Journal of Happiness Studies (2023) 24:1813–1840
https://doi.org/10.1007/s10902-023-00660-4

RESEARCH PAPER

Well-Being and Income Across Space and Time: Evidence from One Million Households

Michael D. Smith[1] · **Dennis Wesselbaum**[2]

Accepted: 3 April 2023 / Published online: 13 April 2023

Abstract
This paper provides an overview of the global trends and driving forces of well-being and income. We extend the literature by examining inequality in both variables, since average well-being and income measures can obscure important disparities in people's lives. We use data from the Gallup World Poll for nine years (2009–2017) and 158 countries ($N = 1{,}437{,}897$). Our analysis proceeds in two steps. First, we present country-level panel evidence. Second, we estimate microeconometric regressions to reveal the individual-level drivers of well-being and income. We find that the mean of well-being and income by development group varies little over time, while inequality in these two variables change significantly. We find no evidence of the Easterlin paradox after controlling for income inequality and show that income growth reduces well-being inequality. Further, drivers of mean and inequality in well-being and income are similar, but policymakers should consider the full distributional impact of investments.

Keywords Development · GDP · Inequality · Well-being

JEL Classification D31 · D63 · I31

1 Introduction

In his presidential campaign speech at the University of Kansas in 1968, Senator Robert F. Kennedy famously said that gross domestic product (GDP) "*measures everything, in short, except that which makes life worthwhile.*" The public and scholars have long debated

The findings and conclusions in the paper are those of the author(s) and do not necessarily represent the views of the National Marine Fisheries Service, NOAA.

✉ Dennis Wesselbaum
dennis.wesselbaum@otago.ac.nz

Michael D. Smith
michael.d.smith@noaa.gov

[1] National Oceanic and Atmospheric Administration, Economics and Social Sciences Research, Alaska Fisheries Science Center, 7600 Sand Point Way NE, Seattle, WA 98115-6349, USA

[2] Department of Economics, University of Otago, Dunedin, New Zealand

the issue he implicitly referenced: what social progress means and how it should be measured. Income, after all, is a means to a fulfilling life and not an end in and of itself (UNDP, 1990). Nordhaus and Tobin (1973) asked whether pursuing economic growth is obsolete as a means to improve social well-being. They argue that while sustainable per-capita consumption must increase, economic growth is an (imperfect) measure of progress. The famous Easterlin paradox (Easterlin, 1974) states that income and well-being are positively correlated in the cross-section, but that income gains over time do not lead to higher levels of well-being. Thus, public officials, economists, and social scientists increasingly ask what social progress looks like, whether it benefits people equally, how it should be measured, and how these measures should affect policy-making.[1]

Several countries have begun to explore alternative measures to GDP as an indicator of progress.[2] In 2008, French President Sarkozy created a commission to review the concept of GDP and to suggest practical alternative measures (see Stiglitz et al., 2009). In 2010, British Prime Minister Cameron commissioned the "*Measuring National Well-being*" initiative. The UAE has had a national programme for happiness and well-being since 2016 and in 2019 the New Zealand government launched a "*Well-being Budget.*"

Well-being is a multidimensional concept (see Margolis et al., 2021 for an overview) and an increasing number of scholars are using subjective well-being (SWB) measures (Deaton, 2008; Frey & Stutzer, 2002). SWB belongs to the group of mental-state accounts as defined in psychology (Dolan & White, 2007).[3] Diener (1984) defines subjective well-being as a combination of hedonic well-being and life satisfaction. Broadly speaking, SWB is a single indicator and proxy variable. It reflects an individual's overall objective welfare. Surveys conducted around the world, including the World Values Survey and the Gallup World Poll (GWP), as well as country-specific surveys such as the U.S. General Social Survey or the German Socio-Economic Panel, have included questions addressing SWB. Measures of well-being can offer insights into people's lives that go beyond income to better capture the comparative inequality and full extent of opportunities available to people (Veenhoven, 2005).

While there exists a rich literature on mean well-being and income over time and space (Deaton, 2008; Easterlin, 2013), less is known about the distribution of both variables among national populations over time (Dolan & White, 2007; Helliwell, 2021). Moreover, Kuznets (1955) famously hypothesized a relationship between the level of income and inequality, with inequality rising initially during economic progress and later declining. Reduced inequality in well-being is typically a policy objective by itself, irrespective of higher average living standards or decreased poverty levels, which is why the Kuznets Curve has attracted such interest the literature (Acemoglu and Robinson, 2002; Fields, 2002; Wesselbaum et al., 2023; Zhang, 2022). The predicted link between average levels and inequality suggests that interventions with the clear goal of reducing inequality may

[1] See Diener et al. (1999), Frey and Stutzer (2002), and Hirschauer et al. (2015) for overviews and literature reviews.

[2] Indeed, Simon Kuznets, inventor of the GDP measure, himself argued against using it as a measure of welfare in his report to Congress in 1934.

[3] There are three general well-being accounts (Dolan and White, 2007) in psychology: mental-state, objective-list, and desire-fulfilment. The mental-state account relates to people's thoughts and feelings about their lives. The objective-list approach, in contrast, assumes that there is a list of items which constitute well-being. Desire-fulfilment states that well-being is derived from achieving or obtaining states of affairs which are considered desirable.

be necessary separately from raising average levels of well-being and income (Wesselbaum et al., 2023).

The goal of this paper is threefold. First, we aim to provide an overview of the global trends in well-being and income. Second, we study the driving forces of well-being and income. This second goal is paramount for policymaking, because policymakers cannot act on the knowledge of how happy people are without knowing what makes them happy (Layard, 2010). Third, we extend the analysis to examine inequality in well-being and income, because using average well-being and income hides important disparities in people's lives and policy-relevant information (Stiglitz et al., 2009). Social progress is not only driven by average conditions, but also inequalities in conditions and opportunities.

We make use of data from the GWP for nine years (2009–2017) and 158 countries (N = 1,437,897). The size of this data set, with about 1.5 million randomly selected people from around the world, as well as the detailed questions asked about well-being, income, and a rich set of other variables of interest, provides a unique opportunity to study the trends and driving forces of mean and inequality in well-being and income around the world. The time period of our data spans important global events such as the aftermath of the 2007–08 Global Financial Crisis and the Global Food Price Crisis of 2010–12. Our data set offers substantial variation across countries and over time that we exploit to examine the relation between well-being and income. Further, while research has established the importance of income to within-country well-being, much less is known about the relationship between income inequality and subjective well-being inequality (Delhey & Kohler, 2011). We fill this gap in the literature by examining inequality in well-being and its relationship to income inequality.

Our analysis proceeds in two steps following Wesselbaum et al. (2023). First, to document the global trends in well-being and income we present country-level mean and inequality results. Second, exploiting the rich microdata the GWP gathers, we examine the correlates of mean and inequality of well-being and income. We do so by estimating microeconometric well-being functions which give, as a side product, the weights for a social welfare function which can be maximized to find optimal policy (Frey & Stutzer, 2002). Combining a micro- and a macro-level analyses enables us to gain a comprehensive understanding of trends and determinants of inequality.

The paper is organized as follows: The next section discusses the GWP data and variable construction for the analyses. Section 3 presents the econometric approach. Section 4 discusses the results and how they relate to the literature. Section 5 discusses the limitations and implications of this research and concludes.

2 Data and Methods

2.1 Data Set Construction

We use the nine waves of the GWP, 2009 to 2017 (see also Deaton, 2008). GWP interviews a nationally representative sample of 1000 adults in most countries. In developing countries, these interviews are conducted face-to-face, while in middle- and high-income countries with at least 80 percent telephone coverage, telephone interviews are used. GWP uses the Kish grid method to randomly select households.

The GWP survey includes a wide range of information about respondents' demographic characteristics, education, marital status, health status, income, employment situation, and

other socioeconomic outcomes. Like all cross-country surveys we acknowledge that the data may suffer from measurement error. This includes possible translation issues, coverage issues, strategic answering of questions, or framing (especially in a cultural context). However, the benefits of asking the same question at the individual level around the world (the GWP is representative of roughly 95% of the global adult population) and the robust translation and sampling scheme that the GWP follows (Gallup, 2016), we assume that these small errors do not confound our estimates. We categorize the economic development status of each country using annual gross national income (GNI) per capita and World Bank (2019) thresholds as follows: low-income (<=$995), lower-middle-income (>$996 and <$3895), upper-middle-income (>$3895 and <$12,055), and high-income (>$12,055).

2.2 Analysis Sample

From 2009 to 2017, the GWP interviewed 1,448,070 individuals aged 15 years and older in 158 countries. Individuals without valid measures of income and well-being (e.g., missing responses) were excluded from the analyses, resulting in a sample of 1,437,897 individuals in 158 countries.[4] An additional 378,685 individuals were dropped from the sample because they failed to provide valid information to one or more of the questions used to construct the individual-level control variables. This results in a final sample of 1,059,212 individuals in 158 countries for the regression models.

2.3 Key Variables

This paper investigates two key variables: income and well-being. Income is measured as log annual household income per capita in international dollars.[5] Further, GWP asks a subjective well-being question using a Cantril ladder (Deaton, 2008 also uses this question in his analysis). The question is: "*Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. 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?*".

