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THE WELFARE COSTS OF WELL-BEING INEQUALITY

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ABSTRACT

If welfare is measured using satisfaction with life (SWL), its variance is a natural measure of inequality that incorporates all the determinants of well-being with the same weights that determine welfare itself. In this paper we explore this possibility empirically in three different ways. First we show that inequality of subjective well-being has a negative effect on life satisfaction considerably greater than does income inequality. Second, we show that this comparative result is stronger for those who report themselves as valuing equality. Finally we show that social trust, which has been shown to support subjective well-being both directly and indirectly, is more fully explained by well-being inequality than by income inequality.

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1 Introduction

Inequality has recently been the object of a great deal of public attention. Much of the focus is on income inequality, but there is also discussion of inequality in wealth (Piketty, 2014) and in other domains, such as health outcomes, education, the criminal justice system, marriage, and access to supportive social networks (Neal & Rick, 2014; Wang & Parker, 2014; Case & Deaton, 2015). Surveys show that a majority of people around the world see inequality as a major problem (Wike, Simmons, & Oates, 2014). Is their concern justified?

Economic theory tells us that inequality can potentially affect people both *directly* (if they have social preferences) and *indirectly* (if inequality has consequences they care about). Some degree of inequality is necessary for the market system to function, but inequality also has undesirable consequences.[1] Economic theory on social preferences mostly assumes that people are inequity averse (Fehr & Schmidt, 1999; Bolton & Ockenfels, 2000), but there are also models of competitive preferences, in which the net effect of inequality is ambiguous.[2] This complexity makes it difficult to interpret surveys in which people are asked about their attitude towards inequality. People tell us that they dislike inequality, but we cannot be certain that they fully understand the complex web of consequences that follow from it. The same problem applies to choice data, with the added complication that it may not even be possible to obtain choice data on societal level inequality.

Addressing these challenges requires empirically useful measures for both welfare and inequality. Our welfare measure is based on people's *ex-post* utility or satisfaction with life (SWL).[3] Let u_j denote the SWL utility function of person j. We assume that the u_j's are cardinal and that SWL values are reported in an interpersonally comparable way, making it possible to normalize different people's utility functions to a common scale.[4] Let $h_j^* = u_j(L_j^*)$

[1] For example, Deaton (2013) argues that recent increases in inequality undermine democracy.

[2] Luttmer (2005) considers a model of relative consumption: $U(C, C/\bar{C})$ where people who consume more than others are made better off by the social comparison, potentially balancing out the negative effect on those for whom $C < \bar{C}$.

[3] SWL has been used as the welfare measure in many recent papers, such as Luttmer (2005), Van Praag and Baarsma (2005), Di Tella and MacCulloch (2006), Frey, Luechinger, and Stutzer (2007), Clark, Frijters, and Shields (2008), and Layard, Mayraz, and Nickell (2008). Deaton (2010) advocates its use in measuring international differences in poverty. Economists are used to think of utility over "consumption bundles" rather than "lives", but the two terms coincide when choices are considered in the context of a person's entire lifetime consumption, as normative economic theory demands.

[4] As Harsanyi (1955) writes, "There is no doubt about the fact that people do make,

denote j's satisfaction with her actual life L_j^*. Overall welfare is represented by mean SWL: $\mu^* = \frac{1}{N}\sum h_j^*$.[5] People report their SWL on a numerical range, such as 0 to 10. In the main analysis we use these reports directly as the dependent variable in our regressions. We then extend this analysis to consider alternative assumptions.

Our second problem is finding a good proxy for inequality. Income is sometimes used in economic theory as a proxy for consumption. Unfortunately, the income that is available in surveys is current income, which can be a poor stand-in for the theoretically relevant permanent income. More fundamentally, even permanent income can only usefully proxy for tradable goods, and many of "goods" people care most about are things like health, love, friendship, and trust, which cannot simply be bought for money.[6]

What is required is a cardinal measure that takes account of all the different aspects of life that people care about with the weights that they ascribe to them. We already have such a measure: the SWL utility u_j. The proposal we test in this paper is to use its standard deviation as our measure of inequality.[7] A high inequality society, therefore, is one in which there are many people who achieve a life they rate very highly, and many others who are stuck in a life they are very much dissatisfied with. This could be because the former are rich, and the latter poor, but it could also be for any number of other reasons. We do not seek to impose any preconceived ideas on how people judge their own lives, or those of their fellow citizens.

The few existing studies of SWL inequality mostly treat it as a secondary outcome variable to complement the study of average SWL (Stevenson & Wolfers, 2008; Dutta & Foster, 2013; Clark, Flèche, & Senik, 2015; Jordá, López-Noval, & Sarabia, 2015). These studies note trends in both average SWL and SWL inequality, but do not try to link them systematically. The major exceptions are Ott (2005) and Bolle, Okhrin, and Vogel (2009). Ott (2005) uses the World Values Survey to correlate life satisfaction means and

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or at least attempt to make, interpersonal comparisons of utility, both in the sense of comparing different persons' total satisfaction and in the sense of comparing increments and decrements in different persons' satisfaction. The problem is only what logical basis, if any, there is for such comparisons." In this paper we simply take it for granted that people are not laboring under a mass delusion when they engage in interpersonal comparisons.

[5] Following Harsanyi (1953), μ^* is also the expected *ex-post* utility satisfaction with life of a hypothetical person who has an equal chance of ending up as each of the people in that society, using that person's utility function to evaluate that person's life.

