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INEQUALITY AND HAPPINESS THE ROLE OF INCOME VERSUS WEALTH INEQUALITY

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Inequality and happiness: the role of income versus wealth inequality

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Abstract: There are conflicting theories about whether individuals like or dislike inequality, or in other words, whether living in an unequal country increases or decreases their subjective well-being. The empirical literature has also not yet reached a consensus. In this paper, we add a new perspective to the inequality-happiness puzzle. First, we study not only income inequality, but also wealth inequality, which has so far been overlooked in the happiness literature. Second, we reach beyond the usually studied Gini coefficient and top income shares, looking also at the other parts of income or wealth distribution. Using data from the integrated World Values Surveys and European Values Surveys for over 50 countries, matched with World Inequality Database data over the years 1981-2020, we find that individuals are happier with increases in the top 10% and top 1% shares of wealth and less happy with increases in the middle 40% share of either wealth or pre-tax income. Increasing the bottom 50% share of after-tax income also makes individuals happier, suggesting that they favor income redistribution. We offer possible explanations for these findings.

Keywords: income inequality, wealth inequality, happiness, subjective well-being, life satisfaction

JEL codes: D31, D63, I31

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1. Introduction

Although it may seem intuitive that the relationship between inequality at the societal level and individual-level well-being is negative, the empirical literature is far from unanimous on this question. In fact, there are good reasons for either a positive relationship, a negative one, or even a lack of any relationship between the two. People may dislike inequality when they expect to be on the losing side, while others may like it if they expect to benefit from it. Growing up during a recession, or during an economic transition, may explain the former, while perceiving high income mobility perspectives may explain the latter. The outcome would also depend on risk aversion, with more risk-averse individuals willing to accept less inequality. The issue is further complicated by the multidimensional nature of inequality. The empirical literature dealing with the inequality-happiness puzzle focused so far on income inequality (for summaries, see e.g. Clark and D'Ambrosio, 2015; Di Tella and MacCulloch, 2006; Ferrer-i- Carbonell and Ramos, 2014; Schneider, 2016; and Verme, 2011). To the best of our knowledge, wealth inequality has so far been overlooked in this strand of the literature, even though it is at much higher levels than income inequality in most, if not all, countries of the world, and also globally (Chancel et al., 2022). Moreover, income and wealth, although interrelated, play different roles in people's lives. Income is a flow, while wealth is a stock, so what is true of one is not necessarily true of the other. Income allows for current consumption, whereas wealth offers a safety net in the case of negative income shocks (such as unexpected job losses, uninsured emergencies, etc.) and may serve as collateral. Saving income helps to accumulate wealth and, at the same time, wealth may generate income, such as capital gains or imputed rents. Income and wealth do not always go hand in hand: one may be income-rich and wealth-poor (e.g., earning a lot, but living in a rented property) or income-poor and wealth-rich (e.g., living on a pension, but still owning a property). D'Ambrosio, Jäntti, and Lepinteur (2020) show that both permanent income and permanent wealth are good predictors of life satisfaction, but their effects differ. Considering this, investigating the effects of wealth inequality on life satisfaction, and comparing them to income effects, is justified.

There are several ways to measure the level of inequality. The happiness literature usually focuses on the most popular Gini index which, although easy to calculate and understand, does not provide information on different parts of income or wealth distribution. It may be that people's preferences towards inequality differ for the top and the bottom of the distribution, for example. In this study, using cross-country panel regressions, we look at the top 1%, top 10%, middle 40%, and bottom 50% shares of income or wealth distribution as our inequality measures, which is quite rare in this strand of literature.

This study offers three main contributions. First, this is one of the first papers – if not the first –

that investigates the wealth inequality-happiness relationship. Second, it reaches beyond the popular Gini index and studies inequality concentrated in different parts of the income or wealth distribution. Third, it precisely defines the income concept and differentiates between pre-tax and post-tax income, rather than using the vague term “income inequality”.

We find a quite surprising pattern: when significant, the link between subjective well-being (by which we mean either a feeling of happiness or life satisfaction) and inequality is negative for the middle 40% share and positive for the top 10% and the top 1% shares. The results are stronger and more significant for wealth than for either pre-tax or post-tax income, but all of them yield a similar pattern. In other words, individuals seem to feel happier when the richest get richer and feel less satisfied with a higher share of income or wealth going to the middle class. Regarding the bottom 50%, we find some evidence of a positive attitude toward the larger share of income going to the poorest half, which is intuitive. We do not find an analogous effect for wealth. We offer several robustness checks and possible explanations for these findings.

The paper is structured as follows. Section 2 presents theoretical arguments both in favor of and against a negative inequality-happiness relationship and reviews the relevant literature, with a special focus on the wealth inequality-happiness link. Section 3 discusses the data, and Section 4 lays out the methods used in the study. Section 5 presents the results. Finally, Section 6 concludes and discusses possible limitations of the paper.

2. Literature review

The very first work that relates income inequality to happiness was perhaps Morawetz et al. (1977), who studied two different Israeli kibbutzim and found that the level of happiness was higher in the community with a more equal income distribution. This early study, however, should be treated anecdotally, as it failed to control for many factors that potentially differed between the two communities. Through the 1980s and 1990s, researchers' interests lay elsewhere, but in the 2000s, the income inequality-happiness topic became very popular and the empirical literature has flourished ever since. The papers found everything from positive relationships (e.g. Berg and Veenhoven, 2010; Bjørnskov et al., 2013; Brzezinski, 2019; Knight, Lina, and Gunatilaka, 2009; Rözer and Kraaykamp, 2013; Kelley and Evans (2016) for developing countries) to negative relationships (e.g. Ebert and Welsch, 2009; Hagerty, 2000; Oshio and Kobayashi, 2010; Powdthavee, Burkhauser, and De Neve, 2017; Schwarze and Härpfer, 2007; and Alesina, Di Tella, and MacCulloch (2004) for European countries) to no relationships at all (e.g. Alesina, Di Tella, and MacCulloch (2004) for the US,

Cojocaru, 2014; Graham and Felton, 2006; and Senik, 2004; Kelley and Evans (2016) for developed countries). Some studies documented a more complex relationship; for example, Ding, Salinas-Jiménez, and Salinas-Jiménez (2021) found an inverted U-shaped relationship between income inequality and individual well-being for urban China, and a negative one for rural China at the same time. In general, the literature analyzes both single countries and cross-country comparisons and uses a variety of data sets and estimation methods, making it difficult to compare the results across studies.

An interesting outsider to correlational analyses is a recent study by Dwyer and Dunn (2022), who are the first to use a randomized control trial (RCT) and show causally that decreasing inequality increases happiness. The authors take advantage of a unique experiment in which two anonymous billionaires give US\$10,000 to each of 200 randomly selected recipients. Dwyer and Dunn (2022) show that cash transfers substantially increase the happiness of individuals and that recipients in lower-income countries exhibited larger happiness gains than those in higher-income countries.