The GWP includes additional questions about daily experiences, but responses are only available for a subset of respondents (for 92 percent of respondents). For example, the data includes whether some respondents reported that they smiled or experienced worry or sadness the previous day. For these respondents, the question using the Cantril ladder is positively correlated with the positive experience smiling (0.19) and negatively correlated with the two negative experiences of worrying (−0.17) and being sad (−0.18). These findings are in line with the related literature (see, e.g., Diener & Seligman, 2004).

[4] We exclude Somalia and Somaliland due to extremely low income levels.

[5] Household income is first reported in respondents' local currency and then made comparable across countries by converting the local currency to international dollars using the World Bank's PPP (2011) private consumption conversion factor. Respondents who have difficulty answering the income question are presented a set of ranges in local currency and are asked which group they fall into (Gallup, 2016). This measure also relies on multiple imputation methodology to replace missing values and could introduce measurement error.

2.4 Control Variables

We control for a wide range of factors that could potentially explain income or well-being. Selection of variables follows the related literature such as Diener et al. (1999), Frey and Stutzer (2000), Alesina et al. (2004), Blanchflower and Oswald (2004), and Dolan et al. (2008). These include demographic factors such as age, immigration status, and sex assigned at birth, as well as educational background (elementary, secondary, post-secondary), and marital status (single, married or partner, separated or widowed or divorced). We also include variables measuring the number of adults, children living in the household (via a dummy), respectively. We include a categorical variable for employment status with four levels: unemployed, out-of-labor force, self-employed, and employed (full-time or part-time).

We further control for health by using a dummy variable derived from the question: "*Do you have any health problems that prevent you from doing any of the things people your age normally can do?*" To capture the influence of social relations, we include a variable which captures confidence in friends and family, based on respondents' answer to the question, "*If you were in trouble, do you have relatives or friends you can count on to help you whenever you need them, or not?*" Since safety is an important driver of well-being and income, we also include a dummy variable for feeling safe according to the question: "*Do you feel safe walking alone at night in the city or area where you live?*".

Finally, the GWP also includes a variable identifying whether individuals live in a rural or urban area. The variable provided by GWP has four levels: (i) rural or farm, (ii) small town or village, (iii) large city, and (iv) suburbs. We generate a rural variable from this by defining (i) and (ii) as rural, and (iii) and (iv) as urban.

2.5 Measurement of Mean and Inequality in Well-being and Income

We have two outcomes of interests, namely the mean and inequality of our two variables of interest: well-being and income. Calculating the mean level of well-being and income is straigthforward, using sample-weighted individual-level data for each country and year.

Calculating inequality is more complicated (see also Goff et al., 2018). Since income is an unbounded positive variable, we use a Gini coefficient computed from individual-level (log) income for each country and year.

For well-being, using a measure like the standard deviation or the Gini coefficient is not possible. Well-being is a bounded, discrete variable on the [0,10] interval. This boundedness creates two problems: the consistency problem and the boundary problem (Erreygers et al., 2012). The boundary problem makes using the standard deviation impossible, because there can not be inter-unit variation at either 0 or 10. Therefore, an inverted-U shaped relationship mechanically emerges. A similar argument holds for the Gini coefficient. The Gini coefficient would decrease mechanically from one to zero when happiness of all people converges from 0 to 10. The consistency problem relates to the framing of the question. The outcome should be the same whether a measure is designed in terms of the attaintment towards or the shortfall from the ideal state.

Therefore, we use a measure of inequality typically employed in the health literature designed to deal with bounded, discrete variables: the Erreygers index (Erreygers, 2009; Erreygers & Van Ourti, 2011; Erreygers et al., 2012). Technically, the Erreygers index is defined as

Table 1 Descriptive statistics

	Full sample	Low-income	Lower-middle-income	Upper-middle-income	High-income
Income	9.106	7.618	8.431***	9.040***	10.254***
	(1.115)	(0.916)	(0.551)	(0.585)	(0.500)
Well-being	5.460	4.026	4.856***	5.401***	6.527***
	(1.108)	(0.563)	(0.616)	(0.772)	(0.689)
Inequality income	0.068	0.107	0.071***	0.068***	0.051***
	(0.042)	(0.069)	(0.037)	(0.035)	(0.019)
Inequality well-being	0.444	0.443	0.450***	0.478***	0.414***
	(0.085)	(0.109)	(0.090)	(0.076)	(0.063)
Observations	1,437,897	198,677	361,794	384,907	492,519

Mean and inequality in income and well-being calculated from sample-weighted individual-level data from the 2009–2017 Gallup World Poll data (N = 1,437,897). Economic development by GNI per capita: low-income (< = $995), lower-middle-income (> $996 and < $3895), upper-middle-income (> $3895 and < $12,055), and high-income (> $12,055). Asterisks indicate statistically significant difference from low-income countries at the 1 percent level. Standard deviation in parenthesis

$$Erreygers = \frac{1}{n}\sum_{i=1}^{n}\left[4b_i\left(2R_i - 1\right)\right], \tag{1}$$

where b_i is a transformed version of our well-being variable, W_i, for each individual i, given by

$$b_i = \frac{W_i - W^{min}}{W^{max} - W^{min}}. \tag{2}$$

Further, the number of observations is denoted by n and the deviation of the rank from the mean is denoted by R_i.

We use two alternative measures of inequality in well-being to provide robustness checks. First, we use the Generalized Concentration Index (Erreygers & Van Ourti, 2011). This measure is a generalization of the most popular rank-dependent index used in the literature. Second, we use the measure developed by Permanyer et al. (2018), which uses a different axiomatic foundation. This measure corrects for the maximum theoretical inequality that could be found in a given variable. Both measures are applicable to the bounded, discrete well-being variable.

In sum, for each year and country, we compute the sample-weighted mean of well-being and income using individual-level data. Then, we compute the within-country, sample-weighted Gini coefficient of individual-level income to measure income inequality for each year and country. Finally, we use the Erreygers index to compute sample-weighted inequality in well-being using individual-level well-being data for each year and country.

Table 2 Correlation matrix

Correlation	Income	Well-being	Inequality income	Inequality well-being
Income	1	0.74	−0.71	−0.33
Well-being	–	1	−0.40	−0.20
Inequality income	–	–	1	0.35

2.6 Descriptive Results

Table 1 presents the descriptive statistics for our key variables of interest: well-being and income.[6] We present the results for mean and inequality in these two variables by World Bank economic development ranking. As the table shows, well-being as well as income increases with economic development, or income. Income inequality is larger in less developed (low-income) countries, but well-being inequality shows a more complex relationship to economic development. It is lowest in high-income countries but increases with development levels between low-income, lower-middle-, and upper-middle-income countries.

Table 2 presents the correlation matrix between the four variables. Income and well-being are positively correlated ($\rho = 0.75$). A correlation coefficient of 0.75 is extremely high and, in line with Cohen's rule of thumb, is a large association. Inequality in income and well-being are negatively correlated with mean income and well-being, respectively. This implies that increases in the mean levels of income and well-being lead to lower levels of inequality in these variables. Over the economic development process, countries which grow and become happier should also see lower levels of inequality in both variables. Along this line, inequality in well-being is positively correlated with inequality in income ($\rho = 0.35$). Overall, the results from Tables 1 and 2 highlight systematic differences between well-being and income across stages of economic development.

To further examine the relation between mean and inequality in income and well-being, Fig. 1 presents a country-level scatterplot of mean income and mean well-being, while Fig. 2 presents a country-level scatterplot of inequality in income and inequality in well-being. In both figures, we categorize country-level observations by World Bank economic development ranking (by colour and symbol). In Fig. 1, we find a strong positive relationship between mean income and mean well-being in each year across countries. The variation in both means increased after the global financial crisis. The figure also shows that the ranking of countries by economic development ranking stays constant over time.

Figure 2 shows that the relationship between the inequality in income and well-being does not follow a similar pattern to the relationship between the means of each. In 2009, the correlation is 0.08 and increases to 0.37 in 2017. The range in inequality in well-being and income increases over the nine years in our data set. While observations are bunched together tightly in 2009, the association weakens over time. This is mainly due to the increase in inequality in both variables in low-income countries and a small number of lower-middle-income countries.

[6] Table 5 in the appendix presents the descriptive statistics for all variables in our (micro-level) regression sample. Figures 6, 7, 8, 9 in the appendix provide kernel density plots of country-level mean and inequality in well-being and income.