[6] This is not to deny, of course, that the rich often enjoy an advantage even in non-tradable goods.

[7] Section 3.1 explains why we chose the standard deviation, rather than some other measure of dispersion.

standard deviations across 78 countries, finding a strong negative correlation between the two. Bolle et al. (2009) combine the Becker (1974) model of interdependent utility with the Fehr and Schmidt (1999) model of inequity aversion to create a version of Fehr and Schmidt (1999) preferences with reported happiness instead of earnings. They use the World Database of Happiness[8] to estimate the model for 71 countries in 1999-2000.

We examine the relationship between SWL and SWL inequality in a number of different surveys: the World Values Survey, the European Social Survey, the Gallup World Poll, and the Gallup-Healthways Well-Being Index (comparing U.S. states). Taken together, these surveys include over 160 countries and (for some of these countries) survey waves from 1990 to 2015.

We estimate individual level regressions with clusters defined by the combination of country/wave (state/wave in the Gallup-Healthways Well-Being Index). We start with simple regressions, replicating the Ott (2005) and Bolle et al. (2009) finding of a strong and strongly statistically significant negative relationship between SWL and SWL inequality in all the surveys we use. Higher SWL inequality is consistently associated with substantially lower SWL.

We continue our analysis by adding region dummies, personal controls, and log GDP per capita (in PPP terms). SWL inequality is correlated with log GDP per capita, and adding these controls reduces the magnitude of the coefficient on SWL inequality. Nevertheless, the coefficient on SWL inequality remains strongly statistically significant in all the surveys, and is substantially larger (in both explanatory power and statistical significance) than the coefficient on the Gini coefficient of income in a comparable regression in which the Gini coefficient replaces SWL inequality. Moreover, including the Gini coefficient of income in the same regression as SWL income makes no difference to the coefficient on SWL inequality, but does affect the partial correlation with the Gini coefficient.

In order to get a sense of the size of the estimated coefficients, it is useful to consider the magnitude of changes associated with a one point increase in SWL. While the exact coefficients vary between the surveys, a one point change in SWL on a 0-10 scale is associated either with a tripling of GDP per capita, or with a one point decrease in the standard deviation of SWL. As an example, New Zealand's GDP per capita is about 35% lower than in the United States, and SWL inequality is about 0.3 points less. According to the estimated coefficients, these two differences are roughly equivalent.

The regression coefficient on SWL inequality captures both the direct

[8] http://worlddatabaseofhappiness.eur.nl/

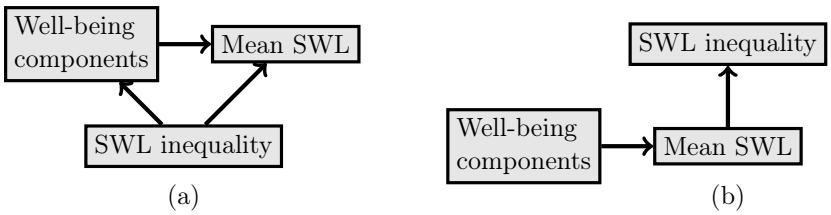

Figure 1: SWL and SWL inequality. Panel (a) depicts the proposed causal relationship between SWL and SWL inequality. SWL inequality affects SWL *directly* (through social preferences) and *indirectly*, by affecting other determinants of well-being, such as social trust and fear of crime. Panel (b) depicts the spurious correlation interpretation. High levels of SWL lead to a compression of the SWL distribution, resulting in a spurious correlation between SWL and SWL inequality. Since well-being components are correlated with SWL, there is also a secondary correlation between SWL components and SWL inequality. However, this secondary correlation is entirely mediated by mean SWL, and its strength depends on the degree to which SWL is dependent on the relevant well-being component.

and indirect effect of SWL inequality on SWL (Figure 1a). It is also possible, however, that part of the correlation is mechanical: the distribution of reported SWL may be compressed in countries with particularly high SWL, either because SWL itself is bounded (you cannot be more than 'extremely satisfied') or because SWL reports are bounded (you cannot report higher satisfaction levels). These two possibilities can be summarized by a possible causal link from a high level of mean SWL to a lower level of reported SWL inequality (Figure 1b).

We explore several routes for testing these two interpretations. Our first test exploits questions in the World Values Survey and the European Social Survey that ask respondents whether they think income differences should be reduced. We take this question as a measure of inequity aversion, and test whether the correlation between these individuals' SWL and SWL inequality is stronger than that of other people. This indeed proves to be the case, consistent with the causal interpretation.

Our second test explores the relationship between SWL inequality and SWL components that can be expected to be affected by inequality. If SWL inequality captures the causal effect of inequality (Figure 1a) we would expect a strong correlation that is not significantly affected by adding mean SWL as a regressor. If, however, the correlation is non-causal (Figure 1b) we would

expect a relatively weak correlation that more or less disappears if mean SWL is included in the regression.

The first well-being component we examine is social trust, which is available in three of the surveys we use, has been found to be a strong support for SWL, both directly (Helliwell & Putnam, 2004; Helliwell & Wang, 2011) and through its effects on the growth of incomes (Knack & Keefer, 1997), and has been found in turn to be correlated with income inequality (Bjørnskov, 2007; Rothstein & Uslaner, 2005). We find that SWL inequality is more strongly related to social trust than is income inequality, and that the coefficient on SWL inequality is barely changed if mean SWL is added to the regression. In the Gallup World Poll we examine recent feelings of worry and stress, and whether the respondent feels safe walking alone. Again we find strong correlations with SWL inequality in the expected direction (more worry, stress, and fear of walking alone), and only a small decline in the coefficient when mean SWL is added as a regressor.