Regarding inequality measures, the most commonly used in the literature is the Gini index. However, as noted by Davies, Fortin, and Lemieux (2017), the Gini index is more sensitive to transfers in the middle of the distribution than to transfers at the bottom or the top of it. In other words, "if \$1,000 is transferred across a wealth gap of \$100,000 in the middle of the distribution, the Gini will change much more than if \$1,000 were transferred across a \$100,000 wealth gap close to the bottom of the distribution or at the very high top, where fewer individuals would be between the donor and recipient" (Davies, Fortin, and Lemieux, 2017). This is why, in the present study, we prefer to focus on income or wealth shares: top 1%, top 10%, middle 40%, and bottom 50%, i.e., the share of income (or wealth) going to the richest 1%, the richest 10%, the middle 40%, or the poorest half, respectively (see also Section 3.1). Contrary to Lous and Graafland (2022), who ask which income groups are more sensitive to national-level income inequality (measured by the Gini index or the top 1% income share) than others, we ask which type of inequality, if any, makes the average of all income groups happier. Other papers that study the top 1% or top 10% income shares and their relation to well-being include Powdthavee, Burkhauser, and De Neve (2017) and Brzezinski (2019). The former obtain mixed results, with the negative relationship between top income shares and average Cantril life ladder for European countries, while the latter finds a positive relationship between top 1% income share and happiness for his European subsample. The two papers, however, differ in terms of the time frame and the happiness data used, in that Powdthavee, Burkhauser, and De Neve (2017) use the Gallup World Poll, whereas Brzezinski (2019) uses the European Values Surveys and the World Values Surveys, which may partially explain the inconsistency. The papers studying income shares other than top 1% or top 10% are rare. There is an early study by Tomes (1986), who uses bottom 40% income share as a measure

of inequality and finds its negative relationship with self-reported satisfaction and mixed results for happiness. Finally, Oishi et al. (2022) consider the bottom 50% income share, along with the top 10%, in their recent study of overtime changes in income-happiness correlation.

2.1. Theoretical arguments

Clark and D'Ambrosio (2015) notice that attitudes toward income inequality may be classified into normative and comparative views. The normative views rely on a question such as, "In my opinion, what is the optimal level of inequality in a given society?". This question is theoretical and disregards the speaker's individual position in the income distribution. In practice, it is difficult for most people to ignore their own income position, and they tend to find it easier to present a comparative view. Most people compare themselves to some reference groups. When they are members of a group they compare to (e.g. they compare themselves to others in their age cohort, or their own neighborhood), they find themselves happier when incomes of others decrease while their own income remains constant or grows. Similarly, they feel less happy when incomes of others grow compared to their own. In other words, people value not only the absolute level of their own income, but also their relative income position: whether they are richer or poorer than others.

The situation is somewhat different when one observes the relative growth of incomes of members of a group to which one does not belong. If one aspires to be a member of this group in the future, then she may feel happier with this group's income growth, even when her income stays constant, since there is a hope that one day, her income will grow, too. This line of argument is consistent with the so-called "tunnel effect", where the income of others provides information about one's own prospects and thereby causes a positive correlation between one's own well-being and the income of others, at least up to some threshold (Hirschman, 1973). Also, altruism may have a similar effect: one may feel happy with the income growth of a group of which he is not a member, but is sympathetic toward, e.g., the poorest or the minority.

2.2. Wealth inequality and happiness

The literature relating subjective well-being to *wealth inequality* is almost non-existent. Some papers relate subjective well-being to *wealth level* (see Senik (2014) for a summary, and a recent book by Brulé and Suter (2019) for a collection of papers on the topic). At a micro level, the literature documents a positive relationship between household wealth and happiness, both for developed countries (e.g. Brokešová, Cupák, and Rizov, 2021; Headey and Wooden, 2004; Jantsch, Blanc, and Schmidt, 2022; and Mullis, 1992) and developing ones (e.g. Graham and Pettinato, 2002; Guillen-

Royo, Velazco, and Camfield, 2013; and Landiyanto et al., 2011). A novel paper by D'Ambrosio, Jäntti, and Lepinteur (2020) studies permanent wealth (and income). They find that their impacts differ: the higher the permanent income of the reference group, the lower the life satisfaction, while the opposite is true for permanent wealth. The authors conclude that the former exerts a comparison effect, while the latter exerts an information effect. Another interesting study links parents' net wealth to the life satisfaction of their children. Ma (2016) documents the intergenerational transmission of wealth and life satisfaction and shows that the positive effect of the parents' wealth on a child's life satisfaction goes through two mediating factors, i.e., parents' life satisfaction, and the child's net wealth.

Among the papers that are the closest to studying the *wealth inequality*-happiness link are Cheng et al. (2020), Popov (2019), and Michalos and Hatch (2020). Cheng et al. (2020) studied housing wealth inequality in urban China and find that, up to a threshold, an increase in housing wealth inequality of a reference group increases one's happiness. When the threshold is passed, the relationship reverses, as the "tunnel effect" theory predicts. Popov (2019) analyses the wealth inequality-happiness relationship on a macro-scale, at a country level. He uses the billionaire and millionaire wealth-to-GDP ratio as a proxy of wealth inequality and finds that it raises happiness even when income inequality lowers it. Michalos and Hatch (2020) also focus on a macro-scale. In their purely correlational study, they analyze a variety of quality-of-life indicators for 105 countries, as well as the Gini index for income, the Gini index for wealth, and the offshore wealth as a fraction of the GDP index. The focus of their paper is to order the 105 countries from best to worst according to quality-of-life/well-being indices, construct some new indices, and show that the indices have good convergent validity among themselves. However, the reader can learn about negative and significant pairwise correlations between the Gini for wealth and the Human Development Index, the Weighted Index of Social Progress, and the Social Progress Index, and insignificant ones for the Sustainable Society Index, the World Happiness Survey, and the Gallup-Healthways Well-Being Index. Unfortunately, the authors do not explicitly report either the time span of their indices or the data sources for the Ginis, making it challenging to draw comparisons with other studies.

3. Data

The data used in this study come from three main sources. The data on both income and wealth inequality at national levels come from the World Inequality Database (WID), the data on subjective well-being and other individual-level characteristics come from the Integrated Values Surveys, and the per capita GDP estimates come from the World Development Indicators, which is the major World Bank set of development indicators.

3.1. *Inequality data*

The World Inequality Database (Chancel et al., 2022) is, arguably, the best possible data source on income and wealth inequality. It combines survey and tax data from most countries in the world in a highly harmonized manner, creating the so-called Distributional National Accounts (DINA), which are distributed income concepts, consistent with national accounts aggregates. The data quality depends on the quality and availability of underlying survey and tax data and is assessed on a 0-5 scale, where 0 is given to a series with no data available and therefore based solely on estimates and imputations, and 5 is given to series based on high-quality tax and survey microdata. In the present study, for the sake of reliability, we use only data with a minimum score of 2.

