the IPII 1 category. According to the table, all the categories with a number below nine have negative coefficients, and those with a score larger than or equal to nine have a positive coefficient. In particular, the ordered log-odds for individuals who report high levels of happiness in the IPII 9 and IPII 10 categories are 0.072 and 0.117 greater than those in IPII 1 category, and around 0.2 greater than those in other categories. Therefore, the first conclusion we derived is that those individuals who strongly support income inequality tend to report higher levels of happiness.

After further analyzing the trend of change in the coefficients, we found a U-shaped association between IPII and happiness except for category 5. Specifically, there exists a decreasing trend from category 1 to category 4 and an increasing trend from category 6 to category 10. In another word, among those who believe that income should be made more equal (in categories 1 to 4), people who exhibit more sympathy for income equality tend to be happier. Inversely, among those who agree with the statement that there should be larger income inequality as an incentive for individual effort (in categories 6 to 10), people tend to be happier when their support for the larger income inequality is greater.

Tables 10 and 12 show the effect of control variables. All the control variables, except for employment status, were found to be statistically significant. Results of the ordered logistic regression show that females tend to be reported happier than males. Specifically, the ordered log-odds for females being in a higher happiness category is 0.087 greater than males. As the age increases, people are becoming less likely to be happy. A one-year increase in age would result in a 0.006 decrease in the ordered log-odds of being in a higher level of happiness. When it comes to the effect of education, people with higher education levels are less likely to be happy. On average, one unit of higher education would lead to a 0.02 decrease in the ordered log-odds of being in a higher happiness category. In terms of social class and income, individuals who report a higher level of social class or income scales have a greater possibility of being happy. A unit increase in social class would bring a 0.202 increase in the ordered log-odds of reporting a higher level of happiness, and a unit increase in scale of income would result in a 0.093 increase in the log-odds.

As nominal variables, the effect of marital status and employment status require further discussion. The reference category for marital status is married, and all the coefficients are the expected difference in the ordered log-odds of being in a higher happiness level compared to the married group. As shown in Table 11, married groups generally tend to be happier than all the other groups, including those living together, divorced, separated, widowed, and single. Moreover, people who have been experiencing an ended relationship are more likely to report low levels of happiness.

Table 9. Baseline Model: Effect of IPII on Happiness

Variables	Coefficients	Significant Level
IPII 2	- 0.1	**
IPII 3	- 0.122	***
IPII 4	- 0.158	***
IPII 5	- 0.102	***
IPII 6	- 0.156	***
IPII 7	- 0.144	***
IPII 8	- 0.067	**
IPII 9	0.072	**
IPII 10	0.117	***

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Figure 2. Baseline Model: Approximate U-shaped Association between IPII and Happiness

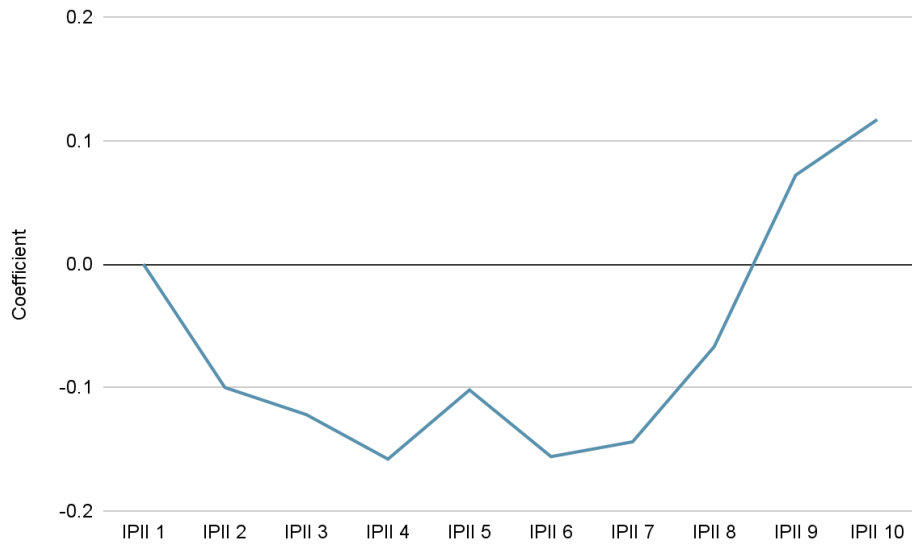


Table 10. Baseline Model: Effect of Control Variables on Happiness

Variables	Coefficients	Significant Level
Female	- 0.087	***
Age	- 0.006	***
Education	- 0.02	***
Social Class	0.202	***
Scale of Incomes	0.093	***

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 11. Baseline Model: Effect of Marital Status on Happiness

Variables	Coefficients	Significant Level
Living together as married	- 0.09	***
Divorced	- 0.523	***
Separated	- 0.511	***
Widowed	- 0.456	***
Single	- 0.29	***

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 12. Baseline Model: Effect of Employment Status on Happiness

Variables	Coefficients	Significant Level
Part-time (less than 30 hours a week)	- 0.01	
Self-employed	0.012	
Retired/pensioned	0.188	***
Homemaker not otherwise employed	0.071	***
Student	0.158	***
Unemployed	-0.15	***
Other	-0.067	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

Table 12 shows the effect of employment status on happiness. The reference group used in the regression is the full-time employed group. The full-time employed group significantly differs from the retired/pensioned group, students, and unemployed individuals: Retired/pensioned and student groups have a higher possibility of being happy, while the unemployed group is less likely to become happy.

