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Redistribution of Income Inequality and Self-rated Happiness: Some Empirical Evidence

A cross sectional study on the impact of a redistributionary policy on individuals' self-rated happiness across OECD member countries

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ABSTRACT: In this paper, combined data from the World Value Survey and OECD, covering 23 countries and a large time span, is used to study the effect of the level of redistribution on individual well-being. Results indicate that individuals are more likely to report themselves happy in the presence of higher levels of redistribution, even after controlling for various individual and macroeconomic characteristics, including year and country dummies. However, additional aspects needs to be taken into consideration when contemplating the impact of redistribution policies such as its effect on unemployment.

Keywords: Happiness, Income Redistribution, Income Inequality

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1. Introduction

In recent decades, there has been somewhat of a shift within the field of economics. People have begun to question the be-all-and-end-all significance previously ascribed to economic growth and, more specifically, to the GDP measure, which was considered as a general indicator of development and well-being. These concepts were construed and gained importance in a markedly different era, where production was seen as the singular vehicle towards well-being and, consequently, the primary aim of any society. In today's post-industrialist society, this no longer necessarily holds true. Consequently, while GDP and economic growth can still be considered important indicators of society's development and the wellbeing of people, and will continue to be so, more and more researchers are also looking at alternative dimensions, often entering cross-disciplinary areas, touching base and exchanging ideas, models and concepts with other disciplines such as sociology and psychology.

One such new resulting sub-discipline is happiness economy, which has seen an explosion in recent years both in terms of the growing body of academic research, the development of appropriate measures and methods, as well as public interest in it, not least from actors within the political arena. Happiness is seen as a measure of well-being and the outcome of the utility function people seek to maximize. As a result of the growing popularity, many aspects of happiness and possible explanatory factors for it have already been explored in these intensifying endeavours. However, many more unexplored frontiers remain and provide plenty of topics of interest and opportunities for future research.

One potential area of interest is inequalities and redistributions, and the potential role of governments in the happiness welfare of its people. We explore this topic using a multi-country regression covering several time-periods, using data from OECD and the World Value Survey, including the most recent data, implying that we have data for a longer period of time than many previous studies. In our regression of Redistribution on Life Satisfaction, controlling for various micro and macro-level variables, we find that redistribution have a positive effect on happiness. However, there are still other factors to take into consideration.

This paper is organized as follows: Section 2 covers the background and previous research and also states our purpose and working hypothesis in detail, while section 3 describes the data collected for the study. Subsequently, section 4 contains a review of the empirical strategy employed and the econometrical methods used to address our research question. In section 5 the empirical results

are presented, together with some robustness checks, and these are then further discussed in section 6 where specific factors are examined before taking on a more universalistic approach by reexamining the data. Lastly, in section 7 we present concluding remarks as well as a summary of the contributions of this paper.

2. Background

Welfare economics is a category of economics that evaluates aggregate well-being by looking at microeconomic and macroeconomic factors. Happiness economics, in turn, is a subcategory of welfare economics and is the empirical and theoretical study of happiness and well-being. Its interdisciplinary nature binds together concepts within economics, psychology and sociology and it has, as a scientific field, grown substantially in the opening years of the 21st century. A general consensus within happiness economics is the need to identify key contributing factors to increase happiness, both at an individual level and on an aggregate macro-level. Its advocates stress the need to shift focus from the previous fixation on “hard value”-measurements, such as GDP per capita, as a proxy for the development and well-being of nations, to more direct measurements of actual happiness and well-being, although the former may still help explain the latter.

As with many psychology-related topics, the subjective nature of "happiness" makes this both a challenging and sometimes unreliable area to study. However, despite the absence of more exact measurements and allowing for this inevitability, several inroads have been made in explaining the determinants.

2.1 Previous research

Originally, it was believed that increasing income and, hence, increasing GDP per capita would inevitably contribute to ever-increasing happiness levels for all individuals. However, one of the key concepts in happiness economics, named the Easterlin Paradox, which was developed by Richard Easterlin (1974), who pioneered the area as the first economist to make use of happiness data, contradicts this long-held belief. In his study, Easterlin used survey responses from two sources during the period 1946 through 1970, and covering 19 countries; one a Gallup-type poll which asked respondents to rate their happiness on a three-grade scale, and the other poll utilising a procedure of self-anchoring devised by Cantril (1965) ¹ with responses on a numerical scale from 0 to 10. What he found and what came to be known as the Easterlin Paradox concept was a noticeable positive association between income and happiness within countries, but that this relationship does not hold between countries and over time.

¹ Cantril's self-anchoring striving scale comes in various mutations, but in essence can be stated as: "The top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. On which step of the ladder would you say you personally feel you stand at this time?"

In other words, while relative income seems to be an important determinant - with more rich people reporting higher happiness on average - absolute income seems to play little to no role, as evidenced by the lack of increasing average happiness over time. This, Easterlin explained, is due to the fact that economic well-being is not the same thing as social well-being, or what is commonly referred to as "happiness", and increases in output leads to an escalation of expectations, which negates the expected positive impact on happiness. Furthermore, in judging happiness people compare themselves to a standard or norm, which is usually specific to a country and/or point in time and not universal. Since then, this paradox has been both challenged, for instance by Stevenson and Wolfers (2008) in a cross-section study using a broader sample of countries, but also widely accepted amongst scientific practitioners. More importantly, perhaps, is that it has inspired a surge of efforts in identifying and discussing other significant factors contributing to increased happiness.

Further underlining the complex nature of efforts to understand happiness and its causes is the findings of Stevenson & Wolfers (2009) who showed that although living standards for women have improved in the US over the last 35 years, their happiness has actually decreased, both in absolute and relative (that is, in comparison to men) terms while the traditional GDP -measure, as well as change in GDP, has both been found to impact happiness positively (Di Tella et al. 2003).

A more modern factor that has been popularly in focus for research has been the correlation between happiness and income inequality, on the aggregate level. In one of the first empirical studies on the subject, researchers found a negative correlation between income inequality and subjective happiness by doing a comparative study on small, relatively closed communities in Israel (Morawetz et al., 1977), findings which have subsequently been substantiated in several later studies (Sanfey and Teksoz, 2005; Oshio and Kobayashi, 2010; Graham and Felton, 2005). One interesting aspect of income inequality's impact on happiness is that higher income inequality does not only make the more worse-off people less happy but that everyone, including the richer part of the population sees a decrease in happiness in the presence of income inequality (Cooper et al. 2013). However, there are some qualifications to this.

In addition to income inequality, a number of papers evaluate the impact of taxes on happiness. Furthermore, not only does the tax policy itself matter, but also people's compliance with the adopted taxes affect happiness. In a recent published paper, empirical evidence show that even after controlling for several demographic and socioeconomic factors, tax morale constitutes a previously unexplored determinant of happiness (Lubian & Zarri, 2011). Oishi, Schimmack

& Diener (2012) also showed that the shape of the tax system, i.e. whether it is progressive or flat, also affects happiness. It would consequently seem that tax policy can play a significant role in determining the happiness of the population.

Other possible macrodeterminants of happiness that have been explored are inflation and unemployment. Several studies have found that unemployment seems to matter more than inflation (Malesovic Perovic 2008; Wolfers 2003; Di Tella et al., 2003). Some socioeconomic factors have also found to be positively related to higher happiness such as being married, being educated, being young or old (implying a U-shaped age curve), and being self-employed (Blanchflower 2007).

The influence of government spending has been found to be inconclusive so far. Bjornskov et al. (2007) found a negative correlation, while Kacapyr (2008) found it to be positive, although the effect was statistically insignificant, and in a replication of the 2007 study on a broader sample, Ram (2009) found the effect to be both positive and statistically significant.

The two studies that are perhaps the closest in nature to our proposed effort is Alesina et al. (2003) and Malesovic Perovic (2008). In their study, Alesina et al. used panel data for the US and Europe, from the United States General Social Survey (1972-1997) and the Euro-barometer Survey Series (1975-1992), respectively, to examine the effects of income inequality on happiness and regional differences of it. Using 123,668 survey responses regarding happiness, and controlling for personal income and other characteristics, the authors find that people have a lower tendency to describe themselves as happy in the presence of income inequality. They also find some interesting effects across groups; for instance, poor people in Europe are more negatively affected by inequality than their counterparts in America. This is explained, they reason, by the perceived higher social mobility in the US.

Using the same econometric principles, Malesevic Perovic & Golem (2010) study macroeconomic determinants of happiness in transition countries in Eastern Europe, and specifically the role of government expenditure as a percentage of GDP. Combining micro-level data from the World Value Survey with macro-level indicators obtained from the World Bank's World Development Indicators, and controlling for country and year, the study, in addition to confirming many of the previous effects (for instance of education, relative income as well as other micro and macro-level determinants), finds that government expenditure has a positive impact on happiness.

2.2 "Happiness" versus "Life Satisfaction"

In the happiness economics literature, there is no clear and generally accepted distinction between "happiness" and "life satisfaction", and the two expressions are often used interchangeably. This lack of distinction is true to the extent that they are both concepts of social well-being. For those who choose to make the distinction, however, "happiness" is seen as being composed of "life satisfaction" as well as negative and positive emotions (Diener, Lucas & Scollon, 2006). Consequently, the two measures are often highly correlated. In this paper, we will use the word "happiness" in discussions as a general term for social well-being, unless specifically stated otherwise, while our primary measures will be ones of life satisfaction.

2.3 Purpose & hypothesis

In light of the previous research mentioned above, this essay will look to continue to explore the field of happiness economics and its determinants by investigating the relationship between happiness and redistribution of income. It is our aim to look beyond the impact of income inequality and explore the effectiveness of a possible and often propagated remedy in the shape of the redistributory properties of taxes. While tax policy, government spending and income inequality have all been looked at as possible determinants of happiness, to our knowledge no one has specifically addressed the role of the efficiency of redistributory measures when it comes to happiness.