The WID data has not yet been extensively used in the inequality-happiness literature (exceptions to this include Brzezinski, 2019; Powdthavee, Burkhauser, and De Neve, 2017; and Lous and Graafland, 2022), who, however, use the WID only for the top 1% income share). For income inequality measures, the majority of papers that focus on between-country comparisons use either SWIID (Standardized World Income Inequality Database, Solt (2020)), or WIID (World Income Inequality Database, UNU-WIDER (2022)). Other inequality sources that are used from time to time include the World Development Indicators produced by the World Bank and the Luxembourg Income Study Database. Before the development of the WID in 2011 (then called The World Top Incomes Database), the SWIID and WIID were considered to be reasonable and convenient income inequality data sources for scientists searching for cross-national data with global coverage over relatively long periods. However, the data quality and comparability were far from perfect (Jenkins, 2015). The WID.world site states, "the key novelty has been to combine fiscal, survey and national accounts data in a systematic manner. This allowed us to compute longer and more reliable top income shares series than previous inequality databases (which generally rely on self-reported survey data, with large under-reporting problems at the top, and limited time span)" (WID.world, 2023).

In the present paper, we study pre-tax income, post-tax income, and wealth. Pre-tax

income is the WID's benchmark concept and is available for the highest number of countries. It generally refers to income before taxes and benefits. It only includes social insurance benefits while excluding other forms of redistribution. Post-tax income, on the other hand, measures the distribution of income after redistribution. In particular, the post-tax income concept used here takes into account both in-cash and in-kind redistribution. Since modeling in-kind redistribution (e.g., use of public education and healthcare) is demanding and requires making a lot of assumptions, the number of countries for which this data is available is smaller. Finally, we study net wealth of household sector. In other words, (i) we are not interested in the worth of the corporate nor general government sector, and (ii) we are interested in net wealth, that is the financial and non-financial assets of households, minus their liabilities.

Regarding precise inequality measures, we focus on the following shares of income or wealth: the top 1%, top 10%, middle 40% (i.e., the segment of the distribution between the 50th and 90th percentiles), and the bottom 50%. As mentioned in Section 2, we use this instead of studying the popular Gini index, for instance, because it allows us to take a closer look at different parts of the distribution. The relationship between subjective well-being and the amount of income or wealth going to the richest 1% may be different from the relationship between subjective well-being and the amount of income or wealth going to the middle 40%. The income or wealth shares are also quite straightforward to understand, unlike other possible inequality measures like the Theil index, the Atkinson index, the Hoover index, and even percentile ratios.

3.2. Happiness data

The Integrated Values Surveys (IVS) are constructed from European Values Study (EVS) 1981-2017 Trend File (EVS, 2021) and the World Values Surveys (WVS) 1981-2021 Trend File (Haerpfer et al., 2021). The data cover individuals from 115 countries over the period 1981-2021. Each country is surveyed from one to nine times at irregular time intervals. Arguably, this is the best and the most commonly used data set for international comparisons of subjective well-being. To measure subjective well-being, we follow the literature and use two IVS questions:

- Happiness: *Taking all things together, would you say you are: Very happy, Rather happy, Not very happy, Not at all happy?*
- Life satisfaction: *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 recode the question on happiness so the answer *Very happy* gets the highest numerical value. We then treat these variables as ordinal and focus on the highest category of each (see Section 4). We also use the IVS data to obtain the number of individual-level controls, which we describe in Section 4 and Table A.2.

All in all, after merging WID and IVS data sets, we start the analysis with 460,960 observations from 59 countries (see Table A.5 for the detailed number of observations in each country-year pair). However, due to frequent cases of missing observations in control variables, our final regression samples vary from 150,000 to 270,000 observations; the exact numbers are reported in the regression tables.

4. Methods

We estimate the following equation:

$$(1) \quad SWB_{ijt} = \beta Inequality_{jt} + \gamma X_{ijt} + \delta Y_{jt} + C_j + T_t + \varepsilon_{ijt},$$

where i denotes individuals, j denotes countries, and t denotes time. *SWB* stands for subjective well-being and is either Happiness or Life Satisfaction. *Inequality* is one of twelve possible inequality indices: three possibilities regarding the income or wealth concept (pre-tax income, post-tax income, wealth) multiplied by four measures (top 1%, top 10%, middle 40%, bottom 50% shares). X is a vector of individual-level variables: gender, age, age squared, number of children, marital status, education, employment, self-assessed income position, self-assessed health, religiosity, and trust in other people. Y denotes the log of per capita GDP. In our primary specification, we include country (C_j) and year (T_t) fixed effects. All variables are described in detail in Tables A.1 and A.2. We estimate Equation 1 using an ordered probit model with standard errors clustered at the country level. We use individual sampling weights.

5. Results

We start this section by presenting the descriptive statistics of inequality measures in our sample of countries (Table 1), in which it is clear that pre-tax income inequality is higher than post-tax inequality on average, demonstrating that the redistribution policies in most (if not all) countries do work. Moreover, wealth inequality is far higher than income inequality, with the top 10% in terms of wealth reaching the maximum of 86% and a mean of 62%, compared to 61% and 32% for post-tax income, respectively.

The descriptive statistics of our two dependent variables, happiness and life satisfaction, are presented in Table A.4. On average, people are "rather happy" and choose number 7 on a 1-10 life satisfaction scale. Summary statistics for all control variables are also presented in Table A.4.

Table 1 Descriptive statistics: Inequality measures

	Countries	Mean	Std. Dev.	Min.	Max.
Pre-tax income: Bottom 50%	59	17.28	5.31	6.18	26.36
Pre-tax income: Middle 40%	59	42.49	5.11	29.29	52.81
Pre-tax income: Top 10%	59	40.22	9.79	27.47	63.62
Pre-tax income: Top 1%	59	13.83	5.09	6.61	28.61
Post-tax income: Bottom 50%	41	24.19	6.90	8.10	34.83
Post-tax income: Middle 40%	41	43.48	5.01	29.53	53.75
Post-tax income: Top 10%	42	32.33	10.60	22.08	60.69
Post-tax income: Top 1%	42	9.91	5.14	4.92	24.36
Wealth: Bottom 50%	58	3.91	2.76	-2.77	11.76
Wealth: Middle 40%	58	34.58	6.68	16.88	46.17
Wealth: Top 10%	58	61.51	8.62	43.94	85.89
Wealth: Top 1%	58	28.08	9.15	13.84	52.35

Notes: This table presents the following statistics for each variable: Number of Country-Level Observations, Average Value, Standard Deviation, Minimum and Maximum Value. The sources and description of the variables can be found in Tables A.1 and A.2.