## 5.2 Result of Alternative Model

Table 13 reports the results of the ordered logit regression with and without an interaction term between the individual perspective toward income inequality and income levels. The statistical significance is confirmed by the p-value (0.0000) of the model. Similarly, the fixed-country effects are included but not reported in the following table. The full results of the ordered logistic regressions are appended in Appendix 4.

Table 13. Alternative Model: Effect of IPII, I and IPII \* I on Happiness

Variables	Coefficients without Interaction term	Coefficients with Interaction term
IPII 2	- 0.094 **	- 0.094 **
IPII 3	- 0.117 ***	- 0.111 ***
IPII 4	- 0.144 ***	- 0.133 ***
IPII 5	- 0.084 ***	- 0.066 **
IPII 6	- 0.141 ***	- 0.118 ***
IPII 7	- 0.127 ***	- 0.097 ***
IPII 8	- 0.048	- 0.011
IPII 9	0.09 **	0.135 ***
IPII 10	0.128 ***	0.177 ***
I	0.253 ***	0.255 ***
IPII * I		- 0.016 ***

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

According to Table 13, the relationships between happiness and individual perspectives toward income distribution found in both models are similar to the result from the baseline model. The reference group is those who strongly support income equality (IPII 1 category), and the coefficient of each group

represents the expected change in the ordered log-odds of the dependent variable given a change from reference group to that group. For instance, the ordered log-odds for those individuals in IPII 10 being in a higher happiness category is 0.177 higher than those in IPII 1, according to the alternative model with interaction term. This means that individuals in the IPII 10 category are more likely to be happier compared to those in the IPII 1 category. For those people who show an extremely positive attitude toward income inequality, they are more likely to report themselves as happy than the rest of the population. Meanwhile, the U-shaped relationships are discovered in both models as well. People who strongly support the income distribution to be more equal or unequal have a larger possibility to report a higher state of happiness than others. The observed trends in the baseline model also exist in both groups of people who are supportive of more equal income (within categories ranging from 1 to 4) and of people who support larger income inequality (within categories ranging from 6 to 10). That is, for both groups, those respondents with more extreme attitudes toward income distribution tend to report higher levels of happiness.

When it comes to the interaction term, we found that the coefficient is statistically significant at a significance level of 0.01. Therefore, we conclude that the interaction term effectively contributes to the explanatory power of our model. Since the interaction term represents the moderating effect of income level on the association between the IPII and happiness, the coefficient of it reflects how IPII influences happiness differently between high-income and low-income levels. The negative coefficient, which is -0.0165, indicates that being in the high-income group imposes a negative effect on the association between the IPII and self-reported happiness. In other words, for those individuals with low income, there will be an extra positive effect of 0.0165 on their happiness level in the ordered log-odds scale when their degree of belief changes toward pro-income-inequalities compared to those high-income individuals with the same changes. For example, two respondents hold neutral attitudes toward income distribution (in category 5), one with low income and the other with high income. If both of them become extremely supportive of income inequality, which means their perspectives have changed to category 10, the low-income respondent is more likely to be happier than the high-income one.

## **6 Discussion and Conclusion**

### **6.1 Discussion**

The purpose of this paper is to study the relationship between subjective happiness and individual opinions toward income inequality. Using data from the WVS-7, this research derives a statistically



significant association between subjective happiness and individual perspective of income inequality. Specifically, an approximate U-shaped relationship is found between the individual perspectives of income inequality and happiness. This U-shaped relationship presents a trend that when people's perspectives on income inequality are more extreme, either extremely supporting income equality or inequality, they usually have higher levels of happiness than those with moderate perspectives.

A significant finding of this study is that those who firmly believe that there should be larger income inequality as incentives for individual effort are usually happier. This finding is consistent with Knight et al. (2009) and Alesina et al. (2004)'s conclusions on a positive relationship between income inequality and individual happiness using data from rural China and America respectively. The positive influence brought by inequality is similar to *the tunnel effect* described by Hirschman and Rothschild (1973). The tunnel effect refers to the idea that those with lower income will tolerate large income inequality if they believe that the income gains of others signal an improvement in their own future. This tunnel effect is also supported by the result in the alternative model, where an interaction term of income and perspective is introduced to study the moderating effect of income level on this relationship. The result shows that positive attitudes toward income inequality have a greater positive effect on happiness for low-income individuals.