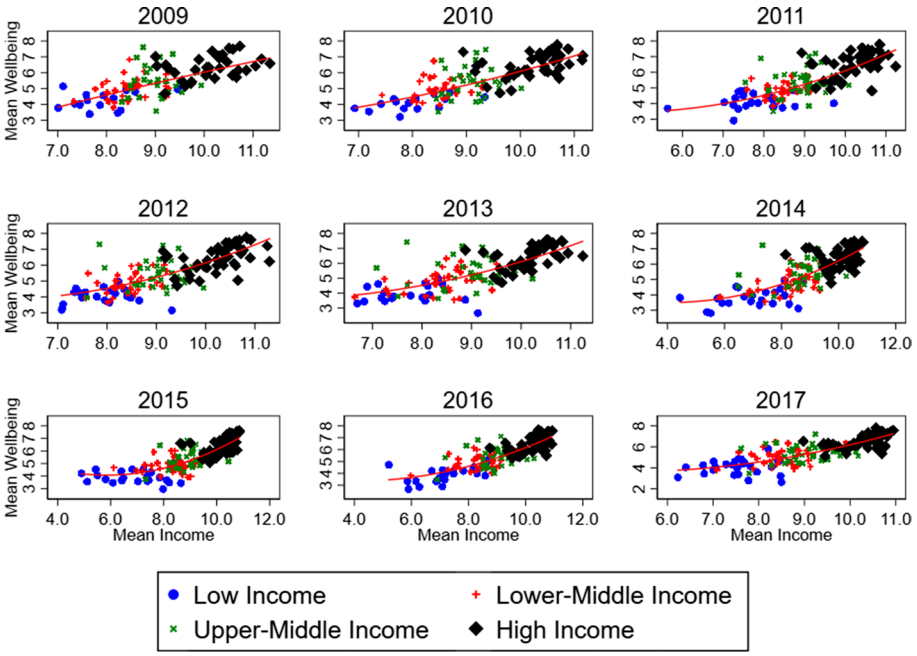

Fig. 1 Mean income versus mean well-being. Notes: Scatterplot of country-level mean income (horizontal axis) and mean well-being (vertical axis) from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

Rather than highlighting the relationships in the cross-section, we can present the variation in mean and inequality over time. The period of our analysis, 2009 to 2017, has seen several far-reaching global events that may affect well-being and income: the Global Financial Crisis (2007–2009), the European Debt Crisis (2009–2014), the World Food Price Crisis (2010–2012), the Russo-Ukrainian War (starting 2014), Brexit (2018–2020), and an increase in temperatures and weather-related disasters (Wesselbaum & Aburn, 2019).

Figure 3 presents the mean and inequality in well-being and income over time by economic development ranking. We find that there is hardly any variation in the means of income and well-being over time by economic development group. For low-income countries, mean income decreases after 2013 but recovers afterwards over four years. However, there is no corresponding drop in well-being in low-income countries.

In contrast, there are interesting dynamics for the inequality in both income and well-being. Inequality increases the most in low-income countries. In lower-middle-income and upper-middle-income countries income inequality is increasing similarly over time. For high-income countries, income inequality decreases until 2013 when it increases and then afterward trends downwards again. Similar dynamics are visible for well-being: well-being inequality increases most in low-income and lower-middle-income countries, while we observe a relatively smaller increase in upper-middle-income countries. Well-being inequality in high-income countries does not vary over time.

The findings in this section have interesting policy implications. Using mean well-being or mean income as policy targets would not imply major differences, due to the

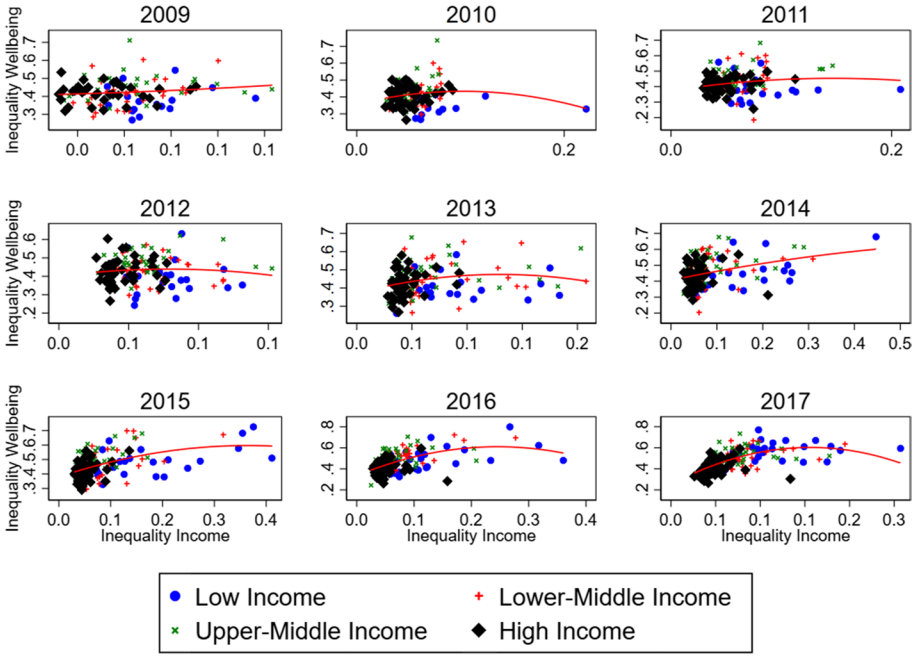

Fig. 2 Inequality in Income versus Inequality in Well-being. Notes: Scatterplot of country-level inequality in income (horizontal axis) and inequality in well-being (vertical axis) from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

high correlation of both variables and similar time series characteristics. However, both means hide important within-country dynamics in the inequality in well-being and income. Other than for high-income countries, inequality in well-being and income is increasing over time. This implies that evaluating policies using macro-level inequality measures of well-being and income in high-income countries may not provide a full picture of their impact. Finally, policies aimed at changing mean levels of income or well-being need also consider distributional impacts.

3 Econometric Methods

In our analysis of the trends in both mean and inequality in well-being and income, we rely on two econometric approaches: a macro-level cross-country model and a micro-level individual-level two-stage regression model.

The macro-level approach uses a country-level panel regression model with country and year fixed effects. Including year fixed effects is important to control for survey context effects. Further, the panel dimension is important to control for individual observable characteristics that are constant over time. The idea is to identify the relationship between the mean and inequality of well-being and income from the inter-year variation within countries which is different from the common trends across all countries. Formally, we estimate a fixed effects panel model

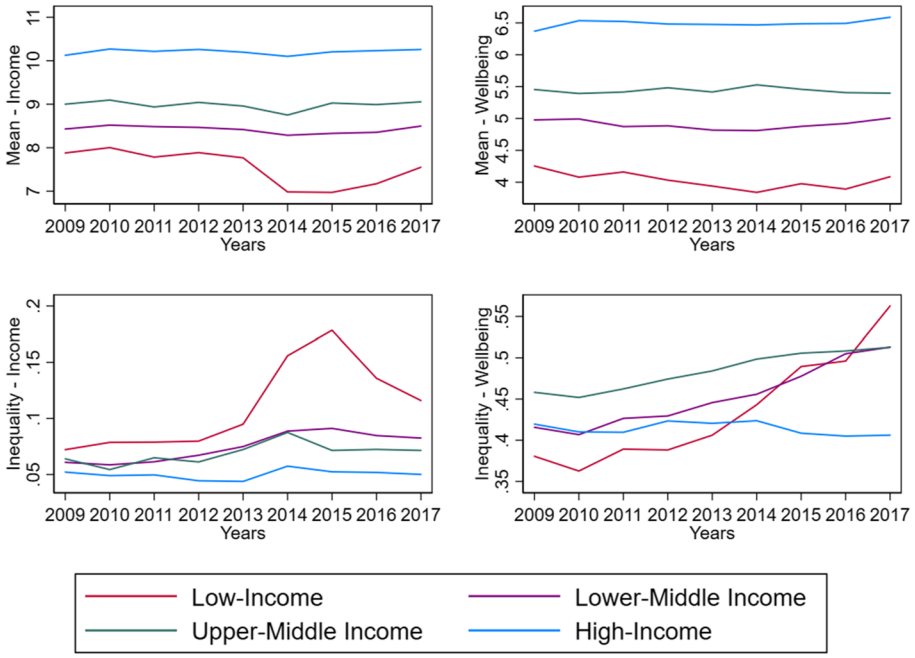

Fig. 3 Time Series Plot of Mean and Inequality in Well-being and Income. Notes: Time Series plots of country-level mean (top row) and within-country inequality (bottom row) of well-being (right panels) and income (left panels). Colours represent World Bank economic development rankings

$$Y_{i,t} = \alpha + \beta W_{i,t} + \beta_1 W_{i,t}^2 + \theta Income_{i,t} + \theta_1 Income_{i,t}^2 + \mu_i + \mu_t + \varepsilon_{i,t}, \tag{3}$$

where $Y_{i,t}$ denotes the inequality of well-being and income, W denotes well-being, and *Income* denotes average household-level income, respectively for country i in year t. Further, the country and year fixed effects are given by μ_i and μ_t, respectively. We are interested in the estimates of β and θ giving the effect of the mean in well-being and income on inequality and the estimates of β_1 and θ_1 giving the (non-linear) effect of the squared terms on inequality. Standard errors are clustered at the country-year level.

Our second approach utilizes the rich nature of the individual-level data in the GWP. We estimate the individual-level conditional mean and conditional variance of well-being and income using the method developed in Just and Pope (1978). To do so, we pool all individual observations across years and countries. Then, we use a two-stage estimation procedure. In the first stage, we estimate the conditional mean of well-being or income for individual i in country j in year t:

$$Y_{i,j,t} = \alpha + \beta Z_{i,j,t} + \theta X_{i,j,t} + \mu_{j,t} + \varepsilon_{i,j,t}, \tag{4}$$

where $Z_{i,j,t}$ is either well-being or income and $X_{i,j,t}$ contains our control variables. We include country-year fixed effects, $\mu_{j,t}$, to capture any common variation shared by individuals in the same country and year.

The second stage then estimates the conditional variance as a measure of inequality. The idea is that the interpersonal dispersion of well-being or income within a given country and year conditional on individual characteristics provides a direct measure of inequality.