We now turn to the results of the ordered probit regressions for pre-tax income, post-tax income, and wealth, respectively. Tables 2-4 present average marginal effects for the probability of being very happy or being very satisfied with life, that is for the highest categories of the two variables.¹ For pre-tax income, we observe that only the relationship between happiness and the middle 40% share is significant (Table 2). Interestingly, the sign of the relationship is negative, meaning that people are less happy with the middle class earning more.

Regarding post-tax income, the only significant relationship turns out to be between happiness and the bottom 50% share (Table 3). The positive sign of this relationship may indicate some preferences for redistribution, especially considering the insignificant corresponding relationship with pre-tax income (Table 2). An increase of the bottom 50% post-tax income share by 1 p.p. translates to an 0.6 p.p. increase in the probability of being very happy. This may seem not large, but

¹ Throughout the paper, we use a single category "10" as the highest category for life satisfaction. Interestingly, the share of respondents who chose this category is not so small, i.e. 14%. As a robustness check, we tried modeling the two highest categories, "9" and "10", merged into one. The share of respondents classified as "very satisfied with life" was 26.5% in this case, but since it did not significantly change the results, for the sake of simplicity we stay with our first choice.

the size of this effect is comparable to others found in the literature; for example, a similar study by Brzezinski (2019) finds the effects of the top 10% and top 1% income shares on the probability of being very happy or very satisfied with life in the range between 0.2 and 0.6 p.p.

Table 2 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pre-tax income: Bottom 50%	0.005 (0.004)				0.002 (0.002)			
Pre-tax income: Middle 40%		-0.004* (0.002)				-0.000 (0.002)		
Pre-tax income: Top 10%			0.001 (0.001)				-0.000 (0.001)	
Pre-tax income: Top 1%				0.004 (0.002)				0.001 (0.001)
Observations	265,733	265,733	265,733	265,733	266,158	266,158	266,158	266,158
Countries	58	58	58	58	58	58	58	58
Pseudo-R2	0.129	0.129	0.129	0.129	0.0660	0.0660	0.0660	0.0660

Notes: *** p<0.01, ** p<0.05, * p<0.10. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

Table 3 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-tax income: Bottom 50%	0.006** (0.003)				-0.002 (0.002)			
Post-tax income: Middle 40%		-0.003 (0.003)				-0.003 (0.002)		
Post-tax income: Top 10%			-0.000 (0.002)				0.002 (0.001)	
Post-tax income: Top 1%				0.001 (0.001)				0.002 (0.002)
Observations	153,359	153,359	156,781	156,781	153,702	153,702	157,122	157,122
Countries	41	41	42	42	41	41	42	42
Pseudo-R2	0.148	0.147	0.148	0.148	0.0682	0.0682	0.0678	0.0678

Notes: *** p<0.01, ** p<0.05, * p<0.10. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

Turning our attention to wealth, we see an interesting pattern. The relationship between the middle 40% share and both happiness and life satisfaction is negative (Table 4), while the relationship between the top 1% share and both happiness and life satisfaction are positive and of a slightly smaller magnitude. The link between the top 10% wealth share and happiness is also positive. We can interpret

these results in the following way: increasing the wealth share of the middle class makes people less happy and less satisfied with their lives. At the same time, increasing the wealth share of the richest makes people feel happier. This may seem counterintuitive at first glance, but there are several possible explanations for these findings. First, the resentment toward the enrichment of the middle class may stem from the increasing polarization in many countries. Second, the positive attitude toward the richest getting richer may be a sign of the “tunnel effect”, as described in Section 2.1: respondents may believe that one day they will become rich too, and thus the higher the wealth of this elite group, the better. Moreover, they may attribute the wealth of the richest to their efforts, rather than luck, and simply believe that the richest deserve it. Korom (2023) summarizes the existing literature and concludes that the rich are perceived as “deserving” when their fortunes result from hard work and competencies, rather than from family gifts and bequests. He also finds that in fact, modern European multimillionaires are the “hybrid rich”, namely entrepreneurs who benefit both from earned and unearned financial resources: on the one hand, the richest European households are the most likely to have received large family transfers, while on the other, they are also likely to have tertiary education and they derive most of their wealth from self-employed businesses (Korom, 2023).

Table 4 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life.

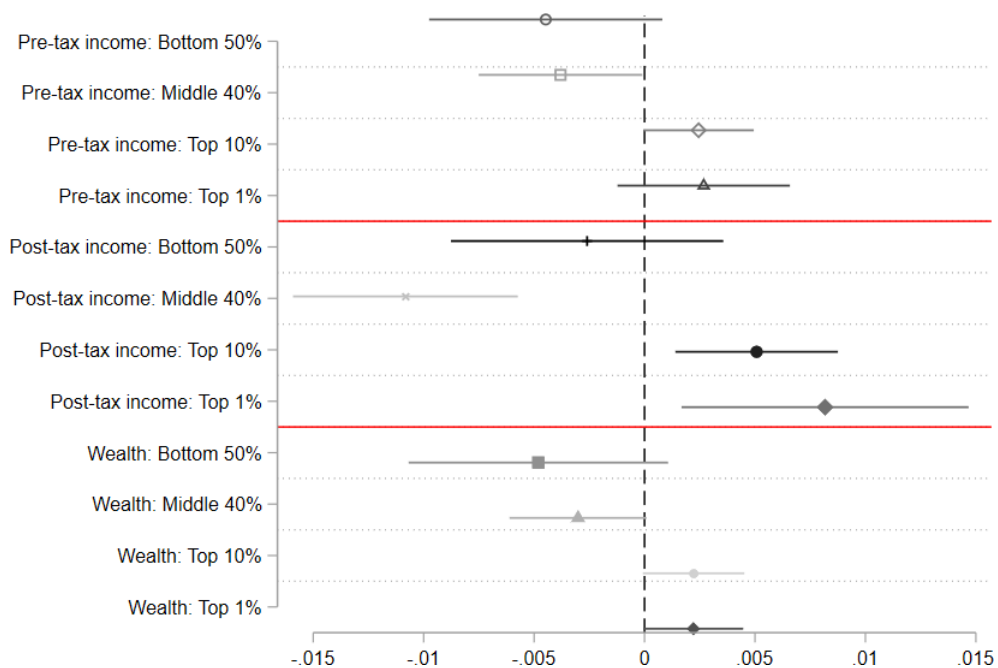
	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth: Bottom 50%	-0.006 (0.005)				0.001 (0.003)			
Wealth: Middle 40%		-0.006** (0.003)				-0.003* (0.002)		
Wealth: Top 10%			0.004** (0.002)				0.001 (0.001)	
Wealth: Top 1%				0.004** (0.002)				0.002** (0.001)
Observations	256,164	256,164	256,164	256,164	256,588	256,588	256,588	256,588
Countries	57	57	57	57	57	57	57	57
Pseudo-R2	0.130	0.131	0.131	0.131	0.0675	0.0677	0.0676	0.0677

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

5.1. Treatment of country and year fixed effects

The usual approach in the literature is to include country and year fixed effects (i.e., two-way fixed effects) in the regression of this (e.g. Equation 1) or similar kind. There is, however, a discussion in the literature regarding the use of two-way fixed effects. Kropko and Kubinec (2020) claim that the two-way fixed effects specification is statistically undefined and produces results that are impossible to interpret. Fortunately, the reasoning presented by Kropko and Kubinec (2020) does not necessarily concern our case, because while using country fixed effects, we use data on individuals nested in countries, rather than solely countries. Regardless, the effects estimated in Tables 2-4 should be treated as “within-country, within-year” effects. In this section, we first remove country fixed effects from Equation 1 and keep year fixed effects. Second, we do the opposite, i.e., we remove year fixed effects and keep the country ones. In the former case, we introduce between-country variation to the model; in the latter, we ignore changes over time. The latter is probably of less interest here, but we present it for the sake of symmetry.