Our main analysis assumes no distortion in the mapping between *ex-post* SWL utility and SWL reports. It is unfortunately not possible to relax this assumption without making alternative assumptions on the underlying distribution of SWL in each cluster. We test a normal and a logistic distribution, with the latter producing a somewhat better fit in all surveys. Estimating the mean and variance separately in each cluster, we use the estimated distributions to repeat our regressions from the main analysis. This results in a somewhat lower correlation between SWL and SWL inequality, but the reduction is not large.

2 Data

Section 2.1 describes the surveys we use. Section 2.2 describes our sources for GDP and income inequality data.

2.1 Satisfaction with life surveys

We use data from four surveys: the World Values Survey, the European Social Survey, the Gallup World Poll, and the Gallup-Healthways Well-Being Index. Table 1 summarizes key statistics about these surveys. The sections below provide additional detail.

European Social Survey

The European Social Survey[9] includes Israel and 36 European countries. We use waves 1-7 with data from 2006 to 2015 with a total of 303,385 individual SWL observations.[10] The SWL variable is life satisfaction (`stflife`), which is recorded on a 0-10 scale, with end points labeled *Extremely dissatisfied* and *Extremely satisfied*. Clusters are defined by the combination of country (`cntry`) and wave (`essround`). The interview year (`inwyye`, `inwyr`, `inwyys`, and `supqyr`) is used for matching with macro variables. Personal controls include gender (`gndr`), age (`age` and `agea`), education (`edulvla` and `eisced` values recoded into the `edulvla` range), marital status (`marital`, `marsts`, `maritala`, and `maritalb`), and unemployment (`unemp3m` and `unempla`). We use post-stratification weights (`pspwght`) for weighting, except in wave 7 when only design weights (`dweight`) are available. We use the variable `gincdif` as measuring a preference for equality. Subjects were asked to record their agreement or disagreement to the following statement: *"The government should take measures to reduce differences in income levels"*. Answers were originally on a 5 level scale ranging from *Agree strongly* to *Disagree strongly*, which we invert to a -2 to $+2$ range, with $+2$ denoting strong agreement. The trust variable `ppltrst` is a 0-10 variable with endpoints labeled *You can't be too careful* and *Most people can be trusted*.

World Values Survey

The World Values Survey[11] includes data from 98 countries. We use waves 1-6 with data from 1981 to 2014 with a total of 314,903 individual SWL observations.[12] The SWL variable we use is life satisfaction (`A170`) reported on a 1-10 scale with endpoints labeled *Dissatisfied* and *Satisfied*. Clusters are defined by the combination of country (`S003`) and wave (`S002`). The interview year (`S020`) is used for matching with macro variables. Personal controls include gender (`X001`), age (`X003`), education (`X025`) and marital status (`X007`). Weights are given by `S017`. The variable `E035` codes a preference for equality. Subjects were asked to report their view on a 1 to 10 scale with 1 labeled "Incomes should be made more equal" and 10 labeled "We need larger income differences as incentives for individual effort". We inverted this scale, so that higher values denote a preference for equality.

[9] http://www.europeansocialsurvey.org

[10] We used the integrated file: `WVS_Longitudinal_1981_2014_stata_v2015_04_18`.

[11] http://www.worldvaluessurvey.org

[12] We drop data from Egypt in 2001, and India in 2001 and 2006, as these particular surveys did not use the full SWL range.

Finally, the trust variable A165 is a binary question, asking people whether "Most people can be trusted" or "you can't be too careful". We recode it so that a positive value denotes agreement with "Most people can be trusted".

Gallup World Poll

The Gallup World Poll[13] includes data from over 160 countries. We used the December 2014 version of the dataset, which includes data for every year from 2008 to 2014, and about 1.34 million individual observations. The SWL variable is the Cantril Ladder of Life (WP16) recorded on a 0-10 scale with end points labeled "Worst possible life for you" and "Best possible life for you". Clusters are defined by the combination of country code (ccode) and the interview year (YEAR_CALENDAR). Personal controls include gender (WP1219), age (WP1220), and marital status (WP1223). We use wgt for weighting observations. As in the World Values Survey, the trust variable WP9039 is binary, asking whether "most people can be trusted" or "you have to be careful in dealing with people". We recoded answers so that a positive value denotes agreement with "most people can be trusted". The emotions data we use includes the following variables: WP60 (well-rested), WP67 (enjoyment), WP69 (worry), WP70 (sadness), WP71 (stress), WP74 (anger), and WP6878 (happiness). These are all binary questions, asking whether the respondent experienced that particular emotion in the previous 24 hours.

Gallup-Healthways Well-Being Index

Gallup-Healthways Well-Being Index[14] includes data from the United States with enough observations for useful statistics at the state level. We use the May 2012 version of the dataset, which includes data for every year from 2008 to 2011 and a total of 1.4 million individual SWL observations. The subjective well-being variable is the Cantril Ladder of Life recorded on a 0-10 scale. Clusters are defined by the combination of state (zipstate) and the interview year (obtained from the interview date, int_date). Personal controls include gender (sc7), age (age), marital status (wp1223) and education (d4). We use weight for weighting observations.