However, for the trend in the individuals who are more supportive of income equality, there seems to be no conclusive theory for explaining why they would be happier when they extremely support income equality. More profound research needs to be conducted for a clear explanation of this kind of trend.

Besides, this study has several limitations. First of all, there are shortcomings in the measure of perspective toward income inequality and happiness using the WVS-7. As mentioned earlier, the way in which the question is structured is, to some extent, ambiguous. Particularly, the statements representing each extreme of the scale seem to include multiple layers of meaning. The first layer of the question is asking whether the respondents are supportive of income equality, while the second layer is implicitly asking whether the respondents believe that income equality should be achieved by regulations such as income redistribution or by individual effort. The current structure of the questions mixes these two questions together, and, therefore, causes ambiguity for the respondents. Consequently, the measure of individual perspectives toward income inequality may be biased due to the misleading phrasing of the question. Moreover, although the self-report measures of happiness have been shown effective in many previous studies, a limitation of survey responses exists because of their context-dependency. That is, people tend to assess their current feeling instead of the global evaluations of their happiness.

Another limitation of this research is the analysis of causality. This paper mainly focuses on the association between subjective happiness and individual perspectives toward income inequality. Even

though some controls have been imposed in the empirical research, more restrictions are required to determine a solid causal effect.

The policy implication of this study is preliminary. It is counterintuitive but significant to realize that large income inequality is not necessarily associated with low happiness. This paper suggests that individual perspectives on income inequality are likely to play important roles in understanding the relationship between income inequality and happiness. Closely related to what is implied in the tunnel effect, large income inequality sometimes imposes a positive influence on happiness, especially when high upward mobility exists in the society, which means that it is easy for individuals to move upward to higher social strata in a society, regardless of their current social standing. This implies that improving social mobility, such as creating equally shared opportunities and adapting pro-competitive policies, might be an alternative solution for reducing income differences to increase people's happiness.

## 6.2 Conclusion

This paper investigates the relation between happiness and individual perspectives toward income inequality using the evidence from the WVS-7. By conducting empirical research using the ordered logistic regression, this study established a statistically significant relationship between personal attitudes toward income inequality and subjective happiness. The main conclusions could be summarized as follows:

1. For the individuals who strongly believe that there should be a larger income inequality as incentives for individual effort, they are more likely to be happy than the others.
2. A U-shaped curve has been found in the relationship between happiness and attitudes toward income inequality, except for those who hold neutral attitudes on income inequality. This pattern refers to the situation that respondents with more extreme attitudes toward income distribution tend to report higher levels of happiness.
3. The absolute income has a mediating effect on the association between happiness and perspectives toward income inequality. Specifically, the positive attitudes toward income inequality have a larger positive effect on individual happiness for those low-income individuals.

This paper also connected these findings to the tunnel effect and social mobility. The first and third results are consistent with the tunnel effect, which suggests that lower-income individuals will

accept large income inequality if they regard the income gains of rich individuals as a signal of their own better future. In a high social mobility setting, individuals are more likely to have a fair chance of success. A possible policy implication is that improving social mobility might be an alternative solution to increase people's happiness, offsetting the national-level negative effect of income inequality.

There are still some unexplained results in the research. When it comes to the lower tail of the U-shaped relationship, more profound research is required to elucidate this uncertainty. As more studies are conducted, we will better understand the association between happiness and income inequality and improve social well-being using new findings.

## Appendix 1. Descriptive Statistics of Control Variables.

Variables	Description	N	Mean	Std. Dev.	Min	Max
Happiness	“Taking all things together, would you say you are: 1) Very happy, 2) Rather happy, 3) Not very happy, 4) Not at all happy”	84,177	3.143	0.711	1	4
Perspective toward Income Inequality	“How would you place your views on this scale? 1 means you agree completely with the statement on the left; 10 means you agree completely with the statement on the right; and if your views fall somewhere in between, you can choose any number in between. Statement on the left: Incomes should be made more equal; Statement on the right: There should be greater incentives for individual effort”	83,586	6.311	2.995	1	10
Gender	1 = Male; 2 = Female	84,580	1.525	0.499	1	2
Age	Measured in years	84,302	42.65	16.29	16	103
Marital status	1 = Married; 2 = Living together as married; 3 = Divorced; 4 = Separated 5 = Widowed; 6 = Single	84,282	2.652	2.151	1	6
Education Level	0 = Early childhood education / no education; 1 = Primary education; 2 = Lower secondary education; 3 = Upper secondary education; 4 = Post-secondary non-tertiary education; 5 = Short-cycle tertiary education; 6 = Bachelor or equivalent; 7 = Master or equivalent; 8 = Doctoral or equivalent	79,444	3.732	1.886	1	9
Employment Status	1 = Full time (30 hours a week or more); 2 = Part time (less than 30 hours a week); 3 = Self employed; 4 = Retired/pensioned; 5 = Housewife not otherwise employed; 6 = Student; 7 = Unemployed; 8 = Other	83,751	3.144	2.061	1	8
Social Class	1 = Upper class; 2 = Upper middle class; 3 = Lower middle class; 4 = Working class; 5 = Lower class	82,816	2.730	0.971	1	5
Scale of Income	1 = Lower step; 2 = second step; 3 = Third step; 4 = Fourth; 5 = Fifth step; 6 = Sixth step; 7 = Seventh step; 8= Eight step; 9 = Ninth step; 10 = Tenth step	82,776	4.827	2.056	1	10
Country	Countries of the respondents, labeled in numbers	84,638	422.3	250.6	20	862