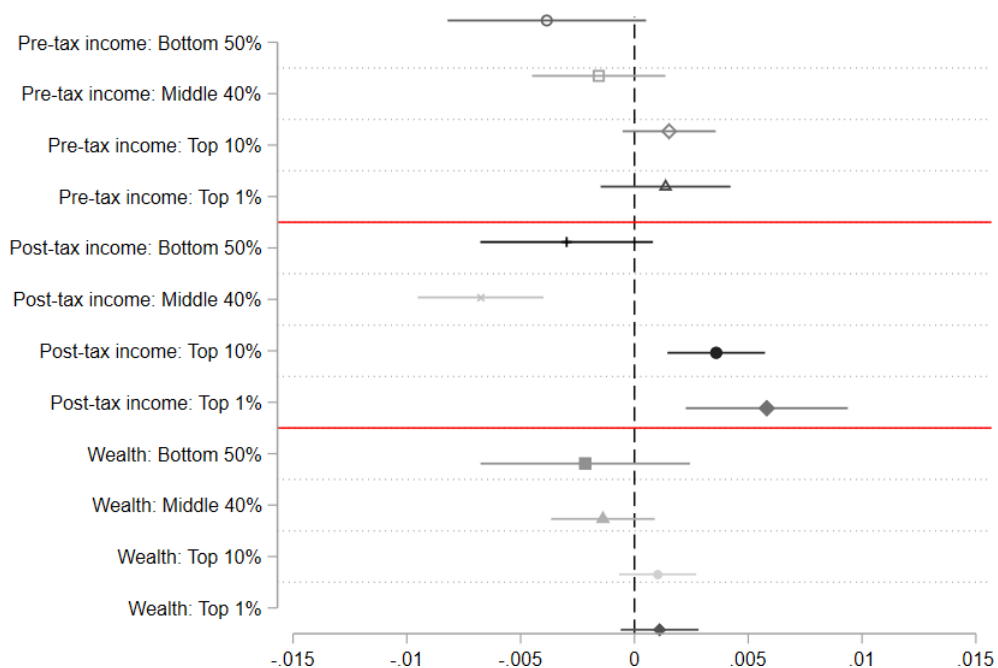
Fig. 1 Happiness: no country fixed effects



Notes: Figure shows average marginal effects from ordered probit models for the probability of being very happy. Year fixed effects are included, country fixed effects are not.

Figures 1 and 2 present the average marginal effects from ordered probit models without country fixed effects for the probability of being very happy and being very satisfied with life, respectively. We can see that the pattern generally holds: the effects, when significant, are negative for the bottom 50% and middle 40% shares and positive for the top 10% and top 1% shares. The effects are usually larger and more significant than in the main specification presented in Tables 2-4, which is especially visible for post-tax income, both for happiness and life satisfaction. The resentment towards the large share of (post-tax) income held by the middle class contrasts with positive attitudes toward the enrichment of the richest. Only the positive attitude toward the bottom 50% post-tax income share, previously interpreted as some preference for redistribution, seems to disappear in the between-country context. Regarding pre-tax income and wealth, the same negative-positive patterns hold, though a little less significant for the life satisfaction question than for the happiness one. We conclude from this that the between-country component in the study of subjective well-being - inequality relationship is not negligible.

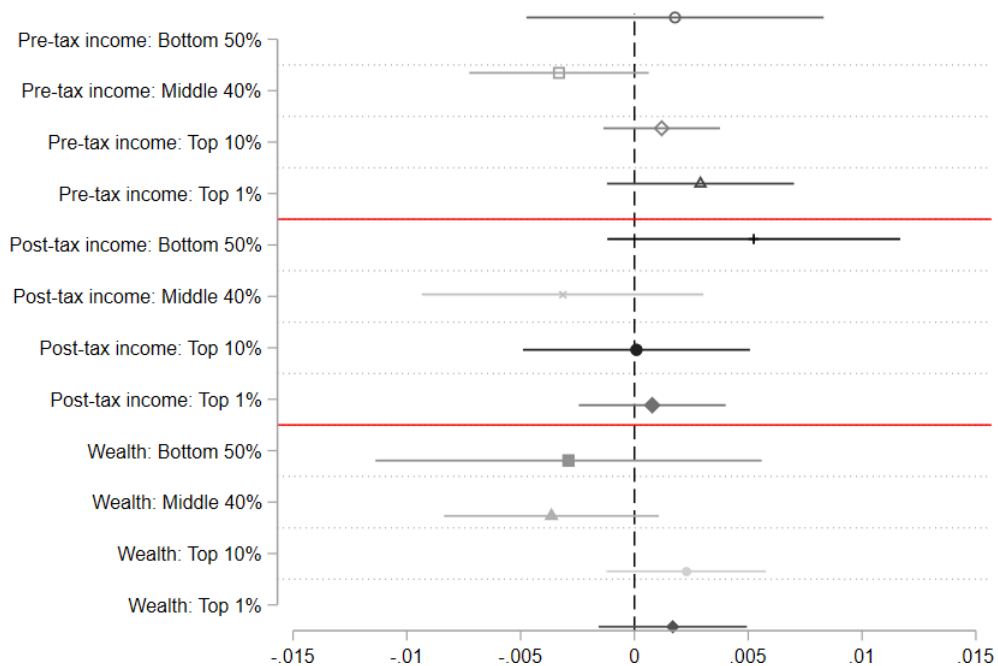
Fig. 2 Life satisfaction: no country fixed effects