[13] http://www.gallup.com/services/170945/world-poll.aspx
[14] http://www.well-beingindex.com

2.2 Supporting macro data

We use the World Bank's World Development Indicators[15] as our primary source for GDP per capita and income inequality data in different countries. GDP per capita is in constant prices adjusted for purchasing power parity. Income inequality is measured using the Gini coefficient. We interpolate data linearly using the closet data points when there are gaps (this is a particular problem with income inequality). We use the most recently available data when recent data is not yet available (this happens often with 2014 and 2015 data). At the opposite end, the World Bank data we use starts at 1990, and some World Values Survey observations are for earlier years. We use comparable GDP data from version 8.1 of the Penn World Tables[16] to fill in the missing years. For missing Gini data we use the data from the closest year for which we have data. For the Gallup-Healthways Well-Being Index we need state level data in the United States . We use the U.S. Census Bureau's American Community Survey for Gini coefficients,[17] and the Bureau of Economic Analysis for GDP.[18]

3 Empirical Strategy

3.1 Principles

The hypotheses we wish to test are (1) that SWL inequality is a good proxy for the effect of inequality on well-being, and (2) that it is a *better* proxy than is income inequality. In order to test these hypotheses we assume throughout that the effect of inequality on well-being is negative. Our general predictions, therefore, are that SWL is negatively correlated with SWL inequality, and that this correlation is more negative than the correlation between SWL and income inequality.

SWL inequality, income inequality, and log GDP per capita are measured in clusters, defined by the combination of geographic unit (country or state) and time (survey wave or year). In order to control for individual determinants of SWL, as well as cluster level factors, we estimate individual level regressions with standard errors corrected for clustering. Observations with ambiguous values (e.g. "no answer", "don't know") are treated as missing.

We use the Gini coefficient of income as our measure of income inequality,

[15] http://data.worldbank.org/data-catalog/world-development-indicators
[16] https://pwt.sas.upenn.edu/
[17] https://www.census.gov/programs-surveys/acs
[18] http://www.bea.gov/

and the standard deviation of SWL as our measure of SWL inequality. We use the standard deviation rather than the Gini or coefficient of variation of well-being (which is highly correlated with the Gini of well-being) for two reasons. First, to compare the SD of well-being with the Gini of income is a natural pairing because the empirically preferred functional form for income in well-being equations is in log terms. Second, since the coefficient of variation is the standard deviation divided by the mean, it has a much higher negative correlation with mean well-being, and is thus more open to the risks of non-causal linkages. Since we are unsure in any event whether the factors that shift the well-being distribution from one country to another will alter the mean and the standard deviation to the same extent, we prefer to make the conservative choice by measuring well-being inequality by the standard deviation. It is the more conservative approach because whatever negative relation we find between the SD and the mean level of well-being would be larger and more significant if we used the Gini or the coefficient of variation of well-being instead.

3.2 SWL and SWL inequality

In order to get a first handle on the relationship between SWL and SWL inequality we start with a basic regression model:

$$h_{ij} = \alpha + \beta_\sigma \sigma_i + \epsilon_{ij} \tag{1}$$

where h_{ij} denotes the reported SWL of person j in cluster i, and σ_i denotes the standard deviation of SWL in this cluster. In the World Values Survey and Gallup World Poll we also add region dummies in order to control for between region differences in SWL levels.[19]

In order to test the extent to which SWL inequality merely reflects the impact of other factors, we then add the cluster's GDP per capita (in purchasing power parity terms), Y_i, as well as personal controls x_{ijk}:

$$h_{ij} = \alpha + \beta_\sigma \sigma_i + \beta_Y Y_i + \sum_k \gamma_k x_{ijk} + \epsilon_{ij} \tag{2}$$

We also estimate a similar regression for income inequality, with the Gini coefficient of income, g_i, replacing σ_i. Both measures of inequality are then compared directly in a combined regression:

$$h_{ij} = \alpha + \beta_\sigma \sigma_i + \beta_g g_i + \beta_Y Y_i + \sum_k \gamma_k x_{ijk} + \epsilon_{ij} \tag{3}$$

[19] Regions include: (i) the West (Europe, North America, and Oceania), (ii) Latin America, (iii) Asia, (iv) Middle East and North Africa, and (v) Sub-Saharan Africa.

Our primary hypothesis is that SWL is negatively correlated with SWL inequality: $\beta_\sigma < 0$ in Equations 1–3. Our secondary hypothesis is that the correlation with income inequality is weaker: $\beta_\sigma < \beta_g$ in Equation 3.

In two of the surveys we use: the World Values Survey and the European Social Survey, there is a question that asks respondents whether they think inequality should be reduced. If SWL inequality has a causal effect on SWL, we would expect the SWL of respondents who agree that inequality should be reduced to be more closely linked to SWL inequality in their cluster than the SWL of other respondents. We estimate the following equation, where e_{ij} denotes person's i level of agreement that inequality should be reduced:

$$h_{ij} = \alpha + \beta_\sigma \sigma_i + \beta_g g_i + \beta_e e_{ij} + \beta_{e\sigma} e_{ij} \sigma_i + \beta_{eg} e_{ij} g_{i+} \beta_Y Y_i + \sum_k \gamma_k x_{ijk} + \epsilon_{ij} \quad (4)$$

Our interest in this equation is in the interaction terms $\beta_{e\sigma}$ and β_{eg}. Our hypotheses are (i) $\beta_{e\sigma} < 0$, and (ii) $\beta_{e\sigma} < \beta_{eg}$.