## Appendix 2. Result of VIF

### Variance inflation factor

	VIF	1/VIF
Q106	1.141	.877
2.Q260	1.219	.82
Q262	2.28	.439
2.Q273	1.281	.78
3.Q273	1.071	.934
4.Q273	1.063	.941
5.Q273	1.181	.847
6.Q273	1.673	.598
2.Q275	1.921	.521
3.Q275	2.65	.377
4.Q275	1.966	.509
5.Q275	1.891	.529
6.Q275	2.58	.388
7.Q275	1.786	.56
8.Q275	1.242	.805
9.Q275	1.005	.995
2.Q279	1.188	.842
3.Q279	1.418	.705
4.Q279	1.684	.594
5.Q279	1.56	.641
6.Q279	1.363	.734
7.Q279	1.269	.788
8.Q279	1.057	.946
Q287P	1.467	.682
Q288	1.444	.693
32.B COUNTRY	1.974	.506
36.B COUNTRY	2.86	.35
50.B COUNTRY	2.211	.452
51.B COUNTRY	2.355	.425
68.B COUNTRY	3.114	.321
76.B COUNTRY	2.666	.375
104.B COUNTRY	2.387	.419
124.B COUNTRY	5.379	.186
152.B COUNTRY	1.996	.501
156.B COUNTRY	3.998	.25
158.B COUNTRY	2.362	.423
170.B COUNTRY	2.658	.376
196.B COUNTRY	1.949	.513
218.B COUNTRY	2.293	.436
231.B COUNTRY	2.103	.476
276.B COUNTRY	2.604	.384
300.B COUNTRY	2.212	.452
320.B COUNTRY	2.142	.467
344.B COUNTRY	3.258	.307
360.B COUNTRY	4.228	.237
364.B COUNTRY	2.669	.375
368.B COUNTRY	2.248	.445

392.B COUNTRY	2.266	.441
398.B COUNTRY	2.146	.466
400.B COUNTRY	2.346	.426
404.B COUNTRY	2.363	.423
410.B COUNTRY	2.433	.411
417.B COUNTRY	2.346	.426
422.B COUNTRY	2.362	.423
434.B COUNTRY	2.108	.474
446.B COUNTRY	1.901	.526
458.B COUNTRY	2.493	.401
484.B COUNTRY	2.794	.358
496.B COUNTRY	2.866	.349
504.B COUNTRY	1.978	.506
554.B COUNTRY	1.811	.552
558.B COUNTRY	2.337	.428
566.B COUNTRY	2.18	.459
586.B COUNTRY	2.497	.401
604.B COUNTRY	2.425	.412
608.B COUNTRY	2.25	.444
630.B COUNTRY	2.214	.452
642.B COUNTRY	2.144	.467
643.B COUNTRY	2.778	.36
688.B COUNTRY	2.146	.466
702.B COUNTRY	3.047	.328
704.B COUNTRY	2.409	.415
716.B COUNTRY	2.368	.422
762.B COUNTRY	2.396	.417
764.B COUNTRY	2.673	.374
788.B COUNTRY	2.207	.453
792.B COUNTRY	3.319	.301
804.B COUNTRY	2.258	.443
818.B COUNTRY	1.973	.507
840.B COUNTRY	3.805	.263
862.B COUNTRY	2.373	.421
Mean VIF	2.223	.