Assuming diminishing returns and a utility function that includes some form of egalitarian component, and in the presence of income inequality, there exists an opportunity for inequality reduction, and consequently possibly an increase of happiness, by means of income redistribution. This in turn could be achieved by, for instance, higher or more progressive taxes, or even simply through a more effective redistribution management of tax funds. The purpose of our essay will therefore be to assess whether income redistribution correlates with higher happiness.

Given the body of existing research and, more specifically, the established declining marginal return to happiness of wealth and the concept of comparative wealth and its impact on happiness, and that income redistribution, if effective, should serve to reallocate wealth to individuals for which it will provide a larger marginal return, it is our initial hypothesis that:

"Happiness is positively affected by redistribution of income towards a more equal state"

This leaves us with a testable main hypothesis, which we will seek to explore empirically in the following paragraphs.

3. Data

In a perfect world, the ideal way to examine our formulated hypothesis would be as follows. We take two groups of random people in a society, group 1 (treatment group) and 2 (control group) with an assumed common trend absent treatment, where there are unequal incomes distributions and measure how happy they are. Next, holding everything else constant, incomes in group 1 are redistributed through government measures to a state where the income distribution is more equal. We do this while we do not change anything for group 2. We then measure again how happy both of the groups are, in order to see how the redistribution of income towards a more equal state has affected group 1's happiness level compared to that of group 2.

Unfortunately, as we have no means to obtain control over a society's redistribution policy, we have to rely on second-best alternatives. One alternative and the approach that we have chosen to pursue is to relate happiness data in different societies, in our case on a country level, to the "redistribution effect" through a regression, while controlling for various macro- and microeconomic factors. The analysis is based on a mix of both micro-level and macro-level data obtained from the World Value Survey association (WVS) and the Organisation for Economic Co-operation and Development (OECD) respectively. For our intents and purposes, we have chosen to limit this analysis to OECD member countries only. The main reason for doing so is because member countries are committed to the OECD's fundamental values, which they are all expected to share. These values, which serve as a foundation for like-mindedness, include a commitment to democracy, human rights, open and transparent market economy and sustainable development. (OECD, 2013) Consequently, these countries can be expected to share several important characteristics, especially fundamental economic ones, while still allowing for diversity and variation when it comes to geographic location, demographics, social values and cultural beliefs. An additional benefit from limiting our analysis to the OECD member countries is the relatively well-developed and extensive data available for these countries through the OECD organisation.

3.1 Data sets

The source of our happiness data, as well as the various corresponding micro-level variables (including sex, age, marital status, employment status, relative income, and religious belief), is the World Value Survey association. The association conducts sample surveys in countries all around the world to explore people's values and beliefs. Samples are drawn to be representative of each country's population and to be of sufficient size and significance. The questionnaire has been developed over time with the latest one having over 300

questions. Samples are carried out in “Waves” which are periods of 4-5 years in which new data is collected. We have chosen to work with Wave 3 (1995-1998), Wave 4 (1999-2004), Wave 5 (2005-2009), and Wave 6 (2010-2014) since that is how far a substantial amount of our macro-level data stretches back to. For our happiness data, we have found two questions that have been carried out by WVS that are of interest to us. The first question is “*Taking all things together, would you say you are – very happy, rather happy, not very happy and not at all happy*”. The second question that is of interest to us is “*All things considered, how satisfied are you with your life as a whole these days? Using this card on which 1 means you are “completely dissatisfied” and 10 means you are “completely satisfied” where would you put your satisfaction with your life as a whole?*”. We have chosen the survey responses to the second question as our main independent variable. Our reasons for this are twofold. Firstly, since happiness is often thought to include more of an emotional component compared to life satisfaction, responses asking for happiness and not life satisfaction may vary more depending on the specific mood of a respondent on the day of the survey. We are not interested in factors which may impact emotional state on the survey day, but rather the overall social well-being of the individual. Thus, life satisfaction can be seen as a more accurate and stable measure of the latent variable we are interested in (Diener, Lucas & Scollon, 2006). Secondly, we believe that our analysis will benefit from the fact that the life satisfaction question is measured on a 10-grade scale, compared to a 4-grade scale for happiness, which will allow for more variation in the data and as a result improve the precision of our analysis. However, we will also use the happiness responses in our robustness checks. We do this as a tool of validating our findings. In section 3.2, we will discuss in further detail why we find a subjective measurement of happiness useful for our analysis.

To be able to see if happiness is affected by a redistribution of income towards a more equal state, we need to identify such a variable. Since there is no established consensus on a measurement of a redistribution effect, we have constructed one ourselves. Before we jump right into it, we need to mention the key ingredients that we are going to use. The GINI coefficient, which we will henceforth refer to as the GINI ratio, is an economical measurement of the income distribution in a population. It is the most widely used measurement for income inequality. GINI ratios can be calculated on the basis of either market income or disposable income. GINI ratios calculated on the basis of market income, which we will hereafter refer to as pre-tax GINI, is calculated on a pre-tax basis and consequently does not include effects of taxation and social security transfers from public sources in a country. The opposite is true for GINI ratios calculated on disposable, or final, income, which we will subsequently

refer to as after-tax GINI. The indicators used for the calculation of our GINI ratios are based on the central concept of “equivalised household disposable income”. The main difference between our two GINI ratios is that the after-tax GINI include effects of social security transfers (such as unemployment benefits, maternity allowances and etc.) as well as taxes paid and social security contributions. A more detailed description of what the income components of the two measures are can be found in Appendix 1. Our redistribution effect is then defined as follows.

$$\text{Redistribution Effect} = \frac{(\text{pre-tax GINI} - \text{after-tax Gini})}{\text{pre-tax GINI}}$$

This variable takes into account the amount (in percentage) of income inequality that has been redistributed towards a more equal income distribution through government means by taking the difference between the pre-tax GINI and the after-tax GINI over the pre-tax GINI. As the calculation of both of our GINI ratios are based on the concept of equivalised household incomes, they include the entire population, both unemployed and employed individuals, of all ages. This results in our variable being collectively exhaustive and a comprehensive way of measuring the redistribution of income. This will be our key independent variable that we are going to study in this paper.

The data source for both of our GINI ratios and the rest of our aggregated macro-level data (such as inflation, unemployment, GDP per capita) is statistics from the OECD. As an international economic organisation, working to stimulate economic development among its member countries and partners, OECD have well-respected economists working daily with obtaining data and analysing it. As such, OECD data is considered to be very reliable and is, therefore, widely used in academic works. Secondly, and given that its credibility has already been established, since our focus is on member countries of OECD, what source would be better for providing economic data for our study than the organisation itself. It should be noted however, that achieving comparability in this area of aggregated national statistics is a challenge since national practices of defining concepts and accounts are different. In order to tackle this problem, data is collected through a common set of statistical methods, based on national sources deemed to be the most representative of the country. We have chosen to work with data ranging back all the way to the earliest point for which we have GINI ratios for a significant number of countries which leaves us with a time period of 1995–2013. The rest of our macro-level variables, together with the micro-level variables, are explained in further detail in Appendix 2.

3.1.1 Limitations

As mentioned before, our redistribution effect, which is the centre piece of this paper, is calculated using GINI ratios. Because of this, one needs to assess what limitations GINI ratios have been shown to implicate in the past. First, we need to acknowledge the fact that GINI ratios are a relative measure. Critics have meant that income inequality should not be seen as a problem, but that focus should be on poverty instead (Martin Feldstein, 1998). We argue that while this may be true, it does not pose a problem in our analysis as our sole question is not whether a society is better off with less poverty but whether it is better off by redistributing its income more equally. Secondly, the GINI ratios we use are based on market income and disposable income, respectively, and thereby does not account for wealth inequalities other than in the form of its contribution to income. It could be the case that while a country has a very low income inequality, that it does, on the other hand, have a high wealth inequality. Whether this dissimilarity is explained by public pension schemes as found by Domeij and Klein (2000), or some other factor is not important. It should, however, be noted that wealth inequality is not taken into account in our paper as we focus solely on income inequality but could in the future pose as an interesting variable to investigate. Finally, while our redistribution effect captures a large portion of the effect of a redistributive income policy, it is not completely exhaustive. For instance, our chosen measure does not include the redistributive effects that result when collective taxation is used for social welfare such as healthcare, school systems etc. It is however very difficult to estimate the direct benefits for each individual, which result from such social programmes.

Having combined the aggregated macro-level data for each country and each year with individual micro-level observations from corresponding years and countries, we are left with 23 countries and 64,768 observations. A list of the countries included in our sample, as well as the corresponding survey waves and years, can be found in Appendix 3. However, this combined data set is not without its limitations and flaws. First of all, out of a total of 34 OECD member countries, we only have sufficient data for 23 countries, as mentioned above. Secondly, our data is limited to those years that the WVS association have carried out their survey for each specific year and each specific country. Since we only work with their latest four waves, we can obtain data for a maximum of four separate points in time for those countries being surveyed in each wave. This results in a data set where we have three countries that have been surveyed in all four waves, three countries with three waves, eleven countries with two waves, and six which cover only one wave. Both of these limitations leave us with a smaller sample of unbalanced panel data where we have 46 unique

clusters on the macro-level, grouped by both year and country. Moreover, we have been forced to make additional compromises due to lacking data. In order to keep our sample of countries and years somewhat intact, we have used adjacent values for our GINI ratios (and in a few instances of other macroeconomic variables) when faced with incomplete data in the process of trying to combine exact matches of corresponding year and country for our macro-level and micro-level data. This problem has mostly occurred for our pre-tax GINI as it is less commonly used as an inequality measure and thus lacks complete data. Such a procedure can however be justified as happiness data is shown to only be subject to stable changes over longer periods (Ehrhard, Saris & Veenhoven 2000). In addition to this, we see a similar pattern as regards to our pre-tax GINI. This metric is also only subject to very small changes between years. Hence our use of adjacent values should not impose any significant problems in our analysis. A list of countries and years for which we have used adjacent values for is found in Appendix 3.