In the final regression model for SWL we add country or state dummies to control for all time invariant between cluster differences. If SWL inequality has a causal effect on SWL, we would expect changes in SWL to be correlated with changes in SWL inequality.

3.3 Social trust and other well-being components

While our main focus is the relationship between SWL and SWL inequality, we also look at the relationship between SWL inequality and such well-being components as social trust that we expect to be affected by inequality. For a well-being component w_{ij} we estimate the following two regressions:

$$w_{ij} = \alpha + \beta_\sigma \sigma_i + \beta_Y Y_i + \sum_k \gamma_k x_{ijk} + \epsilon_{ij} \quad (5)$$

and

$$w_{ij} = \alpha' + \beta_\mu \mu_i + \beta'_\sigma \sigma_i + \beta'_Y Y_i + \sum_k \gamma'_k x_{ijk} + \epsilon'_{ij} \quad (6)$$

where μ_i denotes the mean SWL level in cluster i. These regressions offer an additional test to our assumption that SWL inequality is a good proxy for inequality more generally, and a test for the possibility that the correlation between SWL and SWL inequality is merely a mechanical consequence of high SWL causing a compression of the distribution of reported SWL (Figure 1):

If inequality captures the causal effect of inequality on well-being, we would expect the correlation coefficient β_σ to be strong, and certainly negative (its magnitude should depend on the degree to which w_{ij} is affected by inequality). Since μ_i is expected to be positively correlated with w_{ij}, we would expect the correlation with SWL inequality to weaken (as should the correlation with other regressors, such as Y_i). However, since the correlation between w_{ij} and μ_i is only moderate, β'_σ should still be negative. These predictions can be summarized as follows:

$$\beta_\sigma \leq \beta'_\sigma < 0. \tag{7}$$

If, however, it is high SWL that causes a drop in SWL inequality (Figure 1b), any correlation between w_{ij} and σ_i should be mediated entirely by μ_i. Since μ_i is only moderately correlated with w_{ij}, β_σ should be small in magnitude, but the key prediction is that the correlation should disappear when μ_i is added to the regression:

$$\beta_\sigma < \beta'_\sigma \approx 0. \tag{8}$$

The social trust survey questions have been validated by correlating answers on with cross-country differences in the frequency with which experimentally dropped wallets were returned (Knack & Keefer, 1997). Responses are available as a 0-10 numeric variable in the European Social Survey (ESS), and as a binary variable in the World Values Survey (WVS) and Gallup World Poll (GWP). There is no trust question in the Gallup-Healthways Well-Being Index. In ESS we estimate linear regressions using OLS. In WVS and GWP we estimate a logit regression.

The other well-being components we use are yes/no questions on worry and stress in the previous day, and a question on whether the respondent feels safe walking alone. Unfortunately, these questions are only available in the Gallup World Poll. Since these are yes/no questions we use logit regressions.

3.4 The SWL reporting function

The bounded scale of SWL reports has the potential of distorting the correlation between SWL and SWL inequality. If the right tail of the SWL distribution extends beyond the upper reporting bound, SWL values in that tail would be reported with a downward bias. This would create a downward bias in both mean SWL and the standard deviation of SWL, with an ambiguous effect on their correlation. The restriction of SWL reports to whole numbers is another source of distortion.

For the purpose of this paper, the most important question is whether distortions due to the reporting function could be responsible for the observed correlation between SWL and SWL inequality. Section 3.3 describes one test of this possibility.[20] The test in this section is entirely different. We use maximum likelihood to estimate a model where the distribution of SWL in each cluster is logistic. The likelihood is estimated on the assumption that SWL values are reported as the closest integer in the reporting range. After estimating the mean μ_i^* and standard deviation σ_i^* in each cluster i, we estimate an analogue of Equation 2,

$$\bar{h}_{ij}^* = \alpha^* + \beta_\sigma^* \sigma_i^* + \beta_Y^* Y_i + \sum_k \gamma_k^* x_{ijk} + \epsilon_{ij}^*, \tag{9}$$

where $\bar{h}_{ij}^*$ is the expected value in the distribution of SWL values that are consistent with the SWL report h_{ij}.[21] The null hypothesis is that β_σ^* is zero.

4 Results

4.1 SWL and SWL inequality

The results for SWL and SWL inequality are described separately for each of the four surveys. Section 3.2 describes the regression models. Results are qualitatively similar in all four surveys: SWL inequality is negatively correlated with SWL, and the correlation remains strongly significant when controls are added, and also when income inequality is added to the same regression. The correlation with income inequality is consistently weaker. In the two surveys in which measures of personal concern with inequality are available, the interaction of concern with inequality and SWL inequality is negative, as would be expected if the correlation between SWL and SWL inequality is causal.

European Social Survey

The raw correlation between SWL and SWL inequality is strongly negative, with a standardized beta coefficient of $\hat{\beta}_\sigma = -0.354$ (Column 1 of Table 2). It is weakened to $\hat{\beta}_\sigma = -0.209$ when log GDP and personal controls are added to the regression (Column 2), but remains strongly statistically significant

[20] Section 3.3 also tests for the possibility that the true causal link is from high SWL to low SWL inequality.