## Appendix 3. Result of Baseline Model

### Ordered logistic regression

Happiness	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
<b>Income equality</b>	0	.	.	.	.	.	.
vs~e							
2	-.1	.042	-2.37	.018	-.183	-.017	**
3	-.122	.038	-3.18	.001	-.197	-.047	***
4	-.158	.038	-4.13	0	-.233	-.083	***
5	-.102	.031	-3.30	.001	-.162	-.041	***
6	-.156	.034	-4.65	0	-.222	-.09	***
7	-.144	.032	-4.53	0	-.207	-.082	***
8	-.067	.031	-2.19	.029	-.128	-.007	**
9	.072	.036	2.01	.045	.002	.143	**
Larger income diff~s	.117	.029	4.09	0	.061	.173	***
<b>Sex : base Male</b>	0	.	.	.	.	.	.
Female	.087	.016	5.45	0	.056	.118	***
<b>Age</b>	-.006	.001	-9.42	0	-.008	-.005	***
<b>Marital status :</b>	0	.	.	.	.	.	.
b~d							
Living together as~d	-.09	.03	-2.97	.003	-.149	-.031	***
Divorced	-.523	.038	-13.71	0	-.598	-.448	***
Separated	-.511	.051	-9.94	0	-.611	-.41	***
Widowed	-.456	.037	-12.38	0	-.528	-.384	***
Single	-.29	.022	-13.34	0	-.333	-.248	***
<b>Education</b>	-.02	.005	-4.21	0	-.029	-.011	***
<b>Employment status ~i</b>	0	.	.	.	.	.	.
Part time (less th~	-.01	.028	-0.36	.717	-.066	.045	
Self employed	.012	.024	0.49	.622	-.035	.059	
Retired/pensioned	.188	.03	6.36	0	.13	.246	***
Homemaker not othe~d	.071	.027	2.65	.008	.018	.123	***
Student	.158	.035	4.49	0	.089	.227	***
Unemployed	-.15	.031	-4.89	0	-.21	-.09	***
Other	-.067	.075	-0.90	.37	-.213	.079	
<b>Social Class</b>	.202	.009	21.82	0	.184	.221	***
<b>Scale of Incomes</b>	.093	.004	21.34	0	.084	.102	***
<b>Country</b>	0	.	.	.	.	.	.
Argentina	-.238	.094	-2.54	.011	-.422	-.054	**
Australia	-.21	.081	-2.58	.01	-.369	-.05	***
Bangladesh	-.425	.091	-4.65	0	-.604	-.245	***
Armenia	.198	.09	2.21	.027	.022	.373	**
Bolivia	-.416	.082	-5.05	0	-.578	-.255	***
Brazil	-.083	.084	-0.99	.32	-.247	.081	
Myanmar	-.326	.089	-3.66	0	-.501	-.152	***
Canada	-.729	.072	-10.07	0	-.871	-.587	***
Chile	-.343	.094	-3.67	0	-.527	-.16	***
China	-.314	.076	-4.13	0	-.462	-.165	***
Taiwan ROC	-.312	.086	-3.61	0	-.481	-.143	***
Colombia	.878	.086	10.23	0	.71	1.046	***

Cyprus	-.575	.096	-5.97	0	-.763	-.386	***
Ecuador	.967	.092	10.55	0	.787	1.147	***
Ethiopia	-.425	.094	-4.52	0	-.61	-.241	***
Germany	-.407	.083	-4.88	0	-.571	-.244	***
Greece	-1.15	.09	-12.77	0	-1.326	-.973	***
Guatemala	.341	.092	3.70	0	.16	.522	***
Hong Kong SAR	-1.071	.078	-13.66	0	-1.224	-.917	***
Indonesia	.352	.076	4.62	0	.203	.501	***
Iran	-1.32	.086	-15.27	0	-1.49	-1.151	***
Iraq	-1.279	.092	-13.96	0	-1.459	-1.1	***
Japan	-.124	.089	-1.39	.163	-.298	.05	
Kazakhstan	-.35	.09	-3.87	0	-.527	-.172	***
Jordan	-.56	.089	-6.33	0	-.734	-.387	***
Kenya	.398	.091	4.39	0	.221	.576	***
South Korea	-1.066	.084	-12.63	0	-1.231	-.9	***
Kyrgyzstan	1.065	.093	11.47	0	.883	1.247	***
Lebanon	-.839	.087	-9.67	0	-1.009	-.669	***
Libya	-.116	.091	-1.27	.205	-.294	.063	
Macau SAR	-.657	.094	-6.98	0	-.842	-.473	***
Malaysia	-.802	.085	-9.42	0	-.969	-.635	***
Mexico	.865	.084	10.30	0	.7	1.029	***
Mongolia	-1.372	.083	-16.59	0	-1.534	-1.21	***
Morocco	-1.148	.094	-12.27	0	-1.332	-.965	***
New Zealand	-.161	.098	-1.64	.1	-.353	.031	
Nicaragua	.415	.09	4.59	0	.238	.592	***
Nigeria	-.161	.098	-1.64	.102	-.353	.032	
Pakistan	.355	.088	4.06	0	.184	.527	***
Peru	-.167	.087	-1.91	.056	-.338	.004	*
Philippines	.537	.09	5.96	0	.361	.714	***
Puerto Rico	.48	.091	5.29	0	.302	.657	***
Romania	-1.131	.091	-12.49	0	-1.308	-.953	***
Russia	-.831	.082	-10.12	0	-.992	-.67	***
Serbia	-.937	.092	-10.18	0	-1.117	-.756	***
Singapore	-.36	.08	-4.51	0	-.516	-.203	***
Vietnam	.384	.087	4.41	0	.214	.555	***
Zimbabwe	-1.892	.092	-20.55	0	-2.072	-1.711	***
Tajikistan	.814	.09	9.05	0	.638	.991	***
Thailand	-.35	.085	-4.11	0	-.517	-.183	***
Tunisia	-1.179	.09	-13.16	0	-1.354	-1.003	***
Turkey	-.781	.079	-9.83	0	-.937	-.625	***
Ukraine	-.81	.089	-9.09	0	-.984	-.635	***
Egypt	-1.632	.094	-17.34	0	-1.817	-1.448	***
United States	-.449	.077	-5.86	0	-.599	-.299	***
Venezuela	-.236	.09	-2.63	.009	-.412	-.06	***
Constant	-3.877	.087	.b	.b	-4.047	-3.707	
Constant	-1.758	.083	.b	.b	-1.921	-1.594	
Constant	1.11	.083	.b	.b	.947	1.273	