3.1.2 Descriptive statistics

Below in Table 1, we present summary statistics on all of the numerical variables used in this paper. Since many of our micro-level variables have categorical outcomes, we have created histograms for these to provide a better overview of our sample. These histograms can be found in Appendix 4. Looking at our dependent variable, life satisfaction, we can see that the average satisfaction level is quite high at 7.30. Amongst the happiest countries, we find Switzerland (7.9), Finland (7.8), Norway (7.8) and Sweden (7.7) and in the bottom, we find Estonia (6.2), Czech Republic (6.4) and South Korea (6.5). Shifting focus to our crucial independent variable, the average redistribution effect is approximately 31%. Chile has the lowest country average at 4.96% while Finland reports the highest country average of 48.81% with the rest of the Scandinavian countries following suit. This is not surprising as the Scandinavian countries are known worldwide for both their extensive welfare systems and for earning top rankings in several happiness reports.

Table 1: Summary statistics on all of our variables

Variable	Obs.	Mean	Std. dev.	Min.	Max.
Life satisfaction	64283	7.30	1.92	1	10
Age	64626	46.67	17.32	15	99
Pre-tax GINI	64768	0.462	0.042	0.33	0.54
After-tax GINI	64768	0.318	0.056	0.21	0.51
GDP per capita (thousands)	64768	30.17	8.59	12.45	50.07

Social Expenditure per capita (thousands)	64768	6.17	2.13	1.62	10.16
Inflation %	64768	2.410	2.067	-0.7	10.7
Unemployment %	64768	7.33	3.33	2.5	21.4
Redistribution %	64768	31.19	10.96	4.48599	53.06269
Happiness	64164	3.20	0.64	1	4

3.2 Happiness data in more detail

In many incarnations, “well-being” is often thought of as a composite measure including, alongside happiness defined as above, more tangible measures such as literacy rate, life expectancy, public utilities etc. (World Happiness Report, 2013). While a majority of these measures are undeniably important to society as a whole, the possible theoretical link between these measures and the redistributive effects of taxes is, in many cases, tenuous at best. We chose therefore to focus solely on the isolated property of “happiness”, despite its somewhat vague definition and difficulties to objectively appreciate. There are several ways of measuring happiness and well-being, both normative measures as well as subjective ones. While there is indeed a relationship between the terms “happiness”, “life satisfaction” and “well-being”, it is problematic that they are sometimes used more or less interchangeably. We see a clear distinction between them, and choose to define “happiness” as the subjective experienced mental well-being of the individual. As a measure of this variable, we have chosen to use subjective, self-reported data collected by the World Value Survey. As a reader, one might be sceptic towards the use of subjective self-reported happiness data, but we believe it to be appropriate and effective for our analysis and will point out several arguments in favour of using it. Our main argument is that psychologists, with a significant portion of their efforts being focused on studying happiness and having researched the topic for far longer than economists, primarily use subjective measurement as a measure for happiness. To elaborate, it can be expected that free market and competition in the research field would push out those who use bad data and methods. Secondly, happiness data passes validation exercises and is correlated to physical reactions that are in theory supposed to simulate true internal happiness. Pavot (1991) and Ekman (1990) finds for example that individuals that report higher level of happiness tend to smile more often. Sutton and Davidson (1997) in turn discovered that happiness responses are positively correlated to activity in the specific part of the brain responsible for “happiness”. Happiness data is also negatively correlated with suicide rates (Di Tella 2003). There has been counter-arguments about whether respondents of these questions tend to answer towards more socially desirable trends, but this has been proved

not to hold (Konow and Earley 1999). All of this research, with similar results, strengthens our belief that this kind of data is suitable for our intended analysis.

4. Empirical Strategy

Our empirical strategy to test our hypothesis is to relate our dependent variable, happiness, to the redistribution effect. We do this by using cross sectional data for countries over time to take advantage of variation in GINI ratios and redistribution levels. As mentioned earlier, our dependent variable consists of values existing on an ordinal scale, with each of the values having a sequential order going from lower to higher happiness levels. Thus, we find that the best method for estimating a causal effect is to use an ordered logistic regression.

We have therefore formulated the following ordered logistic regression model:

$$Happiness_{i,s,t} = \alpha Redistribution_{s,t} + \beta MICRO_{i,s,t} + \delta MACRO_{s,t} + n_s + u_t + \varepsilon_{i,s,t} \quad (1)$$

where $Happiness_{i,s,t}$ is the happiness of individual i , living in country s , in year t . The vector $MICRO_{i,s,t}$ refers to a set of variables on an individual level controlling for a set of personal characteristics that have been found to affect happiness. The set of individual characteristics that we include in our regression is, in no particular order, the following:

- **Age** – For a long time, economists have been divided over the effects of age on happiness with several different discoveries (Clark and Oswald 1994; Winkelmann and Winkelmann 1998; Easterlin et al. 1993). One of the more comprehensive studies to date by Blanchflower et al. (2008) found a U-shaped age curve which increases the notion of age having an effect on happiness.
- **Sex** – As mentioned in previous research, Stevenson & Wolfers (2009) show that even though the standard of living for women have improved in the United States, their happiness has, on the contrary, decreased. However, it is still higher on average than that of men.
- **Marital status** – Relations are at the centre of every individual's life and as one of the major personal goals of many, a crucial aspect when individuals assess their subjective happiness. Previous research seems to strongly agree that married individuals are, to a large extent, happier than individuals who have never married or have been divorced (Glenn & Weaver, 1979; Veenhoven, 1984; Gove, Style, & Hughes, 1990; Mastekaasa, 1994).
- **Religious belief** – Religious involvement and belief have long been associated with higher happiness. As a result, this relation has therefore been investigated in several papers where one of the most comprehensive ones conducted by Ellison (1991) shows that individuals with strong religious faith report higher levels of happiness.

- **Education attained** –The degree of education an individual attains has been shown in several papers to have a positive effect on happiness (Blanchflower et al. 2004; Alesina et al. 2004; Malesovic Perovic 2010)
- **Employment status** – Individual unemployment, which in this paper is referred to as employment status, is a micro-level variable which will control for how the individuals employment status affects its happiness. Previous research have shown that unemployment has a large negative effect on happiness (Clark and Oswald, 1994). This has been validated in several more up-to-date papers (Alesina et al. 2004; Malesovic Perovic 2010).
- **Relative Income** – The study by Easterlin (1974) on absolute and relative income have inspired many others to analyse the same factors over time with more recently collected data. One of the more recent studies that confirm Easterlin's conclusion that relative income has a strong positive affect on happiness is by Clark, Frijters and Shields (2008).

The vector $MACRO_{s,t}$, in turn, refers to a set of aggregated macroeconomic variables previously found to affect happiness. The set of aggregated macroeconomic variables that we include in our regression is in no particular order the following:

- **GDP per capita** – This variable also harkens back to the study done by Easterlin (1974) and, similarly, a vast amount of research has been conducted since, studying the effect of income levels which is found to be positive, although with a decreasing marginal utility (Blanchflower et al. 2004; Alesina et al. 2004; Malesovic Perovic 2010).
- **Inflation & Unemployment** – High inflation and unemployment have both been shown to have a negative effect on happiness (Clark and Oswald, 1994). A later paper by Di Tella et al. (2001) has, in a comparison of preferences for inflation and unemployment, discovered that the latter seems to have a larger effect on happiness.

In order to further control for characteristics not covered by our MACRO and MICRO vectors, we also include two dummy variables, n_s controlling for fixed effects for countries and u_t controlling for the specific year. Finally, the control variables mentioned above together with our crucial independent variable, the redistribution effect, form our main model that we are going to use for our analysis in this paper.

It should be mentioned that there has been a research paper focused solely on methodology for the estimation of determinants of happiness (Ferrer-i-Carbonell and Frijters 2004). This paper finds that allowing for individual fixed-effects in

the ordered logit model changes the results substantially, when their result are compared to previous research in the happiness economics and using the same data. They underline the importance of taking these effects into account or to include personality traits that make up for these effects. However, in light of limited research in regards to what these personality traits could be and, moreover, the fact that we do not have panel data for the same individuals over time, we have decided to ignore this effect as most previous researchers have done within this field.

Our ordered logistic regression model (1) above, can be seen as trying to capture the continuous latent variable $Happiness^*_{i,s,t}$ which is not observable. The value of this continuous latent variable determines what our observed ordinal variable $Happiness_{i,s,t}$ equals. This determination is done by the fact that the continuous latent variable has different thresholds points (here defined as κ). Depending on whether or not this unobservable variable has crossed a particular threshold, it is then “collapsed” into one of the ten observable categories that our ordinal variable can assume. In our model, we have the following case demonstrated below which will serve as a base for understanding the interpretation that we will make from our results later on.

$$\begin{aligned}
Happiness_{i,s,t} &= 1 \text{ if } Happiness^*_{i,s,t} \leq \kappa_1 \\
Happiness_{i,s,t} &= 2 \text{ if } \kappa_1 \leq Happiness^*_{i,s,t} \leq \kappa_2 \\
&\dots \\
Happiness_{i,s,t} &= 10 \text{ if } Happiness^*_{i,s,t} \geq \kappa_9
\end{aligned}$$

4.1 Additional strategies

In addition to our main regression, we will also perform a set of additional regressions in order to give our analysis further depth and check its robustness. In the following paragraph we outline a set of different analysis we find interesting to pursue.