[21] Since we cannot determine the exact SWL value h_{ij}^*, this introduces an additional mean zero error that is absorbed into the error term.

($p < 0.001$). This reduction in magnitude is explained by the strong negative correlation of -0.75 between SWL inequality and log GDP. The corresponding correlation with the Gini coefficient of income is also strongly statistically significant ($p < 0.001$), but the standardized beta coefficient is only about a third in magnitude: $\hat{\beta}_g = -0.070$. When both σ_i and g_i are included in the same regression (Column 4), the Gini coefficient drops to insignificance, whereas the coefficient on SWL inequality is hardly changed: $\hat{\beta}_\sigma = -0.200$. Column 5 adds the subject's view on the importance of reducing inequality, e_{ij} and its interaction with σ_i and g_i. As expected, the interaction term is negative: $\hat{\beta}_{e\sigma} = -0.216$ ($p < 0.001$). Finally, Column 6 adds country dummies. The interaction term remains negative, $\hat{\beta}_{e\sigma} = -0.234$ ($p < 0.001$). In summary, the correlation between SWL and SWL inequality is consistently negative in both the cross-section and across time, is *more* negative than the correlation between SWL and income inequality, and is stronger among those who describe themselves as particularly averse to inequality.

World Values Survey

Results for the World Value Survey (Table 3) are not quite as strong, but otherwise similar. The raw correlation (Column 1) of $\hat{\beta}_\sigma = -0.224$ is weakened to $\hat{\beta}_\sigma = -0.167$ when log GDP and personal controls are added (Column 2), but is nonetheless strongly statistically significant ($p < 0.001$). The corresponding correlation with income inequality is also negative ($\hat{\beta}_g = -0.048$), but is not statistically significant ($p < 0.268$). When both σ_i and g_i are included in the same regression (Column 4), $\hat{\beta}_g$ remains insignificant, but $\hat{\beta}_\sigma$ is actually a touch stronger ($\hat{\beta}_\sigma = -0.174$). The interaction term with the importance of inequality (Column 5) is negative: $\hat{\beta}_{e\sigma} = -0.171$ ($p < 0.001$), and this remains the case when country dummies are added (Column 6) with $\hat{\beta}_{e\sigma} = -0.125$ ($p < 0.001$).

Gallup World Poll

The correlations in the Gallup World Poll (Table 4) are weaker still, though again qualitatively similar. The raw correlation of $\hat{\beta}_\sigma = -0.110$ (Column 1) becomes $\hat{\beta}_\sigma = -0.095$ when log GDP and personal controls are added (Column 2). The corresponding correlation with income inequality is equally statistically significant ($p < 0.001$), but weaker: $\hat{\beta}_g = -0.057$. When both σ_i and g_i are included in the same regression (Column 4), $\hat{\beta}_g$ drops in magnitude to -0.042 ($p < 0.006$), while $\hat{\beta}_\sigma$ is unchanged: $\hat{\beta}_\sigma = -0.096$ ($p < 0.001$).

When country dummies are added (Column 6) $\hat{\beta}_\sigma$ drops to -0.045 but remains strongly statistically significant ($p < 0.001$).

Gallup-Healthways Well-Being Index

Results in the Gallup-Healthways Well-Being Index are also qualitatively similar (Table 5). The raw correlation of $\hat{\beta}_\sigma = -0.062$ (Column 1) drops in magnitude to $= -0.049$ when log GDP and personal controls are added (Column 2), but remains statistically significant ($p < 0.001$). Income inequality is not statistically significant (Column 3), and has a perverse positive sign ($\hat{\beta}_g = 0.023$, $p < 0.005$) when both σ_i and g_i are included in the same regression (Column 4). The coefficient on SWL inequality remains negative and statistically significant: $\hat{\beta}_\sigma = -0.055$ ($p < 0.001$), and becomes stronger still when state dummies are added (Column 5): $\hat{\beta}_\sigma = -0.125$ ($p < 0.001$).

4.2 Social trust and other well-being components

This section reports results on the relationship of other well-being variables with SWL inequality. Section 3.3 describes the motivation and regression models. We find negative correlations in all cases, even when the correlation of the well-being variable with mean SWL is weak. Moreover, the correlations remain strong when mean SWL is added to the regression. These results are consistent with the causal interpretation of the correlations (Figure 1a), and are inconsistent with their interpretation as a merely mechanical correlation (Figure 1b).

Table 6 reports the results of regressing social trust on SWL inequality and income inequality, as well as log GDP and personal controls in the three surveys that include a trust question: World Values Survey, the European Social Survey, and the Gallup World Poll. Consistent with our hypotheses, the standard deviation of SWL is strongly negatively correlated with social trust in all three surveys ($p < 0.001$). By contrast, income inequality is only borderline statistically significant in the European Social Survey and World Values Survey ($p < 0.036$ and $p < 0.062$ respectively), and completely insignificant in the Gallup World Poll ($p < 0.618$). When mean SWL in the cluster is added to the equation (Columns 2, 4, and 6) the coefficient on SWL inequality is little changed, moving from -0.252 to -0.205 in the ESS, from -0.254 to -0.218 in the GWP, and from -0.180 to -0.177 in the WVS. In all three cases the coefficient remains strongly significant ($p < 0.001$ in ESS and GWP, and $p < 0.009$ in WVS).