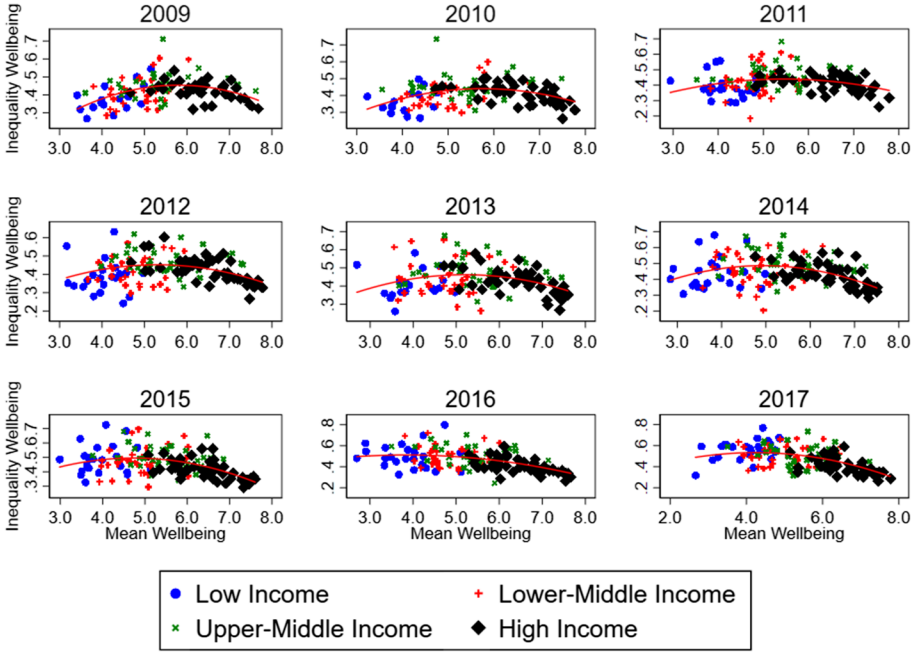

Fig. 4 Kuznets Curve Well-being. Notes: Scatterplot of country-level mean well-being (horizontal axis) and inequality in well-being (vertical axis) from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

Technically, we regress the squared residuals of the first-stage regression on the same set of independent variables used in Eq. (4):

$$\epsilon^2_{i,j,t} = \delta + \vartheta Z_{i,j,t} + \gamma X_{i,j,t} + \varphi_{j,t} + \epsilon_{i,j,t}. \tag{5}$$

Doing so relies on the mean zero property of the residuals from the first-stage regression and the observation that the conditional variance is equivalent to the conditional expectation of the squared residuals from the conditional mean. Notice that we use a linear probability model, as the literature has shown that estimating well-being equations with a linear model or an ordered categorical model yields virtually the same results (Ferrer-i-Carbonell & Frijters, 2004).

4 Results and Discussion

In this section we present two sets of results. First, we use country-level data to study the relationship between income and well-being for their mean and inequality. Second, we use individual-level data to study the correlates of inequality in income and well-being.

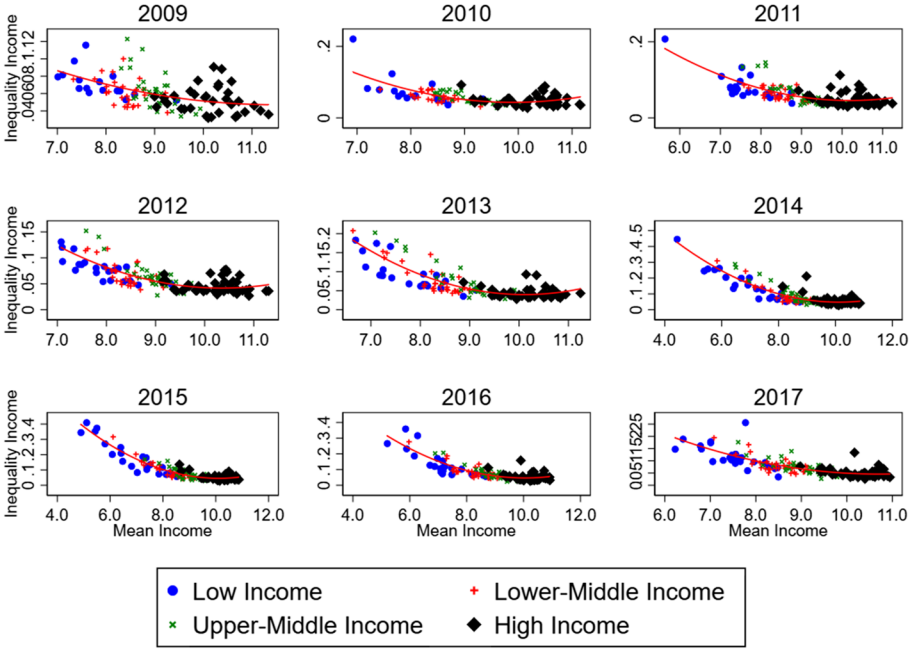

Fig. 5 Kuznets Curve Income. Notes: Scatterplot of country-level mean income (horizontal axis) and inequality in income (vertical axis) from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

4.1 Macro-Level Evidence

Figure 4 presents a scatterplot between the country-level mean in well-being and the within-country inequality in well-being. Figure 5 presents the same for income.[7] Figure 4 suggests the existence of an inverted-U shaped relationship between the mean and the inequality in well-being, sometimes called a Kuznets curve.[8] For example, inequality in well-being is lowest in countries with either low or high mean values of well-being. Inequality in well-being peaks at a well-being value of about 5. Put differently, well-being in countries with high or low average well-being is more equally distributed than in countries with average values of well-being. Income does not show this pattern. Figure 5 indicates a weak negative relation between mean income and income inequality. This negative relation increases over time.

We check the country-level results using the country-level panel regression models presented in Table 3.[9] Column (1) reveals the inverted-U relationship for well-being. As

[7] Figures 10 and 11 in the Appendix present robustness checks using different measures of well-being inequality.

[8] As a reminder, the original Kuznets curve suggests a non-linear relationship between the level and inequality in income over the course of economic development: inequality is first increasing, reaches a maximum, and then decreases.

[9] Table 6 in the Appendix provides robustness checks using two alternative measures of well-being inequality. These confirm the results presented here.

Table 3 Country-level panel regression results

	(1) Inequality well-being	(2) Inequality well-being	(3) Inequality well-being	(4) Inequality income	(5) Inequality income	(6) Inequality income
Income		−0.013 (0.030)	0.025 (0.039)	−0.188*** (0.020)	−0.183*** (0.020)	−0.183*** (0.020)
Income squared		−0.002 (0.002)	−0.004 (0.002)	0.007*** (0.001)	0.007*** (0.001)	0.007*** (0.001)
Well-being	0.137*** (0.028)	0.162*** (0.027)	0.165*** (0.027)		−0.014 (0.010)	−0.016 (0.010)
Well-being squared	−0.014*** (0.003)	−0.015*** (0.002)	−0.016*** (0.002)		0.001** (0.001)	0.002** (0.009)
Income inequality			0.205 (0.131)			
Well-being inequality						0.014 (0.009)
Observations	1.204	1.204	1.204	1.204	1.204	1.204
Adjusted R^2	0.67	0.70	0.70	0.92	0.92	0.92
Fixed effects						
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Observations counted at the country-year level. Regressions account for within-country survey weights. Constant not shown. Clustered standard errors at the country-year level in parenthesis. Significance levels: *: $p<0.10$, **: $p<0.05$, ***: $p<0.01$

Table 4 Country-level panel regression results for *change* in mean and inequality in well-being

	(1)	(2)	(3)	(4)	(5)	(6)
	ΔWell-being			ΔInequality well-being		
ΔIncome	0.07 (0.05)	0.425*** (0.089)	0.451*** (0.089)	−0.029*** (0.007)	−0.042*** (0.010)	−0.047*** (0.013)
ΔIncome inequality		4.205*** (1.006)	4.305*** (1.001)		−0.156 (0.131)	−0.207 (0.132)
ΔWell-being						0.012* (0.006)
ΔWell-being inequality			0.637** (0.323)			
Observations	1.006	1.006	1.006	1.006	1.006	1.006
R^2	0.09	0.12	0.13	0.15	0.15	0.15
Fixed effects						
Country	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes

Observations counted at the country-year level. Regressions account for within-country survey weights. Constant not shown. Clustered standard errors at the country-year level in parenthesis. Significance levels: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

income is a potential driver of well-being, column (2) includes income and its squared term. Both coefficients on income are insignificant and do not change the relationship we obtain for well-being. The literature contains mixed findings on the role of income inequality in well-being inequality. For example, Fahey and Smyth (2004) found no association between income Ginis and the standard deviation of life satisfaction in Europe. Berg and Veenhoven (2010) found virtually no correlation between national income inequality and well-being inequality across 119 countries. However, using a measure of well-being inequality that adjusts for the bounding problem, Delhey and Kohler (2011) found that income inequality affects well-being inequality.

Next, we use income inequality as the dependent variable in columns (4) to (6). Once we purge the country and year fixed effects, we find a significant inverted-U-shape relationship between mean and inequality in income: the original Kuznets curve. Controlling for well-being in column (5) reveals a negative correlation with mean well-being and a positive one with the squared well-being term. We also include inequality in the omitted dependent variable and find no significant relation for well-being or income (columns 3 and 6). While the mean and inequality of income and well-being are positively correlated, finding an income Kuznets curve does not necessarily imply that we also find a Kuznets curve relationship for well-being.