4.1.1 Inequality

One of the more interesting factors to look at is inequality and how it affects our main regression when including it as a control variable. As previously mentioned, our intention in this paper is to look beyond the impact of inequality on happiness and as a result it is of utmost interest to look at these two variables together. There is however potential problems in doing so. Our redistribution effect is defined and calculated on the basis of the pre-tax-and after-tax GINI. Therefore, these two variables are intrinsically linked and, by definition,

correlated. However, we will still pursue this approach as we believe the results may prove to be interesting. A more important question is whether to use the pre-tax GINI or the after-tax GINI as a measurement of income inequality. If we were to look exclusively at the effect of income inequality on happiness in isolation from the redistribution effect, the intuitive approach would be to use the after-tax GINI. This is because of the fact that you would want to analyse the effect of income inequality after any government interventions and their efforts to redistribute income. Contrary, if we want to look at the effect of income inequality together with the redistribution effect, it would serve us better to use the pre-tax GINI as a measurement instead. The reasoning for this is that including the after-tax GINI in our main regression would limit both the values that our redistribution effect can assume, but also the after-tax GINI itself. Let us demonstrate this limitation in an example. If we were to interpret the result from a regression including the redistribution effect as well as the after-tax GINI, a hypothetical increase in redistribution would per se mean that the after-tax inequality should be decreased. This violates the basic element of keeping every other variable constant when interpreting the effect of one variable. This problem is solved by replacing the after-tax GINI with the pre-tax GINI as a measurement of income inequality. This replacement is however only valid for this regression alone. In looking at the effect of income inequality on happiness in isolation, we will use the after-tax GINI, following the line of reasoning outlined above.

4.1.2 Female and male individuals

Gender inequality is a major challenge in today's society and is a frequently debated topic. In light of this, it would be interesting to look at how the redistribution effect differs among sub-groups of females and males and whether this could provide us with any additional insights. Females are today considered to be overrepresented in low-income jobs. Therefore, it is interesting to see whether a redistribution towards a more equal income distribution has a significantly different effect on females than males.

5. Results

Table 2 shows the results of various regressions based on the ordered logistic regression laid out in the previous section. All regressions performed include dummy variables for each country and year.

TABLE 2 VARIABLES	(1) Life satisfaction	(2) Life satisfaction	(3) Life satisfaction
<u>MICRO</u>			
Marital status			
Not in a relationship	REF	REF	REF
In a relationship	0.558*** (0.032)	0.559*** (0.032)	0.556*** (0.032)
Religion			
Religious	REF	REF	REF
Not religious	-0.251*** (0.029)	-0.252*** (0.029)	-0.252*** (0.029)
Atheist	-0.307*** (0.040)	-0.307*** (0.040)	-0.305*** (0.040)
Female (dummy)			
	0.116*** (0.023)	0.116*** (0.023)	0.117*** (0.023)
Age			
	-0.0656*** (0.0044)	-0.0655*** (0.0044)	-0.0656*** (0.0044)
Age squared			
	0.000681*** (4.74e-05)	0.000680*** (4.73e-05)	0.000682*** (4.76e-05)
Education			
No education	REF	REF	REF
Primary school, incomplete	0.186 (0.125)	0.190 (0.124)	0.195 (0.124)
Primary school, complete	0.267** (0.119)	0.269** (0.119)	0.274** (0.119)
Secondary school, incomplete	0.401*** (0.135)	0.402*** (0.135)	0.408*** (0.135)
Secondary school, complete	0.387*** (0.133)	0.387*** (0.132)	0.391*** (0.132)
University, no degree	0.377*** (0.129)	0.377*** (0.129)	0.388*** (0.129)
University, degree	0.518*** (0.131)	0.518*** (0.131)	0.530*** (0.131)
Employment status			
Full-time	REF	REF	REF
Part-time	-0.036 (0.039)	-0.035 (0.039)	-0.033 (0.039)
Self-employed	0.028 (0.044)	0.027 (0.045)	0.027 (0.045)
Retired	-0.035 (0.044)	-0.034 (0.044)	-0.031 (0.044)
Housewife	0.099** (0.046)	0.099** (0.046)	0.10** (0.046)
Students	0.184*** (0.057)	0.186*** (0.057)	0.185*** (0.057)

Unemployed	-0.616*** (0.065)	-0.616*** (0.065)	-0.610*** (0.066)
Other	-0.309*** (0.065)	-0.309*** (0.065)	-0.322*** (0.065)
Scales of income			
Lowest decile	REF	REF	REF
2nd decile	0.171*** (0.056)	0.170*** (0.056)	0.171*** (0.056)
3rd decile	0.277*** (0.059)	0.279*** (0.059)	0.283*** (0.058)
4th decile	0.439*** (0.069)	0.440*** (0.068)	0.446*** (0.068)
5th decile	0.624*** (0.071)	0.626*** (0.070)	0.634*** (0.069)
6th decile	0.791*** (0.083)	0.792*** (0.082)	0.798*** (0.081)
7th decile	0.878*** (0.097)	0.880*** (0.096)	0.890*** (0.095)
8th decile	0.887*** (0.114)	0.889*** (0.114)	0.900*** (0.114)
9th decile	0.972*** (0.104)	0.973*** (0.104)	0.992*** (0.104)
Top decile	1.050*** (0.106)	1.050*** (0.106)	1.069*** (0.105)
Redistribution, %	0.0225*** (0.0080)	0.0258** (0.0124)	0.0024 (0.0109)
MACRO			
Inflation	-	0.022 (0.039)	0.005 (0.028)
GDP, log	-	0.45 (0.73)	2.06*** (0.69)
Unemployment	-	0.0052 (0.0159)	-0.070** (0.027)
Inequality, GINI %	-	-	0.192*** (0.055)
Country (dummy)	INCLUDED	INCLUDED	INCLUDED
Year (dummy)	INCLUDED	INCLUDED	INCLUDED
Observations	52,060	52,060	52,060

Notes to Table 2. Standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Data for micro-variables, including the dependent variable, are from the World Value Survey, and include individuals surveyed between 1999 and 2013. REF is the reference state for dummy variables. Each regression include dummy variables for the corresponding countries and years. Our regressions' threshold points are found in Appendix 5.

Column 1 includes all of our micro-variables as well as our measure of redistribution. All coefficients for our control variables are in line with expectations and the findings of previous research. For instance, age displays the signature U-shaped impact on happiness found in previous studies. Furthermore, females are slightly happier than their male counterparts, and being in a

relationship, instead of being single, as well as being employed full-time, seems to be conducive to happiness. Both education and relative income are important determinants of happiness in this model, with higher levels of each resulting in improved levels of happiness. With the exception of some of the categories under employment status and incomplete primary school under education, the coefficients are all statistically significant. As for our key variable, redistribution, it is both statistically significant ($p\text{-value}=0.005$) and, in line with our hypothesis and expectations, exhibits a positive coefficient of 0.0225.

In column 2, we include some macroeconomic variables such as the rate of unemployment, GDP log and inflation. While the coefficient for GDP log is of the expected sign, those of employment rate and inflation are not. Moreover, none of these new coefficients are statistically significant. This may be due to the fact that since these are on country-level, this effectively leaves us with only 46 unique observations for these variables, and variance may therefore be low. Both the coefficients and statistical significance of the microeconomic variables remain virtually unchanged in this expanded specification of our model.

The effect of our key variable of interest increases slightly to 0.0258, and it remains statistically significant although to a somewhat decreased degree. While its effect might seem comparatively small in relation to many of the other coefficients, it is important to remember that the estimated effect is per percentage unit of redistribution. A redistribution of approximately 31%, equal to our sample mean, would therefore imply a sizeable individual effect. As the coefficients of an ordered logistic regression are hard to interpret, we have also calculated marginal effects for our key variable which we will illustrate with the following example. Since the average life satisfaction of our sample is approximately 7.3, we wanted to predict the probability of falling into the next level of life satisfaction which is 8. We chose two arbitrary redistribution effect, the first being 20% and the second one being 35%. The probability of the average life satisfaction being 8 with a redistribution effect of 20% is approximately 28% while with a redistribution effect of 35%, it is 31%. This indicates that increasing the redistribution effect by 15 percentage points increases the probability of the average life satisfaction being 8 with approximately 3 percentage points. One have to remember that this effect is true for other levels of life satisfaction as well which results can be found in Appendix 9 Table 9, hence its effect is relatively strong.

Finally, in column 3 we add a final macroeconomic variable, and control for income inequality. The microeconomic estimates still remain largely intact, however, the inclusion of this variable has a drastic impact on our macroeconomic variables. In this iteration, both GDP log and unemployment

now turn statistically significant and while the positive coefficient of the former increases significantly, the latter changes sign from a slight positive effect to a larger negative one. Similarly, our main independent variable Redistribution is also impacted significantly, decreasing to 0.0024 and losing its statistical significance. These significant changes seem to imply that we may be having some issues with multicollinearity in our model. Considering that the pre-tax GINI (and consequently income inequality) is an essential part of the very definition of our redistribution variable, and that GDP and unemployment rates are, in turn, intrinsically linked to GINI, this is no major surprise. However, this fact should be kept firmly in mind when considering the results from this last model specification. This also led us to do a separate regression with income inequality excluding our redistribution variable. This regression can be found in Table 8, Appendix 8.

In Table 3 below, we have our final regression where we break down respondents into two categories, females and males. A respondent is simply classified as female if they identify themselves as one and the same goes for males. Our first regression in column 1 is for males and the regression in column 2 is for females. Looking at our key independent variable, we see a quite clear difference between these two groups of individuals. While males as a group have a positive effect of redistribution of 0.0196 with a p-value of 0.093, the females as a group have a much larger positive effect of 0.0347 while having a p-value of 0.015. This demonstrates a quite large difference when it comes to the effect of redistribution on happiness for these two groups of individuals which we will discuss in the next section.