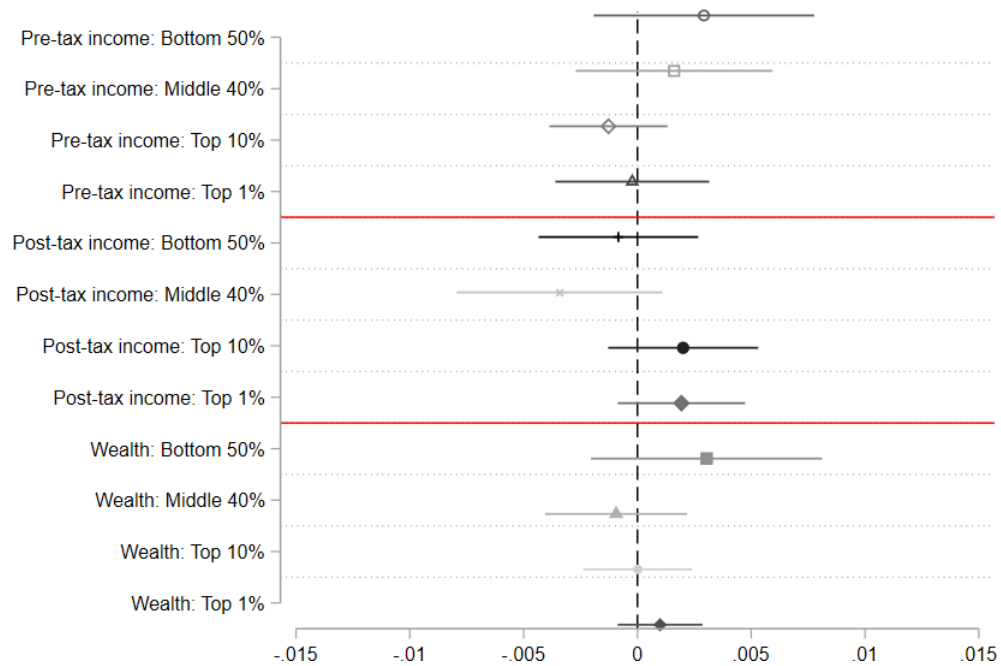
Notes: Figure shows average marginal effects from ordered probit models for the probability of being very satisfied with life. Year fixed effects are included, country fixed effects are not.

Turning now to Figures 3 and 4, in which we exclude year fixed effects, but keep country fixed effects, we see that the results are less significant than in our primary specification. This is probably because there is relatively little country-level over time variation in both the SWB and inequality data, so the models tend to produce insignificant results. Another possible explanation is that such models mix up the past and the present. The attitudes toward inequality may evolve over time and such models simply ignore this fact, as well as all external shocks like wars or systemic changes. For instance, it may matter for countries that underwent an economic transition from centrally planned to market economies. Grosfeld and Senik (2010) find that, in the case of Poland, there was a structural break in the relationship between income inequality and satisfaction: first, an increase in income inequality was welcomed by the population as a sign of forthcoming opportunities but, after a few years, attitudes changed due to widespread dissatisfaction with the country's economic outcomes.

Fig. 3 Happiness: no year fixed effects



Notes: Figure shows average marginal effects from ordered probit models for the probability of being very happy. Country fixed effects are included, year fixed effects are not.

Fig. 4 Life satisfaction: no year fixed effects

Notes: Figure shows average marginal effects from ordered probit models for the probability of being very satisfied with life. Country fixed effects are included, year fixed effects are not.

5.2. Robustness checks

It may be argued that wealth level is an omitted variable in Equation 1, when applied to wealth inequality – especially in light of the fact that income level (although self-assessed) is included in all regressions, including these for income inequality. Our primary specification choice has been dictated by consistency. In the present section, we add the average net household wealth level (USD PPP) to the regressions for wealth inequality. Table B.1 shows that the results are very close to those presented in Table 4. We conclude that our results are robust to the exclusion of the wealth level variable.

Similarly, it may be argued that another potentially omitted variable is the presence of a democratic system. For example, Frey and Stutzer (2000) show in their study of Switzerland that the better developed the institutions of direct democracy, the happier the citizens. In a cross-country context, Dorn et al. (2007) document a positive relationship between democracy and subjective well-being, even when controlling for income, language, and religion. They also show that the link between democracy and happiness is stronger in countries with an established democratic tradition. With this in mind, we add to Equation 1 a control for a democratic system, namely the electoral democracy index (Coppedge et al., 2022). The results presented in Tables B.2-B.4 are again very close to those presented

in Tables 2-4. Some of the effects for wealth are even stronger by 0.1 p.p. The only change in significance is that the effect of the bottom 50% of pre-tax income on happiness is now significant (as is the effect of the bottom 50% of post-tax income). It seems that, regardless of the political system and whether redistribution is present or not, people are happier with a larger share of income going to the bottom half.

6. Conclusions and limitations

We study the link between subjective well-being and various measures of inequality using cross-country panel regressions. We find that individuals are happier with increasing the top 10% and top 1% shares of wealth and less happy with increasing the middle 40% share of wealth. These effects are even stronger and apply also to post-tax income when we allow for between-country variation. Increasing the bottom 50% share of post-tax income also makes individuals happier, as if they favored income redistribution. In general, the effects for wealth are more often significant than for income, both pre-tax and post-tax, although all of them yield a similar pattern.

The present study suffers, of course, from certain limitations. First, inequality at the national level, and indeed at any level, is a concept difficult to grasp (Schneider, 2016). It is unlikely that it is grasped equally well by all respondents, which may introduce bias, even if educational attainment is controlled for. Gimpelson and Treisman (2018) show, using a number of large, cross-national surveys, that people are generally wrong when asked about the level of inequality, and that the misperceptions are sizable. Second, a country population may not be an appropriate reference group. In other words, what matters for people's subjective well-being may not be inequality at the country level, but rather inequalities in their closest neighborhood, age cohort, or among their co-workers. This may explain the relatively small effects found in the study. This issue requires further investigation, which is largely limited by the data availability. Hvidberg, Kreiner, and Stantcheva (2023) link survey data to administrative data for Denmark and show that people assess income inequalities within their co-workers and education groups as significantly more unfair than overall inequality. To the best of our knowledge, there is no such study in a cross-country setting. Third, people's perceptions about the extent of inequality are likely more relevant than objectively measured inequality. Gimpelson and Treisman (2018) show that there is a strong correlation between perceived inequality and the demand for redistribution or reported conflict between rich and poor, while the same for the actual level of inequality does not hold. Also Hvidberg, Kreiner, and Stantcheva (2023) show that people tend to underestimate inequality the most within their reference groups.

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Appendix A Sources and descriptive statistics

Table A.1 Variable descriptions (i.)