Table 4 presents the results from regressing the change in income over time on the change in well-being. This is the typical regression model to test for the Easterlin paradox; while income affects well-being in the cross-section (Table 3), it typically does not affect well-being over time (see Easterlin, 2013). Stevenson and Wolfers (2008a) and Oishi and Kesebir (2015) find no evidence that the Easterlin paradox holds.

Column (1) finds the Easterlin paradox: the change in income does not significantly affect the change in well-being in our panel of countries over time. However, once we control for the inequality in income in column (2), the change in income significantly, positively affects the change in well-being. This aligns with Oishi and Kesebir's (2015) finding

Table 5 Individual-level regression results

	Well−being		Income	
	(1) Conditional mean	(2) Conditional variance	(3) Conditional mean	(4) Conditional variance
Age	−0.038*** (0.001)	−0.018*** (0.004)	0.005*** (0.001)	−0.010 (0.006)
Age^2	0.000*** (0.000)	0.000*** (0.000)	−0.000*** (0.000)	0.000 (0.000)
Adults	−0.007*** (0.003)	0.024*** (0.007)	0.067*** (0.003)	0.036** (0.016)
Children	−0.074*** (0.008)	0.044** (0.021)	0.031*** (0.006)	−0.005 (0.012)
Female	0.153*** (0.008)	−0.010 (0.019)	−0.044*** (0.005)	−0.147*** (0.027)
Single	0.171*** (0.012)	0.045 (0.038)	0.087*** (0.011)	0.080 (0.059)
Married/partner	0.210*** (0.010)	−0.122*** (0.031)	0.181*** (0.008)	−0.195*** (0.044)
Secondary education	0.250*** (0.010)	−0.733*** (0.039)	0.371*** (0.009)	−0.476*** (0.045)
Post-secondary education	0.532*** (0.013)	−1.121*** (0.053)	0.673*** (0.013)	−0.403*** (0.067)
Well-being			0.084*** (0.002)	−0.094*** (0.012)
Log household income	−0.292*** (0.012)	0.026 (0.028)		
Log household $income^2$	0.040*** (0.001)	−0.021*** (0.002)		
Health problems	−0.417*** (0.012)	0.431*** (0.028)	−0.134*** (0.007)	0.229*** (0.038)
Native	0.098*** (0.017)	−0.353*** (0.044)	0.040*** (0.012)	−0.144** (0.067)

Table 5 (continued)

	Well−being		Income	
	(1) Conditional mean	(2) Conditional variance	(3) Conditional mean	(4) Conditional variance
Rural	−0.109***	−0.045	−0.264***	0.177***
	(0.012)	(0.030)	(0.009)	(0.045)
Confidence friends and family	0.678***	−0.475***	0.249***	−0.591***
	(0.015)	(0.035)	(0.010)	(0.056)
Safety	0.222***	−0.113***	0.011**	−0.031
	(0.010)	(0.024)	(0.006)	(0.032)
Employment				
Out-of-workforce	0.155***	−0.238***	−0.048***	0.783***
	(0.014)	(0.042)	(0.013)	(0.072)
Self-employed	0.091***	−0.321***	0.103***	−0.010
	(0.015)	(0.045)	(0.012)	(0.061)
Employed	0.074***	−0.255***	0.104***	0.081
	(0.013)	(0.039)	(0.011)	(0.056)
Country-level inequality in well-being	0.772***			
	(0.245)			
Country-level inequality in income	−0.741*			
	(0.448)			
Observations	1,059,212	1,059,212	1,059,212	1,059,212
Adjusted R^2	0.29	0.06	0.39	0.04
Fixed effects				
Country	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes

All regressions (OLS) include survey weights. Religion and constant not shown. Clustered standard errors at the country-year level in parenthesis. Significance levels: *$p < 0.10$, **$p < 0.05$, ***$p < 0.01$

with respect to a sample of 16 high-developed countries and 18 Latin American countries. They find income inequality has a negative effect on the change in well-being. Further, we find the change in income inequality also increases the change in well-being. Column (3) shows that a larger change in the inequality in well-being increases the change in the level of well-being. Columns (4) to (6) present the results using the change in the inequality of well-being as the dependent variable. Here, we do not find a similar Easterlin paradox, as the change in income significantly negatively affects the change in inequality in well-being. That is, countries growing faster will have lower inequality in well-being. Further, changes in income inequality also reduce the inequality in well-being.

4.2 Micro-Level Evidence

We now turn to the individual-level analysis presented in Table 5. In contrast to our previous, macro-level analysis, we now focus on the determinants of the mean and inequality in well-being, income respectively, as well as differences in the correlates across these two variables.[10]

Column (1) in Table 5 shows the results from estimating the microeconometric well-being function (Eq. 4). Well-being is U-shaped in age, which is in line with the general findings in the well-being literature (see Diener et al., 1999 and Dolan et al., 2008 for overviews of the literature). For example, Blanchflower and Oswald (2004) find this U-shaped relation for the U.S. and the U.K. Our results also show that females are happier than males, which confirms the finding by Frey and Stutzer (1999) for Switzerland (see also Diener et al., 1999 and Alesina et al., 2004). The literature on the drivers of well-being generally find that married people are happier (Diener & Seligman, 2004; Diener et al., 1999). Our results indicate that singles and married people are happier than separated and widowed people. This result aligns with the findings in Frey and Stutzer (1999) or Blanchflower and Oswald (2004). Well-being decreases with number of children. Frey and Stutzer (1999) for Switzerland and Alesina et al. (2004) for the U.S. and 12 European countries find similar results. This result could be related to the finding by Roeters and Gracia (2016) that time spent with children, which presumably increases with the number of children, is associated with stress (especially if they are adolescents).

Health is generally considered to be a key driver of well-being (Diener & Seligman, 2004; Diener et al., 1999). Accordingly, we find that respondents with health problems have lower well-being. Further, people living in urban areas are happier than people living in rural areas. Burger et al. (2020), also using Gallup data, reported similar findings. We also find that the well-being of immigrants is lower than the well-being of natives. This is in line with the literature of migration and (ex post) well-being (see Hendriks, 2015 for an overview). Further, the well-being literature generally finds that people with better social relationships are happier (Diener & Seligman, 2004). Our results show that people who have more trust in friends and family (Oishi et al., 2011) and who feel safe have higher well-being. Further, we find that respondents with secondary and post-secondary education are happier than respondents with only elementary education. This is in line with the findings in the literature, such as Frey and Stutzer (1999) and Blanchflower and Oswald (2004).

[10] Note that in this micro-level analysis, we lose 378,685 observations because of missing observations among the control variables.

The literature generally estimates a linear relationship between income and well-being (e.g., Alesina et al., 2004; Deaton & Stone, 2013; Oishi & Kesebir, 2015; Oishi et al., 2011), but we find that income has a U-shaped relationship with well-being. We also find employed respondents are less happy than unemployed ones. Higher incomes increase well-being (Alesina et al., 2004; Frey & Stutzer, 1999) and we find the opposite of the diminishing returns of income documented in other studies (see Diener & Seligman, 2004 for an overview). This also contradicts the idea that increased material expectations counteract the effect of higher income, such that well-being does not increase.

Finally, several papers in the literature argue that (within-country) inequality in income is a driver of well-being, because people have an inherent distaste for inequality or concerns about fairness (Alesina et al., 2004; Oishi & Kesebir, 2015; Oishi et al., 2011). These papers show that higher income inequality reduces well-being. Our results, however, show that income inequality does not statistically significantly affect well-being (but has a negative coefficient as in the related literature). In contrast, we find that inequality in well-being affects the level of well-being: surprisingly, higher inequality in well-being increases the mean level of well-being. Alesina et al. (2004), Oishi et al. (2011), and Oishi and Kesebir (2015) did not control for inequality in well-being. Goff et al. (2018) found as we did that income inequality is insignificant, but they found that well-being inequality has a negative effect on well-being.

Column (2) of Table 5 shows the results for the driving forces of inequality in well-being (i.e., the conditional variance, Eq. 5). Stevenson and Wolfers (2008b) and Becchetti et al. (2014) are key papers studying the drivers of well-being inequality (technically, the variance in well-being). Stevenson and Wolfers (2008b) directly estimate mean and variance from an ordered probit model for a sample of 46,303 individuals in the U.S. General Social Survey. Becchetti et al. (2014) also estimate the variance of well-being for a sample of 58,899 Germans. In general, they find higher education (college) reduces the variance, while being female increases the variance. Marriage and age both increase the variance. Becchetti et al. (2014) also find that higher income reduces inequality in well-being.

Our results largely confirm these findings. Inequality in well-being and age follow a U-shaped pattern. Inequality also increases in household size (number of adults and children). Higher education reduces inequality, which is also the case for trust, feeling safe, and being a citizen rather than an immigrant. In contrast to Stevenson and Wolfers (2008b), we find that marriage reduces inequality in well-being. Health problems increase inequality but being employed rather than unemployed reduces inequality. Finally, income has an inverted-U shaped relationship with the inequality in well-being.