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Mean dependent var	3.146	SD dependent var	0.706
Pseudo r-squared	0.068	Number of obs	74771
Chi-square	10550.504	Prob > chi2	0.000
Akaike crit. (AIC)	144202.441	Bayesian crit. (BIC)	144986.327

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\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

## Appendix 4. Result of Alternative Model with Interaction Term

### Ordered logistic regression

Happiness	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
<b>Income equality:</b>	0	.	.	.	.	.	
<b>base 1</b>							
2	-.094	.042	-2.24	.025	-.176	-.012	**
3	-.111	.038	-2.91	.004	-.186	-.036	***
4	-.133	.038	-3.48	.001	-.207	-.058	***
5	-.066	.031	-2.12	.034	-.127	-.005	**
6	-.118	.034	-3.47	.001	-.185	-.051	***
7	-.097	.033	-2.95	.003	-.162	-.033	***
8	-.011	.033	-0.34	.732	-.075	.053	
9	.135	.039	3.50	0	.059	.21	***
Larger income differences	.177	.032	5.50	0	.114	.24	***
<b>Sex : base Male</b>	0	.	.	.	.	.	
Female	.088	.016	5.53	0	.057	.119	***
<b>Age</b>	-.007	.001	-10.03	0	-.008	-.005	***
<b>Marital status:</b>	0	.	.	.	.	.	
<b>base Married</b>							
Living together as married	-.096	.03	-3.20	.001	-.155	-.037	***
Divorced	-.535	.038	-14.12	0	-.609	-.46	***
Separated	-.518	.051	-10.16	0	-.618	-.418	***
Widowed	-.462	.036	-12.67	0	-.534	-.391	***
Single	-.296	.022	-13.69	0	-.338	-.253	***
<b>Education</b>	-.016	.005	-3.42	.001	-.025	-.007	***
<b>Income Group:</b>	0	.	.	.	.	.	
<b>base Low income</b>							
1	.255	.017	15.30	0	.222	.288	***
<b>Interaction term</b>	-.016	.005	-3.19	.001	-.027	-.006	***
<b>Employment status: base Full time</b>	0	.	.	.	.	.	
Part time	-.025	.028	-0.89	.375	-.08	.03	
Self employed	.005	.024	0.19	.848	-.042	.052	
Retired/pensioned	.175	.029	5.97	0	.118	.233	***
Homemaker not other	.053	.027	2.00	.046	.001	.105	**
Student	.147	.035	4.20	0	.078	.215	***
Unemployed	-.179	.03	-5.89	0	-.239	-.12	***
Other	-.088	.074	-1.19	.236	-.233	.057	
<b>Social Class</b>	.244	.009	27.63	0	.227	.261	***
<b>Country</b>	0	.	.	.	.	.	
Argentina	-.216	.09	-2.40	.016	-.393	-.04	**
Australia	-.231	.078	-2.97	.003	-.384	-.079	***
Bangladesh	-.397	.088	-4.49	0	-.571	-.224	***
Armenia	.191	.087	2.21	.027	.022	.361	**
Bolivia	-.428	.079	-5.41	0	-.582	-.273	***
Brazil	-.091	.08	-1.13	.256	-.247	.066	
Myanmar	-.324	.086	-3.75	0	-.493	-.155	***
Canada	-.744	.069	-10.82	0	-.879	-.609	***
Chile	-.345	.09	-3.83	0	-.522	-.168	***