Variable	Description	Source
<i>Independent variables</i>		
Happiness	<i>Taking all things together, would you say you are:</i> 1. Very happy 2. Rather happy 3. Not very happy 4. Not at all happy. In the present paper, the order of possible answers has been inverted, with 1 meaning "Not at all happy" and 4 meaning "Very happy".	IVS
Life satisfaction	<i>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?</i>	IVS
<i>Dependent variables: inequality indicators</i>		
Pre-tax income: Bottom 50%	Share of pre-tax income that goes to the bottom 50% (percentiles 0-50) of the pre-tax income distribution. Pre-tax income refers to income before taxes and benefits, except social insurance benefits, which are included.	WID
Pre-tax income: Middle 40%	Share of pre-tax income that goes to the middle 40% (percentiles 50-90) of the pre-tax income distribution. Pre-tax income refers to income before taxes and benefits, except social insurance benefits, which are included.	WID
Pre-tax income: Top 10%	Share of pre-tax income that goes to the top 10% (percentiles 90-100) of the pre-tax income distribution. Pre-tax income refers to income before taxes and benefits, except social insurance benefits, which are included.	WID
Pre-tax income: Top 1%	Share of pre-tax income that goes to the top 1% (percentiles 99-100). Pre-tax income refers to income after taxes and benefits, except social insurance benefits, which are included.	WID

Notes: Description of variables used in the survey data analysis. "IVS" stands for "Integrated Values Surveys", which consists of the World Values Survey (WVS) and the European Values Survey (EVS). "WID" stands for "World Inequality Database". "WDI" stands for "World Development Indicators" provided by the World Bank.

Table A.2 Variable descriptions (ii.)

Variable	Description	Source
<i>Dependent variables: inequality indicators (continued)</i>		
Post-tax income: Bottom 50%	Share of post-tax income that goes to the bottom 50% (percentiles 0-50) of the post-tax income distribution. Post-tax income refers to income after taxes and benefits, including in-kind redistribution (e.g. use of public education and public healthcare).	WID
Post-tax income: Middle 40%	Share of post-tax income that goes to the middle 40% (percentiles 50-90) of the post-tax income distribution. Post-tax income refers to income after taxes and benefits, including in-kind redistribution (e.g. use of public education and public healthcare use).	WID
Post-tax income: Top 10%	Share of post-tax income that goes to the top 10% (percentiles 90-100) of the post-tax income distribution. Post-tax income refers to income after taxes and benefits, including in-kind redistribution (e.g. use of public education and public healthcare).	WID
Post-tax income: Top 1%	Share of post-tax income that goes to the top 1% (percentiles 99-100) of the post-tax income distribution. Post-tax income refers to income after taxes and benefits, including in-kind redistribution (e.g. use of public education and public healthcare).	WID
Wealth: Bottom 50%	Share of wealth that is owned by the middle 40% (percentiles 50-90) of the wealth distribution. Wealth refers to household net financial and non- financial assets.	WID
Wealth: Middle 40%	Share of wealth that is owned by the bottom 50% (percentiles 0-50) of the wealth distribution. Wealth refers to household net financial and non- financial assets.	WID
Wealth: Top 10%	Share of wealth that is owned by the top 10% (percentiles 90-100) of the wealth distribution. Wealth refers to household net financial and non-financial assets.	WID
Wealth: Top 1%	Share of wealth that is owned by the top 1% (percentiles 99-100) of the wealth distribution. Wealth refers to household net financial and non- financial assets.	WID

Notes: Description of variables used in the survey data analysis. "IVS" stands for "Integrated Values Surveys", which consists of the World Values Survey (WVS) and the European Values Survey (EVS). "WID" stands for "World Inequality Database". "WDI" stands for "World Development Indicators" provided by the World Bank.

Table A.3 Variable descriptions, continued (iii.)

Variable	Description	Source
<i>Control variables: individual level</i>		
Gender	Gender of the respondent (1 - Male, 2 – Female)	IVS
Age	Age of the respondent	IVS
Age squared	Age squared of the respondent	IVS
Children	How many children do you have? (Truncated variable, "5 or more" recoded as one category)	IVS
Married	Marital status of the respondent (Married, Living together as married, Divorced, Separated, Widowed, Single/Never married)	IVS
Education	Level of respondent's education (Lower, Middle, Upper)	IVS
Employment	Employment status of the respondent (Full time, Part time, Self-employed, Retired, Housewife, Student, Unemployed, Other)	IVS
Income	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.	IVS
Health	All in all, how would you describe your state of health these days? Would you say it is... (Very good, Good, Fair, Poor, Very poor)	IVS
Religious	Independently of whether you attend religious services or not, would you say you are...? (A religious person, Not a religious person, A convinced atheist)	IVS
Trust	Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people? (1 - Most people can be trusted, 0 - Need to be very careful)	IVS
<i>Control variables: country level</i>		
GDP per capita (log)	Log of per capita GDP, PPP (constant 2017 international \$)	WDI

Notes: Description of variables used in the survey data analysis. "IVS" stands for "Integrated Values Surveys", which consists of the World Values Survey (WVS) and the European Values Survey (EVS). "WDI" stands for "World Inequality Database". "WDI" stands for "World Development Indicators" provided by the World Bank.

Table A.4 Descriptive statistics: happiness, life satisfaction, and control variables

	Obs.	Mean	Std. Dev.	Min.	Max.
Happiness	450115	3.06	0.71	1.00	4.00
Life satisfaction	456356	6.97	2.29	1.00	10.00
Log of GDP per capita	418472	10.02	0.76	7.26	11.68
Gender (1 = Male, 2 = Female)	456254	1.53	0.50	1.00	2.00
Age	456258	44.09	17.16	13.00	108.00
Age squared	456258	2238.62	1648.35	169.00	11664.00
Income category, self-rated	404814	4.78	2.41	1.00	10.00
Most people can be trusted	460960	0.30	0.46	0.00	1.00
0 children	447386	0.28	0.45	0.00	1.00
1 child	447386	0.17	0.38	0.00	1.00
2 children	447386	0.29	0.45	0.00	1.00
3 children	447386	0.14	0.34	0.00	1.00
4 children	447386	0.06	0.24	0.00	1.00
5 or more children	447386	0.06	0.23	0.00	1.00
married==Married	454930	0.57	0.50	0.00	1.00
married==Living together as married	454930	0.05	0.23	0.00	1.00
married==Divorced	454930	0.05	0.22	0.00	1.00
married==Separated	454930	0.02	0.13	0.00	1.00
married==Widowed	454930	0.08	0.26	0.00	1.00
married==Single/Never married	454930	0.24	0.42	0.00	1.00
education==Lower	380194	0.28	0.45	0.00	1.00
education==Middle	380194	0.45	0.50	0.00	1.00
education==Upper	380194	0.27	0.45	0.00	1.00
employment==Full time	449173	0.40	0.49	0.00	1.00
employment==Part time	449173	0.07	0.26	0.00	1.00
employment==Self employed	449173	0.07	0.26	0.00	1.00
employment==Retired	449173	0.17	0.38	0.00	1.00
employment==Housewife	449173	0.13	0.33	0.00	1.00
employment==Students	449173	0.06	0.24	0.00	1.00
employment==Unemployed	449173	0.07	0.26	0.00	1.00
employment==Other	449173	0.02	0.13	0.00	1.00
health==Very good	415647	0.23	0.42	0.00	1.00
health==Good	415647	0.42	0.49	0.00	1.00
health==Fair	415647	0.27	0.44	0.00	1.00
health==Poor	415647	0.07	0.25	0.00	1.00
health==Very poor	415647	0.01	0.10	0.00	1.00
religious==A religious person	427838	0.66	0.47	0.00	1.00
religious==Not a religious person	427838	0.28	0.45	0.00	1.00
religious==A convinced atheist	427838	0.07	0.25	0.00	1.00