The results from estimating Eq. (3) using income as dependent variable are shown in column (3). Our analysis of the driving forces of mean income aligns well with the related literature. Well-being is positively correlated with income. This was established as early as Easterlin (1974). Not surprisingly, being employed increases income. We find that mean income shows an inverted-U shaped pattern with age, revealing the standard age profile found in the literature (e.g., Gourinchas & Parker, 2002). More adults in the household, not surprisingly, increase household income. Income decreases with number of children, but the finding is only weakly significant. This could be driven by the adverse effect of children on labor supply, especially of mothers (Attanasio et al., 2008), which would affect income negatively. Our results also show that females earn lower incomes compared to males. This gender gap has been widely documented in the literature (see Blau & Kahn, 2017 for an overview). Single and married individuals have higher incomes than divorced individuals. Further, education increases income. Individuals with secondary and post-secondary education have higher incomes than individuals with only primary education. This, again,

has been established in the labor literature and the life-cycle income literature (e.g., Gourinchas & Parker, 2002). Natives have relatively higher wages than immigrants, which is an established stylized fact in the migration literature (e,g., Boudarbat & Lemieux, 2014). Health and income have been shown to be strongly positively correlated (Case, 2002) and we reveal this relationship by showing that health problems reduce income. Trust, measured by confidence in friends and family, increases with income. This finding is related to Butler et al. (2016) showing that trust affects economic performance. They even find an inverted-U shape relationship between the two variables. Feeling safe positively affects income but the finding is weakly significant. Finally, individuals in rural areas have lower incomes relative to individuals living in cities, a stylized fact in the literature (e.g., Henderson, 2010).

The drivers of income inequality appear in column (4). Income inequality increases along with the number of adults in the household, living in a rural area rather than in an urban area, being employed and having health problems. Further, we find a U-shaped relationship with age. Being single, married increases, decreases the inequality relative to being widowed/divorced respectively. Inequality decreases with being female, a citizen, having higher trust, and higher education. Finally, higher well-being is negatively correlated with income inequality.

Overall, we can draw the following conclusions. For the mean of income and well-being, we find that almost all drivers have identical significant effects. The only differences are found in age, being female, being employed, and the number of adults in the household. Similarly, for inequality we find that most drivers have the same effect on inequality in well-being and income. The differences are in the number of children, being female, living in a rural area, and feeling safe.

The regression results presented here should be interpreted carefully. These regressions likely suffer from omitted variable bias and reverse causality, especially between well-being and income (Diener & Seligman, 2004). Further, our regressions also likely suffer from multicollinearity (where income, well-being respectively affect other control variables). Therefore, one should interpret the estimates as correlations.[11]

5 Conclusion

This paper studies the trends and correlates of well-being and income around the world. We examine the mean and inequality in both variables. We do so by using data from the Gallup World Poll for nine years (2009–2017) and 158 countries (N = 1,437,897). The size of this data set, as well as the detailed questions asked about well-being, income, and a rich set of controls provides a unique opportunity to answer our research questions.

Several findings stand out. At the macro-level, our results show that over the last decade mean levels of income and well-being changed little, but inequality in these variables have increased. We find a very high correlation between the means ($\rho = 0.75$) and a high correlation between the inequality ($\rho = 0.35$) in both variables. In our data, there is no evidence of the Easterlin paradox when we control for income inequality. Further, we show that income growth reduces well-being inequality.

[11] Our results are robust to interacting rural with economic development ranking indicators.

At the micro-level, we find that the drivers of mean and inequality in income and well-being are extremely similar. This mirrors early research on the subject and suggests maximizing these drivers will increase both well-being and income (Pigou 1932; Nordhaus & Tobin, 1973). This seems to belie Layard's (2010) claim that understanding the driving forces of well-being may lead to different policy priorities than understanding the driving forces of income. However, our findings on the relationship between the inequality of income and well-being suggest there is a deep connection between the two variables.

Our results have implications policy implications. Policymakers should consider the lack of a trend in mean income and well-being and the substantial change in their inequality and shift their focus away from policies targeting average levels and focus instead on the distribution of income and well-being. Further, policymakers should focus on the underlying drivers which positively affect income and well-being distributions. These include investments in health, safety (e.g., police and justice system), education, and social capital, as well as developing sound labor market policies. Each of these investments and policy decisions should consider the full distributional impact on income and well-being.