TABLE 3 VARIABLES	(1) Life satisfaction (males)	(2) Life satisfaction (females)
<u>MICRO</u>		
Marital status		
Not in a relationship	REF	REF
In a relationship	0.618*** (0.0411)	0.515*** (0.0393)
Religion		
Religious	REF	REF
Not religious	-0.284*** (0.0352)	-0.220*** (0.0319)
Atheist	-0.359*** (0.023)	-0.254*** (0.023)
Age	-0.0734*** (0.00571)	-0.0592*** (0.00549)
Age squared	0.000755*** (6.20e-05)	0.000621*** (5.77e-05)
Education		
No education	REF	REF
Primary school, incomplete	0.366	0.0938

	(0.223)	(0.154)
Primary school, complete	0.363*	0.200
	(0.217)	(0.157)
Secondary school, incomplete	0.467**	0.363**
	(0.238)	(0.174)
Secondary school, complete	0.428*	0.365**
	(0.234)	(0.175)
University, no degree	0.405*	0.378**
	(0.233)	(0.171)
University, degree	0.561**	0.505***
	(0.232)	(0.172)
Employment status		
Full-time	REF	REF
Part-time	-0.0805	0.00410
	(0.0759)	(0.0430)
Self-employed	-0.0518	0.154***
	(0.0538)	(0.0570)
Retired	-0.107**	0.0446
	(0.0521)	(0.0566)
Housewife	0.207*	0.153***
	(0.116)	(0.0530)
Students	0.288***	0.114*
	(0.0723)	(0.0630)
Unemployed	-0.680***	-0.539***
	(0.0684)	(0.0878)
Other	-0.503***	-0.124
	(0.0893)	(0.0761)
Scales of income		
Lowest decile	REF	REF
2nd decile	0.173**	0.168**
	(0.0751)	(0.0656)
3rd decile	0.273***	0.289***
	(0.0766)	(0.0654)
4th decile	0.470***	0.423***
	(0.0858)	(0.0778)
5th decile	0.668***	0.599***
	(0.0790)	(0.0813)
6th decile	0.800***	0.794***
	(0.0964)	(0.0869)
7th decile	0.883***	0.896***
	(0.109)	(0.106)
8th decile	0.924***	0.866***
	(0.119)	(0.131)
9th decile	0.989***	0.977***
	(0.117)	(0.108)
Top decile	1.107***	1.016***
	(0.106)	(0.125)
<hr/>		
Redistribution, %	0.0196*	0.0347**
	(0.0117)	(0.0143)
<hr/>		
MACRO		
Inflation	0.0385	0.0108

	(0.0406)	(0.0405)
GDP, log	0.648	0.126
	(0.764)	(0.986)
Unemployment	-0.00123	0.00789
	(0.0188)	(0.0185)
Country (dummy)	INCLUDED	INCLUDED
Year (dummy)	INCLUDED	INCLUDED
Observations	24,807	27,253

Notes to Table 3. Standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Data for micro-variables, including the dependent variable, are from the World Value Survey, and include individuals surveyed between 1999 and 2013. REF is the reference state for dummy variables. Each regression include dummy variables for the corresponding countries and years. Our regressions' threshold points are found in Appendix 6.

We have also performed a number of different robustness checks by running a few variations of our main regression. Among other things, we have run our main regression for restricted subsamples for each individual wave, and for subpopulations. We have also run regressions where we have exchanged our dependent variable from "Life Satisfaction" (measured on a 10-grade scale) to "Happiness" (measured on a 4-level scale) (can be found in Table 7, Appendix 7). As a final robustness check, we have used public expenditure as a proxy measure of redistribution. The results for all of these regressions were essentially in line with our main findings throughout these robustness checks. While the coefficient of the redistribution effect remains positive throughout all tested variations of model specification, its exact magnitude varies and it is not statistically significant throughout. Still, the similar effect of redistribution throughout these regressions leaves us with a greater level of assurance in our findings.

6. Discussion

In this section, we will discuss our results in further detail. First, we will shed some light upon the similarities and differences between our results and the results of previous research within this field. We will have a particular focus on papers that have previously studied the effect of income inequality as it is closely related to the topic of our paper. We will moreover assess the ambiguities that might arise in such a comparison. Secondly, we will make several interpretations of our results and provide some possible explanation of what the underlying key mechanisms of these could be. Finally, we will illustrate what the implications of our findings are and suggest possible directions for future work.

6.1 Findings

Starting off with our first basic regression in Table 2 Column 2, we find that all of our coefficients are in line with what previous research already have established. Our results therefore confirm, and conform to, the existing line of research, validating the different effects of these micro-level variables and also, to some degree, our dataset. Of these variables marital status, employment status, education attained and relative income seem to have the strongest effects which, intuitively, seem very reasonable.

When adding our key variable in focus, the redistribution effect, in accordance with our stated hypothesis has a positive effect on happiness. As mentioned in the results section, although this effect might seem small compared to other variables such as relative income, its effect is estimated per percentage unit of redistribution. In regards to the average redistribution of income amongst our sample countries, which is approximately 31%, this effect is then actually quite large and increases the possibility of reaching higher happiness levels drastically. Even after controlling for several macroeconomic variables, which are themselves statistically insignificant in this specification, we still have a positive and statistically significant redistribution effect. However, the perhaps more crucial question to ask is whether this effect is a causal effect of redistribution on happiness or whether, in a case of reverse causality, higher happiness itself might influence redistribution. Before we consider this question and provide our thoughts on the matter, we would like to take a closer look at the effect of inequality.

Referring back to our empirical strategy section, we mentioned that including income inequality in our main regression would most likely pose a problem. This was due to the close relationship between the inequality variable and our

redistribution effect, as the latter is calculated on the basis of the first. In our case, we find that adding income inequality to our regression has some remarkable effect on the significance of our macroeconomic variables and make them all statistically significant. Income inequality in this case has a positive effect on happiness, contrary to previous research while our main independent variable redistribution decreases in value drastically but stays positive. All this taken together makes us suspect that this impact may be a result of multicollinearity, and we will touch upon this effect further down below. This phenomenon further induced us to look at the income inequality variable in isolation from the redistribution effect to see whether our result would differ from previous papers. Doing an additional regression where we only look at the effect of income inequality on happiness while controlling for both micro- and macro-level variables, we find that its effect is negative and statistically significant (see Table 8, Appendix 8). This result is in line with what others have previously found. Alesina et al. (2004) identified a statistically significant negative effect when looking both at the US and Europe. This similarity is particularly interesting since we use different data sources, during different time periods and also look at a somewhat different set of countries. We would like to point out that the GINI ratios of Alesina et al. poses some issues in our opinion. The GINI ratios that they use are not based on a uniform basis of calculation as some are based on disposable income and others on market income, which, in our opinion, make their GINI ratios unreliable. In light of this, we consider our data set to be more consistent and, therefore, more reliable for this purpose.

Continuing the reasoning on this premise that income inequality has a negative effect on happiness, it should be noted that a negative effect of inequality does not per se mean that a change towards more income equality automatically leads to higher happiness, as the basis for this change is unknown. It could be that individuals are fond of higher income equality but this does not necessarily imply that they are willing to sacrifice their own financial gains for this purpose. When we included inequality as a control variable in our main regression, it would have been ideal to achieve results of statistical significance, but this regression contained problems of possible multicollinearity and could therefore not be seen as completely reliable. What we can do, however, is to compare our regression in Table 2 Column 2 with the one in Table 8 Appendix 8 and develop our thinking based on this comparison. Our first regression shows a positive effect from redistribution on happiness, while our second regression on inequality alone shows a negative effect of inequality on happiness. These two results are very sensible from a theoretical perspective and illustrate that while individuals face a negative happiness effect of inequality, they are also

positively impacted by redistribution towards a more equal state. It thus follows that their preferences seem to be consequent in this aspect.

So why do individuals dislike inequality and favour redistribution of income towards a more equal state? Thurow (1971) argues that individuals include income inequality in their utility function, which in our paper is represented by happiness. One possible reason for this could be that there are externalities associated with income inequality. Such externalities could be crime and social instability. Kennedy et al. (1998) found for example that income inequality was strongly correlated with firearm violent crimes in United States. In order to reduce the effect of these externalities and, thereby, maximize their own utility function, individuals may want to decrease income inequality. One of the more immediate instruments to achieve this is by a strong redistribution policy. Thurow also argues for an alternative reason for why people would include income inequality in their utility functions. He argues that individuals could simply exercise an aesthetic taste for income inequality. Assuming that individuals include income inequality in their own individual utility functions and maximize this function, our coefficient estimate for inequality and redistribution shows the direction of this taste. One could then argue that there exists a social norm advocating a preference for income equality and, consequently, for an effective redistribution policy. However, this taste could be subject to change as society, and with it its values and norms, evolve.

A second argument is put forward by Alesina et al. (2004). They argue that individuals do not have a particular taste for income inequality per se but look at this metric rather as an indicator of their future income. A poor individual could perhaps see high inequality as a good thing as long as he or she believed that they would climb on this “ladder”. They argue that this belief depends strongly on a society’s opportunities of social mobility and/or the individual’s perceived view of this factor. They find that poor individuals in Europe, as compared to those in the US, are more negatively affected by income inequality and suggest that a reasonable interpretation of this could be that opportunities for social mobility are and/or are perceived to be lower in Europe than in the US. Wilkinson and Pickett (2009) further showed that countries with high income inequality have low social mobility which is contrary to what Alesina et al argues for. For example, US is a country with high income inequality and low social mobility according to Wilkinson and Pickett. It should be noted however that while Alesina et al. interpret their result as due to actual and/or perceived view of social mobility, that Wilkinson and Pickett only look at actual social

mobility. In this example, the US may commonly be perceived as a country with high social mobility, while in actual fact have low social mobility.