Notes: This table presents the following statistics for each variable: Number of Observations, Average Value, Standard Deviation, Minimum and Maximum Value. The sources and description of the variables can be found in Tables A.1 and A.3

Country	1981	1982	1984	1989	1990	1991	1992	1993	1995	1996	1997	1998	1999	2000	2001	2002	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2017	2018	2019	2020	Total
Argentina	0	0	1,005	0	0	1,002	0	0	1,079	0	0	0	1,280	0	0	0	0	0	1,002	0	0	0	0	0	0	1,030	0	1,003	0	0	0	7,401
Australia	1,228	0	0	0	0	0	0	0	2,048	0	0	0	0	0	0	0	0	1,421	0	0	0	0	0	0	1,477	0	0	0	1,813	0	0	7,987
Austria	0	0	0	0	1,460	0	0	0	0	0	0	0	1,522	0	0	0	0	0	0	0	1,510	0	0	0	0	0	0	1,644	0	0	6,136	
Belgium	1,145	0	0	0	2,792	0	0	0	0	0	0	0	1,912	0	0	0	0	0	0	0	0	1,509	0	0	0	0	0	0	0	0	7,358	
Brazil	0	0	0	0	0	1,782	0	0	0	0	1,143	0	0	0	0	0	0	0	1,500	0	0	0	0	0	0	1,486	0	1,762	0	0	7,673	
Bulgaria	0	0	0	0	0	1,034	0	0	0	0	1,072	0	1,000	0	0	0	0	1,001	0	1,500	0	0	0	0	0	0	1,558	0	0	0	7,165	
Canada	0	1,254	0	0	1,730	0	0	0	0	0	0	0	0	1,931	0	0	0	0	2,164	0	0	0	0	0	0	0	0	0	0	4,018	11,097	
Chile	0	0	0	0	1,500	0	0	0	0	1,000	0	0	0	1,200	0	0	0	0	1,000	0	0	0	0	0	1,000	0	0	0	1,000	0	0	6,700
China	0	0	0	0	1,000	0	0	0	1,500	0	0	0	0	0	1,000	0	0	0	0	1,991	0	0	0	0	0	2,300	0	0	3,036	0	0	10,827
Colombia	0	0	0	0	0	0	0	0	0	0	3,029	2,996	0	0	0	0	0	3,025	0	0	0	0	0	0	1,512	0	0	0	1,520	0	0	12,082
Croatia	0	0	0	0	0	0	0	0	0	1,196	0	0	1,003	0	0	0	0	0	0	0	1,525	0	0	0	0	0	0	1,487	0	0	0	5,211
Cyprus	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,050	0	1,000	0	0	1,000	0	0	0	0	0	0	1,000	0	4,050
Czech Republic	0	0	0	0	0	3,033	0	0	0	0	0	1,147	1,908	0	0	0	0	0	0	1,821	0	0	0	0	0	0	0	1,811	0	0	0	9,720
Denmark	1,182	0	0	0	1,030	0	0	0	0	0	0	0	1,023	0	0	0	0	0	0	0	1,507	0	0	0	0	0	0	3,362	0	0	0	8,104
Dominican Republic	0	0	0	0	0	0	0	0	417	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	417	
Ecuador	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1,202	0	0	1,200	0	0	2,402	
Egypt	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3,000	0	0	0	0	0	3,051	0	0	0	1,523	0	0	1,200	0	0	0	8,774
El Salvador	0	0																														

Appendix B Robustness checks

Table B.1 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life. Average household wealth level included.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth: Bottom 50%	-0.006 (0.005)				0.001 (0.003)			
Wealth: Middle 40%		-0.006** (0.003)				-0.003** (0.002)		
Wealth: Top 10%			0.004* (0.002)				0.001 (0.001)	
Wealth: Top 1%				0.004* (0.002)				0.003*** (0.001)
Observations	256,164	256,164	256,164	256,164	256,588	256,588	256,588	256,588
Countries	57	57	57	57	57	57	57	57
Pseudo-R2	0.131	0.131	0.131	0.131	0.0676	0.0678	0.0676	0.0678

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Average net household wealth level (USD PPP) included. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

Table B.2 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life. Electoral democracy index included.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Pre-tax income: Bottom 50%	0.006* (0.004)				0.003 (0.002)			
Pre-tax income: Middle 40%		-0.004** (0.002)				-0.000 (0.002)		
Pre-tax income: Top 10%			0.001 (0.001)				-0.000 (0.001)	
Pre-tax income: Top 1%				0.003 (0.002)				0.001 (0.001)
Observations	265,733	265,733	265,733	265,733	266,158	266,158	266,158	266,158
Countries	58	58	58	58	58	58	58	58
Pseudo-R2	0.129	0.129	0.129	0.129	0.0662	0.0662	0.0662	0.0662

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

Table B.3 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life. Electoral democracy index included.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Post-tax income: Bottom 50%	0.006** (0.003)				-0.002 (0.002)			
Post-tax income: Middle 40%		-0.003 (0.003)				-0.003 (0.002)		
Post-tax income: Top 10%			-0.000 (0.002)				0.002 (0.001)	
Post-tax income: Top 1%				0.000 (0.001)				0.002 (0.002)
Observations	153,359	153,359	156,781	156,781	153,702	153,702	157,122	157,122
Countries	41	41	42	42	41	41	42	42
Pseudo-R2	0.148	0.147	0.148	0.148	0.0682	0.0682	0.0678	0.0678

Notes: *** p<0.01, ** p<0.05, * p<0.10. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.

Table B.4 Average marginal effects from the ordered probit model for the probability of being very happy or being very satisfied with life. Electoral democracy index included.

	Happiness				Life Satisfaction			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Wealth: Bottom 50%	-0.006 (0.005)				0.001 (0.003)			
Wealth: Middle 40%		-0.007** (0.003)				-0.003* (0.002)		
Wealth: Top 10%			0.004** (0.002)				0.002 (0.001)	
Wealth: Top 1%				0.004** (0.002)				0.003** (0.001)
Observations	256,164	256,164	256,164	256,164	256,588	256,588	256,588	256,588
Countries	57	57	57	57	57	57	57	57
Pseudo-R2	0.130	0.131	0.131	0.131	0.0676	0.0678	0.0677	0.0679

Notes: *** p<0.01, ** p<0.05, * p<0.10. Standard errors clustered at the country level. Country and year fixed effects included. Individual-level controls and log of GDP per capita included.



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