Appendix

See Figs. 6, 7, 8, 9, 10, 11
See Tables 6, 7

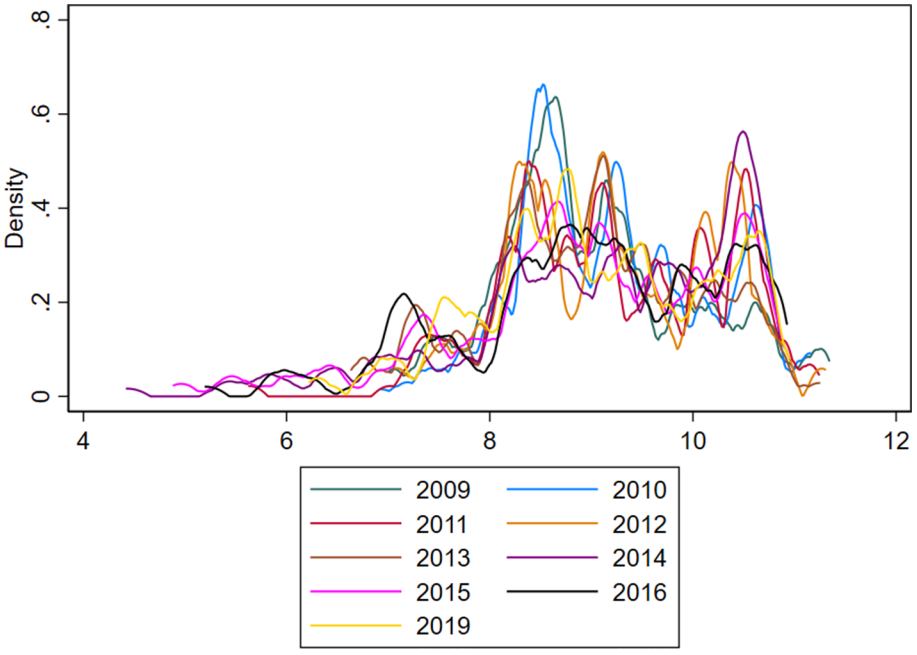

Fig. 6 Kernel density of mean income

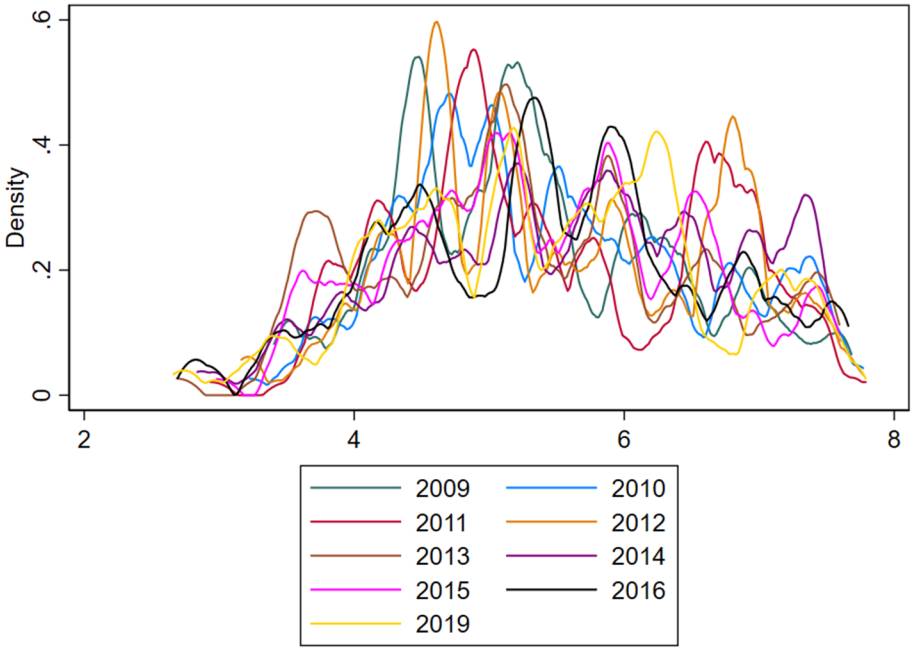

Fig. 7 Kernel density of mean well-being

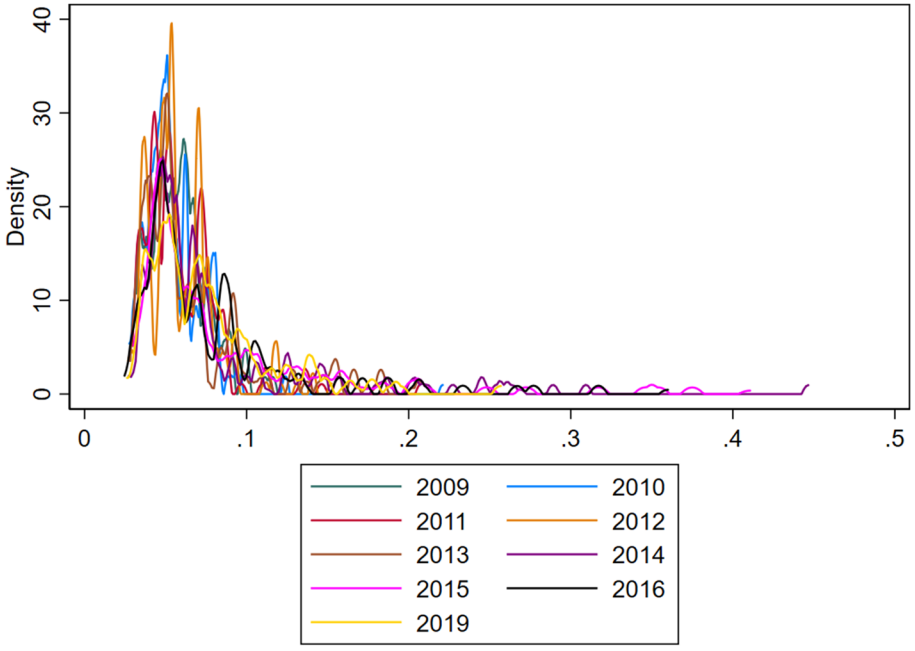

Fig. 8 Kernel density of inequality income

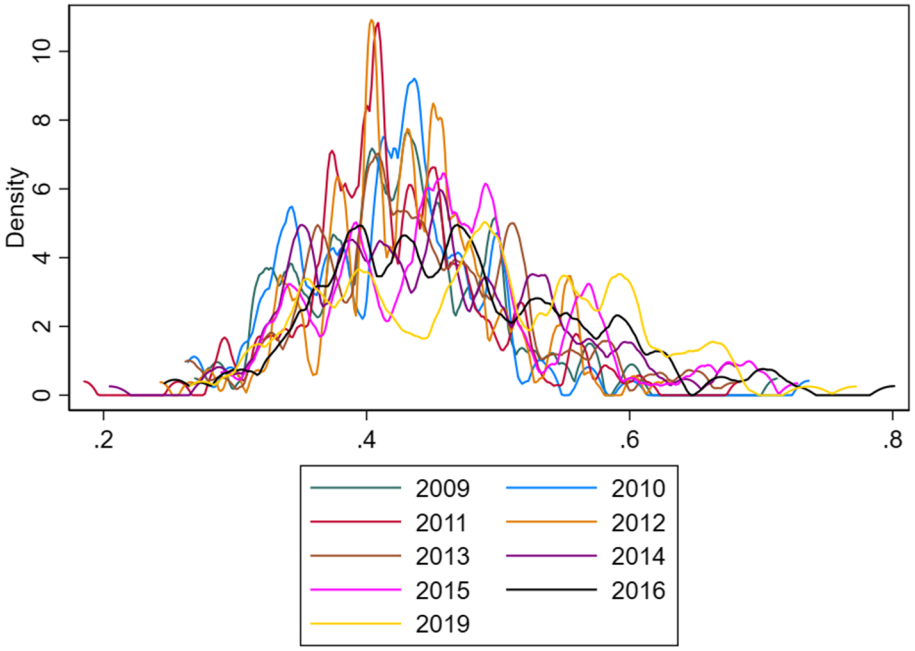

Fig. 9 Kernel density of inequality well-being

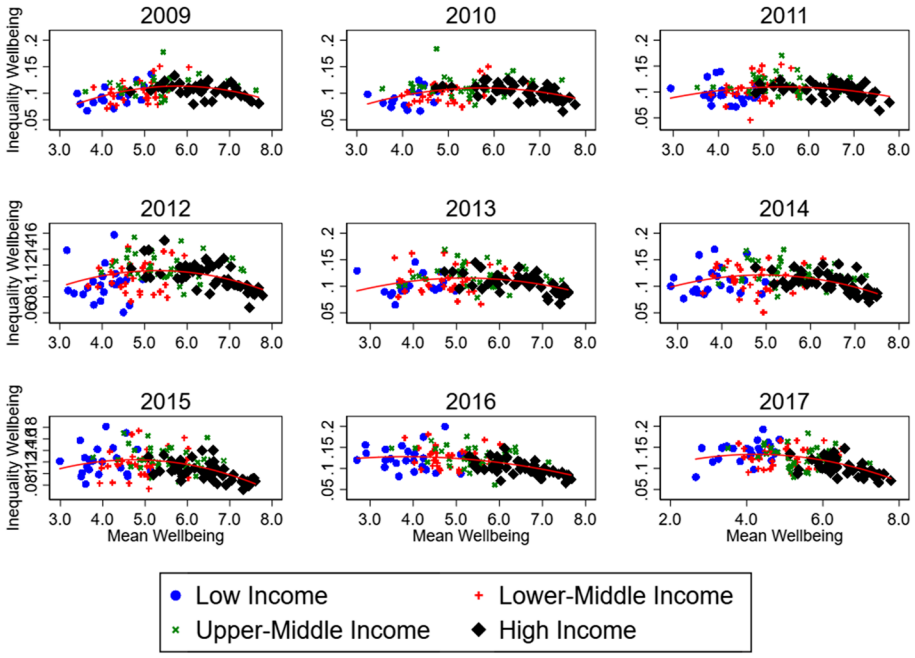

Fig. 10 Kuznets curve well-being—GCI. Notes: Scatterplot of country-level mean well-being (horizontal axis) and inequality in well-being (vertical axis) using the *Generalized Concentration Index* from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

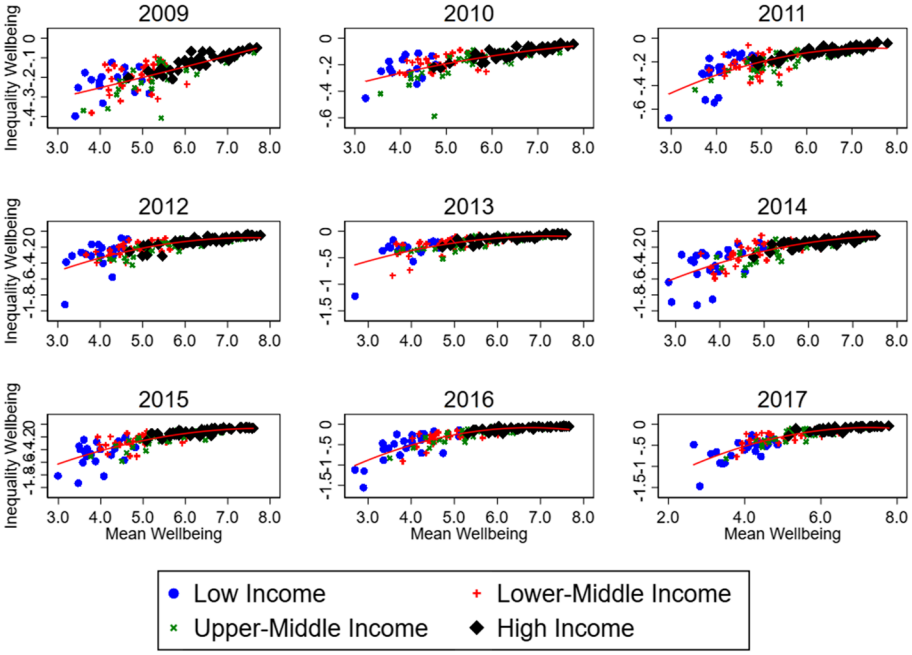

Fig. 11 Kuznets Curve Well-being—PSY. Notes: Scatterplot of country-level mean well-being (horizontal axis) and inequality in well-being (vertical axis) using the *measure by* Permanyer et al. (2018) from 2009 to 2017. Colours and symbols represent World Bank economic development rankings. Quadratic regression shown in red line

Table 6 Descriptive statistics for micro-level controls (N = 1,059,212)

	Mean	Std. dev	Min	Max
Age	40.985	17.452	13	99
Adults	3.011	1.785	0	96
Children	0.536	0.499	0	1
Female	0.538	0.499	0	1
Marital status				
Single	0.286		0	1
Married/partner	0.582		0	1
Separated, widowed, divorced	0.132		0	1
Education				
Elementary	0.344		0	1
Secondary	0.507		0	1
Post-secondary	0.149		0	1
Well-being	5.402	2.330	0	10
Log household income	8.927	1.803	0	20.616
Health problems	0.250	0.433	0	1
Native	0.957	0.202	0	1
Rural	0.596	0.491	0	1
Confidence friends and family	0.805	0.396	0	1
Safety	0.618	0.486	0	1
Employment				
Out-of-workforce	0.381		0	1
Self-employed	0.144		0	1
Employed	0.400		0	1
Unemployed	0.075		0	1

Table 7 Robustness—country-level panel regression results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Generalized Concentration Index				**PSY**			
	Inequality Well−being	Inequality Well−being	Inequality Well−being	Inequality Income	Inequality Well−being	Inequality Well−being	Inequality Well−being	Inequality Income
Income		−0.003 (0.001)	0.006 (0.010)	−0.183*** (0.020)		0.041 (0.074)	−0.033 (0.095)	−0.182*** (0.019)
Income squared		−0.001 (0.001)	−0.001 (0.001)	0.007*** (0.001)		0.001 (0.004)	0.004 (0.005)	0.007*** (0.001)
Well-being	0.034*** (0.007)	0.040*** (0.007)	0.041*** (0.001)	−0.016 (0.010)	0.505*** (0.060)	0.474*** (0.063)	0.469*** (0.062)	−0.007 (0.009)
Well-being squared	−0.004*** (0.001)	−0.004*** (0.001)	−0.004*** (0.001)	0.002** (0.001)	−0.036*** (0.005)	−0.034*** (0.006)	−0.033*** (0.006)	0.001 (0.001)
Income inequality			0.051 (0.033)				−0.402* (0.224)	
Well-being inequality				0.058 (0.037)				−0.016* (0.009)
Observations	1.204	1.204	1.204	1.204	1,204	1.204	1.204	1.204
Adjusted R^2	0.67	0.70	0.70	0.92	0.82	0.83	0.84	0.92
Fixed effects								
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Columns (1) to (4) use Generalized Concentration Index to measure inequality in well-being and columns (5) to (8) use the measure by Permanyer et al. (2018). Observations counted at the country-year level. Regressions account for within-country survey weights. Constant not shown. Clustered standard errors at the country-year level in parenthesis. Significance levels: *: $p < 0.10$, **: $p < 0.05$, ***: $p < 0.01$

Acknowledgements We would like to thank Arthur Grimes and Kirsten Jensen for comments and feedback.