Table 7 reports the results for worry, stress, and emotions yesterday

from the Gallup World Poll. As expected, SWL inequality is positively correlated with worry and stress, and negatively correlated with feeling safe when walking alone. The size of this correlation in these different well-being variables bears no obvious relationship to the correlation between the well-being variable and mean SWL, and remains strongly statistically significant ($p < 0.001$) when mean SWL is added to the regressions (Columns 2, 4, and 6).

4.3 Distortion due to how SWL is reported

Table 8 reports the resulting estimates of the logistic distribution model of Section 3.4. The model assumes a symmetric SWL distribution in each cluster, but reported SWL distribution tends to be negatively skewed in high SWL clusters, and positively skewed in low SWL clusters. Consequently, the likelihood maximizing fit tends to have higher mean SWL in high SWL countries, and lower mean SWL in low SWL countries, and a higher standard deviation in all countries. For example, in the European Social Survey the mean SWL range goes up from 3.85–8.76 to 4.22-8.58 and the standard deviation range increase from 1.39–3.08 to 1.40–4.02. The overall effect is a drop in the magnitude of the estimated coefficient on SWL inequality from $\hat{\beta}_\sigma = -0.209$ to $\hat{\beta}^*_\sigma = -0.167$. Results differ by survey, but are qualitatively similar. In particular, the regression coefficient using the logistic model remain strongly statistically significant in all the surveys ($p < 0.003$ in the World Values Survey, and $p < 0.001$ in the other three surveys). It is important to emphasize that these alternative estimates are not necessarily closer to the truth than using reported SWL directly, as we do elsewhere in the paper. The assumption that the skew in reported SWL distribution is entirely a result of how SWL is reported is an extreme assumption, and the resulting reduction in the magnitude of estimated coefficients is best seen as an upper bound on the part of the correlation that can be ascribed to a mechanical result of how SWL is reported.

5 Discussion

If subjective well-being provides a more comprehensive measure of the quality of life than does income, it should be expected that whatever negative linkages there may be between income inequality and life evaluations should be even stronger for well-being inequality. In this paper we have provided three sorts of evidence that supports the conjecture that well-being inequality adds to the information provided by income inequality in important ways.

Indeed, in each of the types of test, where income inequality and well-being inequality are compared, the evidence favors the latter.

Our first sort of evidence involves direct tests of income inequality and well-being inequality as predictors of subjective life evaluations drawn from several different surveys. In each case, we also repeat the tests controlling for a number of other possibly confounding variables. We also consider the likely risks that well-being inequality in the regions or countries with higher level of well-being may be estimated with a downward bias because of truncation or compression effects affecting the top answer categories. Our various attempts to measure and allow for this possible bias reduce but do not eliminate the negative linkage between well-being inequality and the level of subjective well-being. In cross-national comparisons using three different international surveys (the European Social Survey, the World Values Survey, and the Gallup World Poll), and in cross-state analysis using the Gallup-Healthways Well-Being Index, we find a consistently negative relation between well-being inequality and the average reported level of well-being. In all cases the negative relation is stronger than that for income inequality.

Since the first sort of evidence is drawn from repeated cross-sectional surveys there is no obvious way to sort out the direction of causality between inequality and well-being. Our other two types of evidence attempt to dig deeper into the possible causal structure by testing other relationships that would be expected to hold if, and possibly only if, there is a causal linkage running from inequality to well-being. In both cases we once again compare income inequality and well-being equality to see which is the preferred measure.

If people do not enjoy life as much where there is more inequality, then we would also expect to find that the strength of the negative linkage would be stronger for those who describe themselves as wishing to reduce inequality in the European Social Survey (ESS) and in the World Values Survey (WVS). As shown in the last two columns of of Table 2 for the ESS and Table 3 for the WVS, the effects of well-being inequality are twice as high for those respondents who favor equality, and this remains the case where country fixed effects are included, as in the final column of these tables. These results show the consequences of within-country changes of well-being inequality to be three times greater for those prefer equality. These results, which support causal reasoning for the link between inequality and well-being once again apply for well-being inequality but not for income inequality.

Our final tests dig deeper into an area where income inequality has been argued to have a causal link to well-being. Social trust has been argued to provide causal support for well-being, both directly and also indirectly,

through its effects on the levels and rates of growth of income. Since this is an area where both theory and empirical evidence have supported a role for inequality, it provides another useful way of assessing the usefulness of well-being inequality as an alternative to income inequality as a predictor of social trust. Our results from all three international surveys show that the data strongly prefer well-being inequality over income inequality as a predictor of lower social trust. This is to us especially compelling evidence, as the use of social trust as a dependent variable frees the analysis of any risk of being possibly due to a mechanical negative link between well-being inequality and its level. Similar results are obtained for other determinants of well-being, such as worry, stress, and fear of crime. These results hold even when mean well-being is included in the regression—consistent with well-being inequality affecting the determinants well-being, and inconsistent with reverse causality.

Thus all three types of test provide, in our view, independent but mutually supporting evidence that the inequality of subjective well-being has strong claims to be considered superior to income inequality as a single summary measure of inequality. At the very least, our results should encourage others to pay more attention to inequalities beyond that of income—whether they be of opportunities, education, health, justice, or access to supportive social networks.