China	-.328	.073	-4.52	0	-.47	-.186	***
Taiwan ROC	-.333	.083	-4.00	0	-.497	-.17	***
Colombia	.859	.083	10.40	0	.697	1.021	***
Cyprus	-.572	.093	-6.13	0	-.755	-.389	***
Ecuador	.964	.089	10.87	0	.79	1.138	***
Ethiopia	-.441	.091	-4.83	0	-.62	-.262	***
Germany	-.418	.08	-5.23	0	-.575	-.262	***
Greece	-1.154	.087	-13.32	0	-1.324	-.984	***
Guatemala	.355	.089	3.98	0	.18	.529	***
Hong Kong SAR	-1.093	.075	-14.57	0	-1.24	-.946	***
Indonesia	.325	.073	4.47	0	.182	.467	***
Iran	-1.365	.083	-16.38	0	-1.529	-1.202	***
Iraq	-1.252	.089	-14.08	0	-1.426	-1.078	***
Japan	-.165	.084	-1.96	.05	-.33	0	*
Kazakhstan	-.364	.087	-4.17	0	-.534	-.193	***
Jordan	-.595	.085	-6.97	0	-.763	-.428	***
Kenya	.387	.088	4.41	0	.215	.559	***
South Korea	-1.08	.081	-13.28	0	-1.239	-.921	***
Kyrgyzstan	1.061	.09	11.83	0	.885	1.236	***
Lebanon	-.833	.084	-9.95	0	-.997	-.669	***
Libya	-.128	.088	-1.46	.143	-.3	.043	
Macau SAR	-.672	.091	-7.36	0	-.85	-.493	***
Malaysia	-.819	.082	-9.97	0	-.98	-.658	***
Mexico	.819	.081	10.17	0	.662	.977	***
Mongolia	-1.39	.079	-17.49	0	-1.546	-1.235	***
Morocco	-1.147	.091	-12.63	0	-1.325	-.969	***
New Zealand	-.116	.093	-1.25	.211	-.299	.066	
Nicaragua	.416	.087	4.76	0	.245	.587	***
Nigeria	-.148	.096	-1.55	.121	-.335	.039	
Pakistan	.325	.083	3.90	0	.161	.488	***
Peru	-.173	.084	-2.06	.04	-.338	-.008	**
Philippines	.529	.087	6.05	0	.357	.7	***
Puerto Rico	.49	.088	5.60	0	.319	.662	***
Romania	-1.111	.087	-12.78	0	-1.282	-.941	***
Russia	-.834	.079	-10.59	0	-.988	-.679	***
Serbia	-.946	.089	-10.63	0	-1.12	-.771	***
Singapore	-.362	.076	-4.74	0	-.512	-.212	***
Vietnam	.399	.084	4.74	0	.234	.564	***
Zimbabwe	-1.948	.089	-21.86	0	-2.122	-1.773	***
Tajikistan	.835	.087	9.60	0	.665	1.006	***
Thailand	-.341	.082	-4.14	0	-.502	-.179	***
Tunisia	-1.189	.087	-13.73	0	-1.359	-1.019	***
Turkey	-.772	.076	-10.17	0	-.921	-.623	***
Ukraine	-.83	.086	-9.69	0	-.998	-.662	***
Egypt	-1.616	.09	-17.97	0	-1.792	-1.44	***
United States	-.468	.073	-6.42	0	-.611	-.325	***
Venezuela	-.24	.087	-2.76	.006	-.411	-.07	***
Constant	-4.103	.083	.b	.b	-4.266	-3.939	
Constant	-1.985	.08	.b	.b	-2.141	-1.828	
Constant	.881	.08	.b	.b	.725	1.037	

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Mean dependent var	3.147	SD dependent var	0.705
Pseudo r-squared	0.067	Number of obs	75701
Chi-square	10433.207	Prob > chi2	0.000
Akaike crit. (AIC)	146099.496	Bayesian crit. (BIC)	146893.667

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\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

## Appendix 5. Result of Alternative Model without Interaction Term

### Ordered logistic regression

Happiness	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
<b>Income equality:</b>	0	.	.	.	.	.	
<b>base 1</b>							
2	-.094	.042	-2.25	.024	-.176	-.012	**
3	-.117	.038	-3.08	.002	-.192	-.042	***
4	-.144	.038	-3.79	0	-.218	-.069	***
5	-.084	.031	-2.75	.006	-.144	-.024	***
6	-.141	.033	-4.24	0	-.206	-.076	***
7	-.127	.032	-4.03	0	-.189	-.066	***
8	-.048	.031	-1.59	.112	-.108	.011	
9	.09	.036	2.50	.012	.019	.16	**
Larger income diff~s	.128	.028	4.53	0	.073	.184	***
<b>Sex : base Male</b>	0	.	.	.	.	.	
Female	.088	.016	5.54	0	.057	.119	***
<b>Age</b>	-.007	.001	-10.02	0	-.008	-.005	***
<b>Marital status :</b>	0	.	.	.	.	.	
<b>base Married</b>							
Living together as married	-.096	.03	-3.19	.001	-.155	-.037	***
Divorced	-.535	.038	-14.13	0	-.609	-.461	***
Separated	-.518	.051	-10.15	0	-.618	-.418	***
Widowed	-.462	.036	-12.66	0	-.533	-.39	***
Single	-.296	.022	-13.69	0	-.338	-.254	***
<b>Education</b>	-.016	.005	-3.36	.001	-.025	-.007	***
<b>Income group:</b>	0	.	.	.	.	.	
<b>base 0</b>							
1	.253	.017	15.17	0	.22	.285	***
<b>Employment</b>	0	.	.	.	.	.	
<b>status: base Full</b>							
<b>time</b>							
Part time	-.025	.028	-0.88	.376	-.08	.03	
Self employed	.005	.024	0.20	.845	-.042	.052	
Retired/pensioned	.175	.029	5.97	0	.118	.232	***
Homemaker not otherwise employed	.053	.027	1.99	.047	.001	.105	**
Student	.147	.035	4.21	0	.078	.216	***
Unemployed	-.18	.03	-5.90	0	-.239	-.12	***
Other	-.091	.074	-1.22	.221	-.236	.055	
<b>Social Class</b>	.244	.009	27.67	0	.227	.262	***
<b>Country</b>	0	.	.	.	.	.	
Argentina	-.215	.09	-2.39	.017	-.391	-.039	**
Australia	-.231	.078	-2.97	.003	-.384	-.079	***
Bangladesh	-.385	.088	-4.35	0	-.558	-.211	***
Armenia	.197	.087	2.27	.023	.027	.366	**
Bolivia	-.427	.079	-5.40	0	-.582	-.272	***
Brazil	-.09	.08	-1.13	.26	-.246	.067	
Myanmar	-.322	.086	-3.72	0	-.491	-.152	***
Canada	-.742	.069	-10.79	0	-.877	-.607	***
Chile	-.348	.09	-3.85	0	-.525	-.171	***
China	-.327	.073	-4.50	0	-.469	-.184	***