Funding Open Access funding enabled and organized by CAUL and its Member Institutions. No funding was received for conducting this study.

Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

References

Alesina, A., Di Tella, R., & MacCulloch, R. (2004). Inequality and happiness: Are Europeans and Americans different? *Journal of Public Economics, 88*(9–10), 2009–2042.

Attanasio, O., Low, H., & Sanchez-Marcos, V. (2008). Explaining changes in female labour supply in a life-cycle model. *American Economic Review, 98*(4), 1517–1552.

Austin, A. (2016). On well-being and public policy: Are we capable of questioning the hegemony of happiness? *Social Indicators Research, 127*, 123–138.

Becchetti, L., Massari, R., & Naticchioni, P. (2014). The drivers of happiness inequality: Suggestions for promoting social cohesion. *Oxford Economic Papers, 66*(2), 419–442.

Berg, M. & Veenhoven, R. (2010). Income inequality and happiness in 119 nations: In *search for an optimum that does not appear to exist. In Happiness and social policy in Europe*. Edward Elgar Publishing.

Blanchflower, D. G., & Oswald, A. J. (2004). Well-being over time in Britain and the USA. *Journal of Public Economics, 88*(7–8), 1359–1386.

Blau, F. D., & Kahn, L. (2017). The gender wage gap: Extent, trends, and explanations. *Journal of Economic Literature, 55*(3), 789–865.

Boudarbat, B., & Lemieux, T. (2014). Why are the relative wages of immigrants declining? *A Distributional Approach ILR Review, 67*(4), 1127–1165.

Burger, M., Morrison, P. S., Hendricks, M., & Hoogerbrugge, M. (2020). Urban-rural happiness differentials across the world. In J. Helliwell (Ed.), *World Happiness Report.* London.

Butler, J. V., Giuliano, P., & Guiso, L. (2016). The right amount of trust. *Journal of the European Economic Association, 14*(5), 1155–1180.

Case, A. (2002). Health, income and economic development. In *Proceedings of the World Bank Conference on Development Economics*, pp. 221–241.

Deaton, A. (2008). Income, health, and well-being around the world: Evidence from the gallup world poll. *Journal of Economic Perspectives, 22*(2), 53–72.

Deaton, A., & Stone, A. (2013). Economic analysis of subjective well-being. *American Economic Review: Papers & Proceedings, 103*(3), 591–597.

Delhey, J., & Kohler, U. (2011). Is happiness inequality immune to income inequality? New evidence through instrument-effect-corrected standard deviations. *Social Science Research, 40*(3), 742–756.

Diener, E. (1984). Subjective well-being. *Psychological Bulletin, 95*(3), 542–575.

Diener, E., & Seligman, M. E. P. (2004). Beyond money: Toward an economy of well-Being. *Psychological Science in the Public Interest, 5*(1), 1–31.

Diener, E., Suh, E. M., Lucas, R. E., & Smith, H. L. (1999). Subjective well-being: Three decades of progress. *Psychological Bulletin, 125*(2), 276–302.

Dolan, P., & White, M. (2007). How can measures of subjective well-being be used to inform public policy? *Perspectives on Psychological Science, 2*(1), 71–85.

Dolan, P., Peasgood, T., & White, M. (2008). Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology, 29*(1), 94–122.

Easterlin, R. A. (1974). Does economic growth improve the human lot Some empirical evidence. In P. David & W. Melvin (Eds.), *Nations and Households in Economic Growth* (pp. 89–125). Palo Alto: Stanford University Press.
Easterlin, R. A. (2013). Happiness, growth, and public policy. *Economic Inquiry, 51*, 1–15.
Erreygers, G. (2009). Correcting the concentration index. *Journal of Health Economics, 28*, 504–515.
Erreygers, G., & Van Ourti, T. (2011). Measuring socioeconomic inequality in health, health care and health financing by means of rank-dependent indices: A recipe for good practice. *Journal of Health Economics, 30*, 685–694.
Erreygers, G., Clarke, P., & Van Ourti, T. (2012). Mirror, mirror, on the wall, who in this land is fairest of all? Distributional sensitivity in the measurement of socioeconomic inequality of health. *Journal of Health Economics, 31*, 257–270.
Fahey, T., & Smyth, E. (2004). Do subjective indicators measure welfare? Evidence from 33 European societies. *European Societies, 6*(1), 5–27.
Ferrer-i-Carbonell, A., & Frijters, P. (2004). How important is methodology for the estimates of the determinants of happiness? *Economic Journal, 114*, 641–659.
Frey, B. S., & Stutzer, A. (1999). Measuring preferences by subjective well-being. *Journal of Institutional and Theoretical Economics, 155*(4), 755–778.
Frey, B. S., & Stutzer, A. (2000). Happiness, economy and institutions. *Economic Journal, 110*, 918–938.
Frey, B. S., & Stutzer, A. (2002). What can economists learn from happiness research? *Journal of Economic Literature, 40*(2), 402–435.
Gallup, I. (2016). *Worldwide research methodology and codebook*. Gallup Inc.
Goff, L., Helliwell, J. F., & Mayraz, G. (2018). Inequality of subjective well-being as a comprehensive measure of inequality. *Economic Inquiry, 56*, 2177–2194.
Gourinchas, P.-O., & Parker, J. A. (2002). Consumption over the life cycle. *Econometrica, 70*, 47–89.
Helliwell, J. (2021). Measuring and Using Happiness to Support Public Policies. In M. T. Lee, L. D. Kubzansky, & T. J. Van der Weele (Eds.), *Measuring Well-Being: Interdisciplinary Perspectives from the Social Sciences and the Humanities.* New York City: Oxford Univ. Press.
Henderson, J. V. (2010). Cities and development. *Journal of Regional Science, 50*, 515–540.
Hendriks, M. (2015). The happiness of international migrants: A review of research findings. *Migration Studies, 3*(3), 343–369.
Just, R. E., & Pope, R. D. (1978). Stochastic specification of production functions and economic implications. *Journal of Econometrics, 7*, 67–86.
Layard, R. (2010). Measuring subjective well-being. *Science, 327*, 534–535.
Margolis, S., Schwizgebel, E., Ozer, D. J., & Lzubomirsky, S. (2021). Empirical Relationships Among Five Types of Well-Being. In M. T. Lee, L. D. Kubzansky, & T. J. VanderWeele (Eds.), *Measuring Well-Being: Interdisciplinary Perspectives from the Social Sciences and the Humanities.* New York City: Oxford Univ. Press.
Nordhaus, W. D., & Tobin, J. (1973). Is Growth Obsolete? In M. Moss (Ed.), *The Measurement of Economic and Social Performance* (pp. 509–564). NBER.
Oishi, S., & Kesebir, S. (2015). Income inequality explains why economic growth does not always translate to an increase in happiness. *Psychological Science, 26*(10), 1630–1638.
Oishi, S., Kesebir, S., & Diener, E. (2011). Income inequality and happiness. *Psychological Science, 22*(9), 1095–1100.
Permanyer, I., Seth, S., and Yalonetzky, G. (2018). Inequality measurement for bounded variables. 14th Mtg Society for Social Choice and Welfare, Seoul, Korea.
Roeters, A., & Gracia, P. (2016). Child care time, parents' well-being, and gender: Evidence from the American time use survey. *Journal of Child and Family Studies, 25*, 2469–2479.
Stevenson, B. & Wolfers, J. (2008a). Economic growth and subjective well-being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity*, pp. 1–87.
Stevenson, B., & Wolfers, J. (2008b). Happiness inequality in the United States. *Journal of Legal Studies, 37*(S2), S33–S79.
Stiglitz, J. E., Sen, A., & Fitoussi, J.-P. (2009). Report by the commission on the measurement of economic performance and social progress.
UNDP. (1990). Human Development Report 1990: Concept and measurement of human development. New York. http://www.hdr.undp.org/en/reports/global/hdr1990.
Veenhoven, R. (2005). Return of inequality in modern society? Test by dispersion of life-satisfaction across time and nations. *Journal of Happiness Studies, 6*(4), 457–487.
Wesselbaum, D., & Aburn, A. (2019). Gone with the wind: International migration. *Global and Planetary Change, 178*, 96–109.

Wesselbaum, D., Smith, M. D., Barrett, C. B., & Aiyar, A. (2023). A food insecurity Kuznets curve? *World Development, 65*, 106189.
Zhang, P. (2022). Happiness inequality has a Kuznets-style relation with economic growth in China. *Scientific Reports, 12*(1), 1–9.