One of the more interesting results also worth discussing is the markedly large discrepancy in the effect of redistribution on happiness for females and males. The effect of redistribution on the happiness of females were much larger than for males, both being statistically significant. We argue that this may be the result of overrepresentation of women in low-income jobs; not as a matter of personal income but as a question of gender inequality which affect all women regardless of occupation and personal income. Gender inequality is a major challenge in today's society where women are overrepresented in low-income jobs and have a generally lower income compared to men. This could lead to women feeling solidarity amongst themselves as a group on a stronger level and, as a result of this, be more positive towards a strong redistribution policy.

It is also of relative importance to discuss the effect of a significant redistribution policy on other important factors affecting happiness. First, a significant redistribution policy would serve to decrease the variance of disposable income and likely also increase the entry-level salaries in a society. A very likely consequence of this could be that weaker groups of individuals would face a higher degree of difficulty in entering the labour market. For example, young individuals could face a more competitive environment when trying to enter the labour market as entry-level salaries are higher. This can in effect lead to higher unemployment which, as we have seen in our regression, leads to a multi-faceted negative effect. The individual being unemployed faces a quite strong negative effect in their happiness both due to the income loss and due to other negative externalities arising from unemployment (such as social isolation, lack of purpose in life etc.) while society as a whole suffers as well when unemployment-rates increases. This is a trade-off policy makers interested in exploring this domain should keep firmly in mind as its effects depends on finding the right balance of redistribution. Secondly, since a strong redistribution policy would decrease the variance of income, the absolute difference between income deciles would also decrease. This would most likely result in a decreasing incremental effect of the coefficients for the different income deciles. The total aggregated effect of this is however difficult, if not impossible, to estimate, but is still well worth having in mind.

Finally, the strong evidence for loss-aversion (where a given degree of loss of income has a bigger effect than a gain in income on one's well-being) and the diminishing positive return of income on happiness advocates that one should

only aim to redistribute marginal income. If this is not carefully balanced, the negative effect of a loss of income could outweigh the positive effect of redistribution towards a more equal state and leave society in an overall less happy state.

6.2 Multicollinearity and omitted variable bias

In our results, we mentioned that the effects of including an income inequality term into our main regression model imply a possible issue with multicollinearity. This provides us with a dilemma. Including certain candidate explanatory variables leaves us with potential multicollinearity issues, as illustrated by the significant changes of the results for our macroeconomic variables when we include our inequality variable. However, on the other hand, not including a variable which one would have reason to believe impacts our dependent variable, happiness, would imply that we would instead be facing issues of omitted variable bias. As there is no silver bullet to solve all of these potential issues, the most important thing is to keep them in mind and be aware of their possible impact on the results.

6.3 Implications and future research

This paper finds that redistribution of income towards a more equal income distribution positively influences happiness. This supports the view that a government can serve as a benevolent actor and that government intervention is beneficial, in line with the neoclassical view of Arthur Pigou. While it is still believed that, at this early stage of the development of the field, “we do not yet know enough to make recommendations to change the tax system on the basis of the happiness literature” (Weisbach 2008), this is another step towards providing valuable input towards the identification of considerations for an optimal tax model.

While our own findings are merely the first step towards this research topic, we hope that our effort will serve to entice others to continue exploring this specific path of the field, as it is certainly worth pursuing when considering the potential scientific and political implications. Not least, such research could be a major factor to take into consideration for governments in adopting tax policies.

One way of doing this would be to undertake a case study of a country in which a significant change of redistributory policy has taken place, say by going from a flat tax rate to a progressive one or vice-versa and examine the effect this has had on the happiness of the population (this country being the "treatment

group", with the findings controlled against another similar country with a common expected trend were it not for the policy change).

Due to increased globalization, which might imply a convergence of norms and standards across the world, the underlying explanation of the Easterlin paradox might have changed. In light of this, the time might be ripe for a study exploring whether the conditions for the paradox, namely heterogeneous expectation standards across countries, have weakened over time. If standards change, so will the effect of relative income, which might have implications for the preference for income redistribution as well as its effect on happiness.

Another possible further development of our research, and one which we originally considered incorporating into this thesis, is to explore in an experiment setting whether information regarding the nature of happiness and the effects of income and redistribution on it have an impact on people's actual preferences for redistribution, for instance when choosing a tax system. Other possible variations would be to examine the effects on happiness inequality, that is, not only the effect on average happiness but also the effect on the variance of happiness. From an egalitarian standpoint this could be just as an important consideration as the former, utilitarian aspect. It is also possible that redistribution could serve as a tool when it comes to gender inequality, and this is yet another aspect worth considering. In short, one of our main conclusions remain identical to the one reached by Easterlin over 30 years ago and holds just as true today; "[...]we need much more research on the nature and causes of human welfare."

7. Conclusion

In this paper we look at whether income redistribution affects happiness. We use recent data from the World Value Survey and OECD covering a total of 23 countries, beginning in 1995 and stretching up to and including 2013. Our analysis find that data supports our hypothesis and that happiness is indeed affected positively by income redistribution towards a more equal state. We argue that the reason for such an implied preference can have various grounds. One may be that there are negative externalities arising from income inequality such as crime and social instability, and that income redistribution serves to ameliorate such externalities. Another explanation is that there could be an aesthetic taste for income redistribution and that a norm advocating such redistribution is internalised into the individual's utility function. A third way of seeing it would be as an indicator of future income, whereby poor individuals' preferences for redistribution may depend on their assessment of future prospects. Conversely, a rich person may support income redistribution because they fear becoming poor and see it as a kind of insurance policy. Moreover, we would like to emphasise the trade-off a high redistribution and its effect upon other key variables such as unemployment. Finally, we encourage more research in this topic as we think that it is very beneficial for the development of our societies.

8. References

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9. Appendices

Appendix 1

Our GINI ratios are based on the central concept of “equivalised household disposable income”. The observation unit is the household while the reference unit is persons. The figures are calculated on an equivalence elasticity of 0.5. The calculations for disposable and market income which are the foundation for our GINI ratios are as follows:

1. Equivalised disposable income: $W_{ij} = EH_{ij} + ES_{ij} + EO_{ij} + K_{ij} + SE_{ij} + TR_{ij} - TA_{ij}$

2. Equivalised market income: $M_{ij} = EH_{ij} + ES_{ij} + EO_{ij} + K_{ij} + SE_{ij}$

The income components referenced in the equations above are explained and identified in Table 4 below.

Table 4: Income components of market and disposable incomes – OECD, Terms of Reference	
EH:	“the wage and salary income of the household head, excluding employers’ contributions to social security, but including sick pay paid by governments”
ES:	“the wage and salary income of the household head spouse or partner, excluding employers’ contributions to social security, but including sick pay paid by governments”
EO:	“the wage and salary income from other household members, excluding employers’ contributions to social security, but including sick pay paid by governments”
K:	“capital and property income (net dividends, interests, rents), private pensions, private occupational pensions, and all kinds of private transfers.”
SE:	“self-employment incomes”
TR:	“social security transfers from public sources (including accident and disability benefits, old age cash benefits, unemployment benefits, maternity allowances, child and/or family allowances, all income-tested and means-tested benefits)”
TA:	“taxes and social security contributions paid directly by households.”

Finally, the indicator formula for our GINI ratios are as follows:

$$Gini = \left(\frac{2}{\mu * n^2} * \sum_{k=1}^n kW_k \right) - \frac{n+1}{n} = \frac{2cov(W_k, \frac{k}{n})}{\mu} = \frac{\frac{2}{n} \sum_{k=1}^n (W_k - \mu) \left(\frac{k}{n} - \frac{1}{n^2} \sum_{k=1}^n k \right)}{\mu}$$

For additional comments and a more detailed overview of the terms of reference, see Terms of Reference – OECD Project on the Distribution of Household Incomes (2012).

Appendix 2

Table 5: Definitions and sources for all of our variables

Variable Name	Definition	Possible outcomes	Source
Sex	Code respondent's sex by observation	Male (1), Female (2) Note: we have changed the outcome variables to Male (0) and Female (1)	WVS
Age	This means you are ____ years old (write in age in two digits)	Arbitrary	WVS
Marital Status	Are you currently (read out and code one answer only):	Married (1), Living together as married (2), Divorced (3), Separated (4), Widowed (5), Single (6) Note: we have merged Married and Living together as married into "In a relationship (1), Divorced, Separated, Widowed and Single into "Not in a relationship (0)	WVS
Religious	Independently of whether you attend religious services or not, would you say you are (read out and code one answer):	A religious person (1), Not a religious person (2), An atheist (3)	WVS
Education attained	What is the highest educational level that you have attained? [NOTE: if respondent indicates to be a student, code highest level s/he expects to complete]:	No formal education (1), Incomplete primary school (2), Complete primary school (3), Incomplete secondary school: technical/vocational types (4), Complete secondary school: technical/vocational type (5), Incomplete secondary: university-preparatory type (6), Complete secondary: university-preparatory type (7), Some university-level education without degree (8), University-level education with degree (9) Note: we have merged category 4 and 6 together; and category 5 and 7 together.	WVS
Employment status	Are you employed now or not?	Full time employee (1), Part time employee (2), Self employed (3), Retired (4), Housewife (5), Student (6), Unemployed (7), Other (8)	WVS
Scales of income / Relative income	On this card is a scale of incomes on which 1 indicates the "lowest income decile" and 10 the "highest income decile" 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. (Code one number):	Measured on a 10-grade scale where lowest decile is 1 and the highest decile is 10.	WVS
Inflation	"Consumer Price Indices (CPIs) measure the average changes in the prices of consumer	Arbitrary	OECD statistics