Taiwan ROC	-.332	.083	-3.99	0	-.496	-.169	***
Colombia	.861	.083	10.42	0	.699	1.023	***
Cyprus	-.572	.093	-6.13	0	-.755	-.389	***
Ecuador	.965	.089	10.88	0	.791	1.139	***
Ethiopia	-.439	.091	-4.80	0	-.617	-.26	***
Germany	-.418	.08	-5.23	0	-.575	-.261	***
Greece	-1.154	.087	-13.31	0	-1.324	-.984	***
Guatemala	.352	.089	3.94	0	.177	.526	***
Hong Kong SAR	-1.092	.075	-14.56	0	-1.239	-.945	***
Indonesia	.325	.073	4.48	0	.183	.468	***
Iran	-1.362	.083	-16.35	0	-1.526	-1.199	***
Iraq	-1.254	.089	-14.10	0	-1.428	-1.079	***
Japan	-.166	.084	-1.97	.049	-.331	-.001	**
Kazakhstan	-.367	.087	-4.21	0	-.538	-.196	***
Jordan	-.589	.085	-6.90	0	-.757	-.422	***
Kenya	.39	.088	4.44	0	.218	.562	***
South Korea	-1.078	.081	-13.26	0	-1.237	-.919	***
Kyrgyzstan	1.065	.09	11.87	0	.889	1.241	***
Lebanon	-.834	.084	-9.96	0	-.998	-.67	***
Libya	-.13	.088	-1.48	.138	-.302	.042	
Macau SAR	-.672	.091	-7.36	0	-.851	-.493	***
Malaysia	-.819	.082	-9.97	0	-.98	-.658	***
Mexico	.82	.081	10.18	0	.662	.978	***
Mongolia	-1.391	.079	-17.51	0	-1.547	-1.236	***
Morocco	-1.141	.091	-12.57	0	-1.319	-.963	***
New Zealand	-.114	.093	-1.23	.219	-.297	.068	
Nicaragua	.418	.087	4.78	0	.247	.589	***
Nigeria	-.147	.096	-1.54	.124	-.334	.04	
Pakistan	.328	.083	3.94	0	.165	.491	***
Peru	-.171	.084	-2.04	.042	-.336	-.006	**
Philippines	.531	.087	6.08	0	.359	.702	***
Puerto Rico	.49	.088	5.60	0	.319	.662	***
Romania	-1.114	.087	-12.82	0	-1.285	-.944	***
Russia	-.833	.079	-10.58	0	-.987	-.679	***
Serbia	-.945	.089	-10.63	0	-1.12	-.771	***
Singapore	-.361	.076	-4.72	0	-.511	-.211	***
Vietnam	.403	.084	4.79	0	.238	.568	***
Zimbabwe	-1.943	.089	-21.82	0	-2.118	-1.769	***
Tajikistan	.833	.087	9.57	0	.662	1.004	***
Thailand	-.338	.082	-4.11	0	-.499	-.177	***
Tunisia	-1.189	.087	-13.73	0	-1.359	-1.019	***
Turkey	-.771	.076	-10.15	0	-.919	-.622	***
Ukraine	-.83	.086	-9.69	0	-.998	-.662	***
Egypt	-1.615	.09	-17.95	0	-1.791	-1.438	***
United States	-.466	.073	-6.39	0	-.609	-.323	***
Venezuela	-.239	.087	-2.74	.006	-.409	-.068	***
Constant	-4.125	.083	.b	.b	-4.287	-3.962	
Constant	-2.007	.08	.b	.b	-2.163	-1.851	
Constant	.858	.079	.b	.b	.703	1.013	
Mean dependent var		3.147	SD dependent var			0.705	
Pseudo r-squared		0.067	Number of obs			75701	
Chi-square		10423.057	Prob > chi2			0.000	
Akaike crit. (AIC)		146107.646	Bayesian crit. (BIC)			146892.583	

\*\*\*  $p < .01$ , \*\*  $p < .05$ , \*  $p < .1$

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