	goods and services purchased by households. In most instances, CPIs are compiled in accordance with international statistical guidelines and recommendations.”		
GDP per capita	“In national currency, in current prices and constant prices (national base year, previous year prices and OECD base year i.e. 2005) - and for comparative purposes in US \$ current prices and constant prices (using exchange rate and PPPs). Expressed in millions and in indices. For the Euro area countries, the data in national currency for all years are calculated using the fixed conversion rates against the euro.”	Arbitrary	OECD statistics
Unemployment	“Harmonised Unemployment Rate - Harmonised unemployment rates define the unemployed as people of working age who are without work, are available for work, and have taken specific steps to find work.”	Arbitrary	OECD statistics
Social Expenditure	Social expenditure includes aggregated data that includes the main social policy areas. These are as follows: Old age, Survivors, Incapacity-related benefits, Health, Family, Active labour market programmes, Unemployment, Housing, and Other social policy areas. Per head, at constant prices (2005) and constant PPPs (2005), in US dollars	Arbitrary	OECD statistics
Pre-tax GINI	See Appendix 1	0-1 scale	OECD statistics
After-tax GINI	See Appendix 1	0-1 scale	OECD statistics
Redistribution effect	Redistribution Effect % = (pre-tax GINI – after-tax GINI) / pre-tax GINI	0-100 %	Calculated based on OECD statistics

Appendix 3

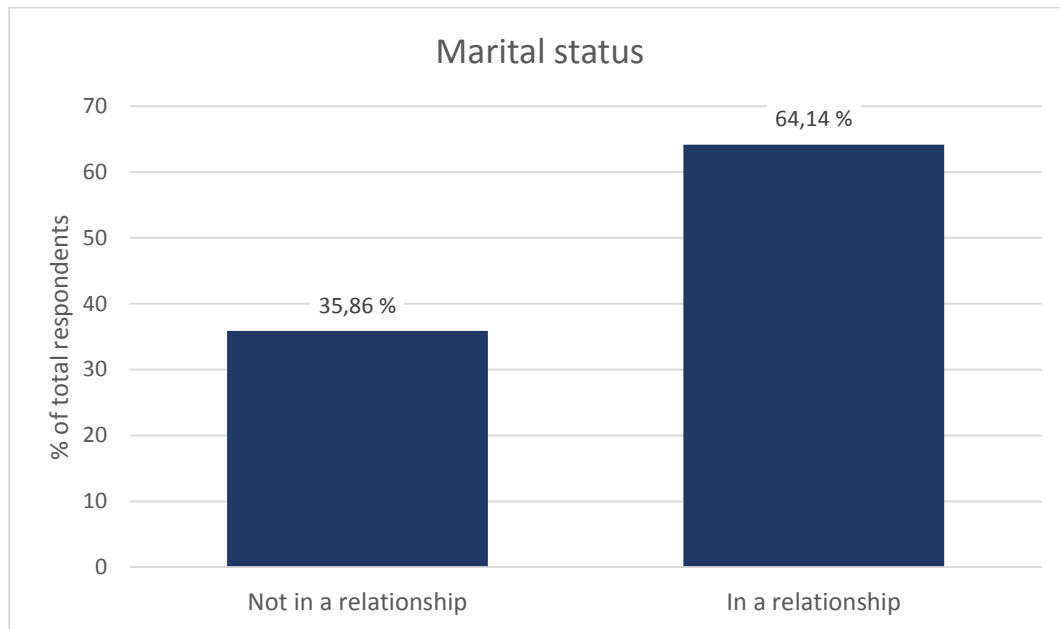
Table 6: A list of the countries included in our sample, the corresponding survey waves and years and indications of any adjacent values

Country	Wave 3 (94-99)	Wave 4 (99-04)	Wave 5 (05-07)	Wave 6 (10-13)
Australia	1995		2005*	2012
Canada		2000	2006	
Chile			2006	2011
Czech Republic	1998**			
Estonia	1996			2011
Finland			2005	
France			2006*	
Germany	1997**		2006**	2013**
Israel		2001		
Italy			2005*	
Japan	1995	2000	2005*	2010*
South Korea			2005*	2010
Netherlands			2006	2012
New Zealand	1998**	2004*		2011
Norway	1996*		2007*	
Poland			2005	2012*
Slovenia			2005	2011
Spain			2007	2011
Sweden	1996*	1999*	2006**	2011
Switzerland			2007**	
Turkey			2007***	2011
Great Britain	1998*		2005	
United States	1995	1999*	2006*	2011

The table shows for which wave and specific year the data for each country is from. Asterisks (*/**/****) indicates that macroeconomic figures were taken from a previous or subsequent year, relative to the rest of the data. (*) indicates a gap of one year, (**) a two-year gap and (***) a three year gap.

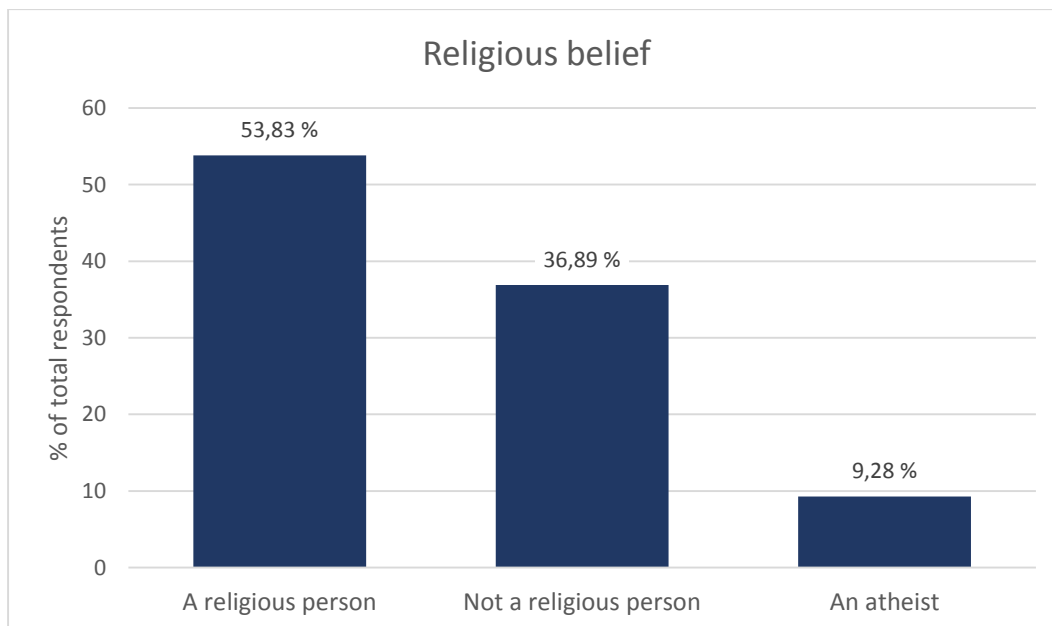
Appendix 4

Figur 1: Marital status



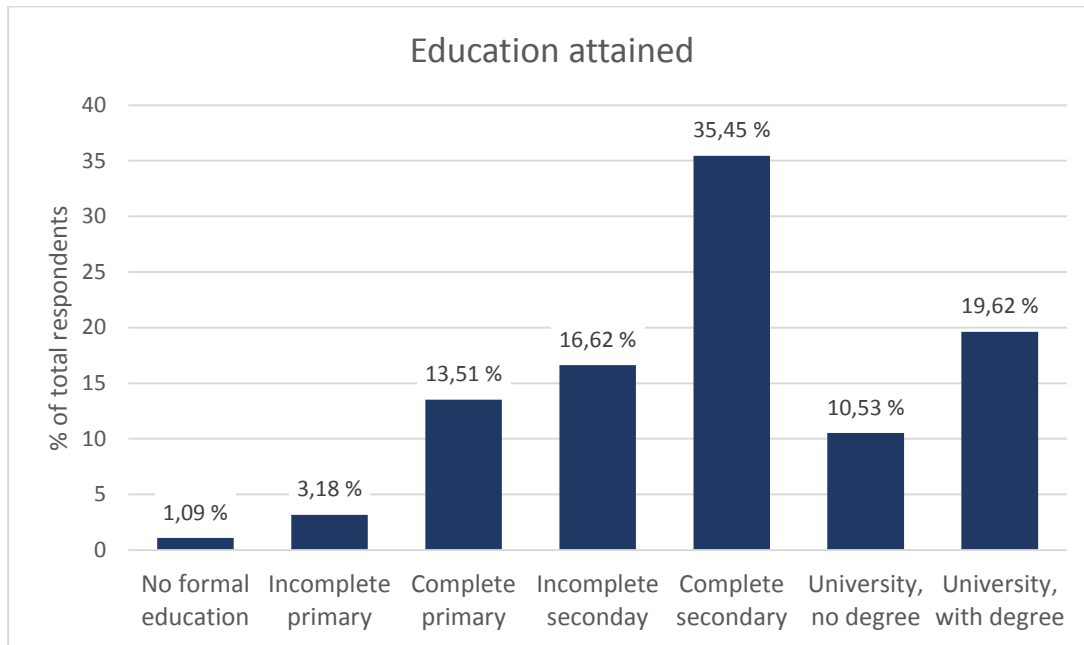
Data source: World Value Survey, covering the period of 1995-2014 for all the countries in our sample.

Figur 2: Religious belief



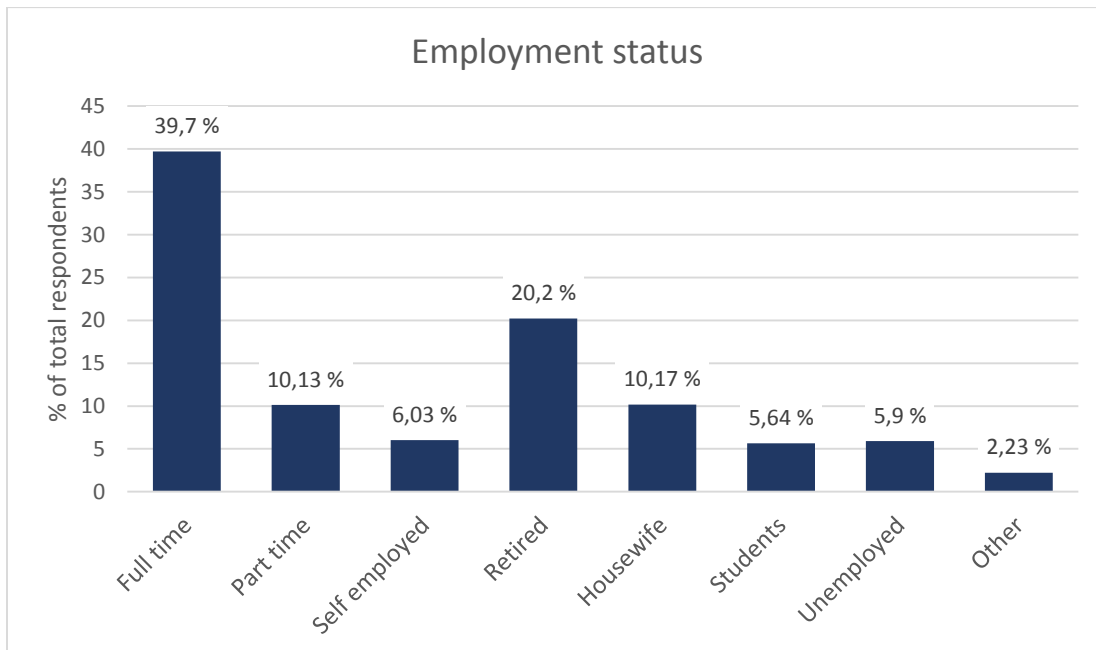
Data source: World Value Survey, covering the period of 1995-2014 for all the countries in our sample.

Figur 3: Education attained



Data source: World Value Survey, covering the period of 1995-2014 for all the countries in our sample.

Figur 4: Employment status



Data source: World Value Survey, covering the period of 1995-2014 for all the countries in our sample.

Appendix 5

Threshold points for the regressions in Table 2.

Constant cut1	-4.421*** (0.332)	0.429 (7.367)	24.33*** (8.162)
Constant cut2	-3.724*** (0.340)	1.127 (7.367)	25.03*** (8.173)
Constant cut3	-2.854*** (0.344)	1.997 (7.369)	25.90*** (8.172)
Constant cut4	-2.226*** (0.343)	2.625 (7.362)	26.53*** (8.167)
Constant cut5	-1.329*** (0.343)	3.522 (7.355)	27.43*** (8.164)
Constant cut6	-0.702** (0.345)	4.149 (7.355)	28.05*** (8.165)
Constant cut7	0.199 (0.340)	5.051 (7.360)	28.96*** (8.171)
Constant cut8	1.539*** (0.342)	6.390 (7.365)	30.30*** (8.187)
Constant cut9	2.646*** (0.343)	7.498 (7.376)	31.40*** (8.202)

Appendix 6

Threshold points for the regressions in Table 3.

Constant cut1	2.052 (7.695)	-2.505 (10.16)
Constant cut2	2.827 (7.696)	-1.875 (10.16)
Constant cut3	3.712 (7.687)	-1.017 (10.17)
Constant cut4	4.365 (7.677)	-0.411 (10.16)
Constant cut5	5.206 (7.676)	0.539 (10.16)
Constant cut6	5.843 (7.675)	1.160 (10.15)
Constant cut7	6.799 (7.679)	2.015 (10.16)
Constant cut8	8.197 (7.680)	3.308 (10.16)
Constant cut9	9.304 (7.680)	4.418 (10.18)

Appendix 7

TABLE 7 VARIABLES	(1) Happiness
MICRO	
Marital status	
Not in a relationship	REF
In a relationship	0.787*** (0.0380)
Religion	
Religious	REF
Not religious	-0.298*** (0.0298)
Atheist	-0.348*** (0.0469)
Female (dummy)	0.165*** (0.0298)
Age	-0.0678*** (0.00504)
Age squared	0.000610*** (4.68e-05)
Education	
No education	REF
Primary school, incomplete	-0.143 (0.145)
Primary school, complete	0.0101 (0.115)
Secondary school, incomplete	0.0819 (0.138)
Secondary school, complete	0.102 (0.134)
University, no degree	0.0666 (0.133)
University, degree	0.173 (0.130)
Employment status	
Full-time	REF
Part-time	0.0220 (0.0372)
Self-employed	0.0645 (0.0451)
Retired	-0.0318 (0.0425)
Housewife	0.0869* (0.0500)
Students	0.222*** (0.0594)
Unemployed	-0.547*** (0.0689)
Other	-0.189** (0.0906)
Scales of income	

Lowest decile	REF
2nd decile	0.132** (0.0554)
3rd decile	0.209*** (0.0589)
4th decile	0.388*** (0.0635)
5th decile	0.511*** (0.0687)
6th decile	0.598*** (0.0812)
7th decile	0.645*** (0.0773)
8th decile	0.636*** (0.0922)
9th decile	0.702*** (0.0856)
Top decile	0.796*** (0.0958)
Redistribution, %	0.00169 (0.00829)
MACRO	
Inflation	-0.0266 (0.0207)
GDP, log	0.347 (0.626)
Unemployment	0.0152 (0.0125)
Country (dummy)	INCLUDED
Year (dummy)	INCLUDED
Observations	52,060

Notes to Table 7. Robust standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Data for micro-variables, including the dependent variable, are from the World Value Survey, and include individuals surveyed between 1994 and 2013. REF is the reference state for dummy variables. Each regression include dummy variables for the corresponding countries and years.

Constant cut1	-2.321 (6.491)
Constant cut2	-0.0754 (6.462)
Constant cut3	3.272 (6.472)

Appendix 8

TABLE 8 VARIABLES	(1) Life satisfaction
<u>MICRO</u>	
Marital status	
Not in a relationship	REF
In a relationship	0.558*** (0.032)
Religion	
Religious	REF
Not religious	-0.251*** (0.029)
Atheist	-0.308*** (0.040)
Female (dummy)	0.117*** (0.023)
Age	-0.0652*** (0.0044)
Age squared	0.000676*** (4.71e-05)
Education	
No education	REF
Primary school, incomplete	0.189 (0.125)
Primary school, complete	0.270** (0.119)
Secondary school, incomplete	0.404*** (0.136)
Secondary school, complete	0.390*** (0.133)
University, no degree	0.383*** (0.130)
University, degree	0.519*** (0.132)
Employment status	
Full-time	REF
Part-time	-0.0383 (0.039)
Self-employed	0.0236 (0.045)
Retired	-0.0302 (0.044)
Housewife	0.0940** (0.046)
Students	0.185***

	(0.057)
Unemployed	-0.617***
	(0.065)
Other	-0.307***
	(0.065)
Scales of income	
Lowest decile	REF
2nd decile	0.170***
	(0.056)
3rd decile	0.278***
	(0.058)
4th decile	0.439***
	(0.068)
5th decile	0.624***
	(0.070)
6th decile	0.791***
	(0.082)
7th decile	0.878***
	(0.096)
8th decile	0.887***
	(0.114)
9th decile	0.971***
	(0.105)
Top decile	1.054***
	(0.106)
<hr/>	
<u>MACRO</u>	
Inflation	-0.008
	(0.041)
GDP, log	0.69
	(0.91)
Unemployment	0.0223*
	(0.0135)
<hr/>	
Pre-tax GINI, %	-0.00349
	(0.0337)
<hr/>	
Country (dummy)	INCLUDED
Year (dummy)	INCLUDED
<hr/>	
Observations	52,060
<hr/>	

Notes to Table 8. Robust standard errors are in parentheses (*** p<0.01, ** p<0.05, * p<0.1). Data for micro-variables, including the dependent variable, are from the World Value Survey, and include individuals surveyed between 1994 and 2013. REF is the reference state for dummy variables. The regression include dummy variables for the corresponding countries and years.

Constant cut1	1.917
	(9.895)
Constant cut2	2.615
	(9.897)
Constant cut3	3.485
	(9.899)

Constant cut4	4.113 (9.892)
Constant cut5	5.010 (9.886)
Constant cut6	5.637 (9.886)
Constant cut7	6.538 (9.892)
Constant cut8	7.877 (9.899)
Constant cut9	8.984 (9.913)

Appendix 9

Table 9

Delta-method				Delta-method		
Predicted Y-value	Margin	Std. Err		Predicted Y-value	Margin	Std. Err
1	0.0111804	0.0018093		1	0.0073596	0.0008012
2	0.0110071	0.0017271		2	0.0073013	0.0006629
3	0.0290761	0.0040587		3	0.0195578	0.0012833
4	0.0402712	0.0050092		4	0.0277559	0.0016209
5	0.1073832	0.0119484		5	0.07805	0.0038815
6	0.1183035	0.0099373		6	0.0934875	0.0027039
7	0.2154459	0.0065089		7	0.1942081	0.006085
8	0.2804035	0.0157727		8	0.3126847	0.0075434
9	0.1157595	0.0128882		9	0.1549688	0.0050793
10	0.0711695	0.0097319		10	0.1046262	0.0078717
Redistribution = 20 %, keeping all other variables at average values				Redistribution = 35 %, keeping all other variables at average values		