References

Becker, G. S. (1974). A theory of social interactions. *Journal of Political Economy*, *82*(61).

Bjørnskov, C. (2007). Determinants of generalized trust: a cross-country comparison. *Public choice*, *130*(1-2), 1–21.

Bolle, F., Okhrin, Y., & Vogel, C. (2009). A note on interdependent happiness. *Journal of Socio-Economics*, *38*(5), 713–721.

Bolton, G. E. & Ockenfels, A. (2000). ERC: A theory of equity, reciprocity, and competition. *American economic review*, 166–193.

Case, A. & Deaton, A. (2015). Rising morbidity and mortality in midlife among white non-hispanic americans in the 21st century. *Proceedings of the National Academy of Sciences*, *112*(49), 15078–15083.

Clark, A., Frijters, P., & Shields, M. (2008). Relative Income, Happiness and Utility: An Explanation for the Easterlin Paradox and Other Puzzles. *Journal of Economic Literature*, *46*(1), 95–144.

Clark, A., Flèche, S., & Senik, C. (2015). The great happiness moderation. In A. Clark & C. Senik (Eds.), *Happiness and economic growth — lessons from developing countries* (Chap. 2, pp. 32–139). Oxford University Press.

Deaton, A. (2010). Price indexes, inequality, and the measurement of world poverty. *American Economic Review*, *100*(1), 5–34.

Deaton, A. (2013). *The great escape: health, wealth, and the origins of inequality*. Princeton University Press.

Di Tella, R. & MacCulloch, R. (2006). Some uses of happiness data in economics. *Journal of Economic Perspectives*, 25–46.

Dutta, I. & Foster, J. (2013). Inequality of Happiness in the US: 1972–2010. *Review of Income and Wealth*.

Fehr, E. & Schmidt, K. M. (1999). A theory of fairness, competition, and cooperation. *Quarterly journal of Economics*, 817–868.

Frey, B., Luechinger, S., & Stutzer, A. (2007). Calculating tragedy: Assessing the costs of terrorism. *Journal of Economic Surveys*, *21*(1), 1–24.

Harsanyi, J. (1955). Cardinal welfare, individualistic ethics, and the interpersonal comparison of utility. *Journal of Political Economy*, *63*, 309–321.

Harsanyi, J. C. (1953). Cardinal utility in welfare economics and in the theory of risk-taking. *Journal of Political Economy*, *61*(5), 434.

Helliwell, J. F. & Putnam, R. D. (2004). The social context of well-being. *Philosophical Transactions: Biological Sciences*, *359*(1449), 1435–1446.

Helliwell, J. F. & Wang, S. (2011). Trust and wellbeing. *International Journal of Wellbeing*, *1*(1), 42–78.

Jordá, V., López-Noval, B., & Sarabia, J. M. (2015). *Distributional dynamics of life satisfaction in europe*.

Knack, S. & Keefer, P. (1997). Does social capital have an economic payoff? a cross-country investigation. *Quarterly Journal of Economics*, 1251–1288.

Layard, R., Mayraz, G., & Nickell, S. (2008). The marginal utility of income. *Journal of Public Economics*, *92*(8-9), 1846–1857.

Luttmer, E. F. (2005). Neighbours as negatives: relative earnings and well-being. *Quarterly Journal of Economics*, *120*(3), 963–1002.

Neal, D. & Rick, A. (2014). *The prison boom and the lack of black progress after smith and welch*. National Bureau of Economic Research.

Ott, J. (2005). Level and inequality of happiness in nations: Does greater happiness of a greater number imply greater inequality in happiness? *Journal of Happiness Studies*.

Piketty, T. (2014). *Capital in the twenty-first century*. Harvard University Press.

Rothstein, B. & Uslaner, E. M. (2005). All for all: equality, corruption, and social trust. *World Politics*, *58*(01), 41–72.

Stevenson, B. & Wolfers, J. (2008). Economic Growth and Subjective Well-Being: Reassessing the Easterlin Paradox. *Brookings Papers on Economic Activity*.

Van Praag, B. & Baarsma, B. (2005). Using Happiness Surveys to Value Intangibles: The Case of Airport Noise. *Economic Journal*, *115*(500), 224–246.

Wang, W. & Parker, K. (2014). Record share of americans have never married as values, economics and gender patterns change. *Pew Research Center*.

Wike, R., Simmons, K., & Oates, R. (2014). Emerging and developing economies much more optimistic than rich countries about the future. *Pew Research Center*.

Table 1: Surveys used. The headings refer, respectively, to the European Social Survey, the World Values Survey, the Gallup World Poll, and the Gallup-Healthways Well-Being Index. SWL variables include satisfaction with life, and the Cantril Ladder of Life. μ_i, σ_i, g_i and Y_i report the overall range, mean, and standard deviation, of mean SWL, the standard deviation of SWL, the Gini coefficient of income, and log GDP in the different clusters in each survey. The final three lines of the table notes the surveys that had questions we were able to utilize on social trust, attitude to inequality, and emotions yesterday, respectively.

	ESS	WVS	GWP	GHWBI
Year range	2002–2015	1989-2014	2006–2014	2008–2011
Geographic Units	countries	countries	countries	states
No. geog. units	36	93	164	50
No. clusters	166	222	1,120	200
Individual obs.	303,853	314,903	1,341,049	1,404,982
ySWL variable	SWL	SWL	Ladder	Ladder
SWL range	0–10	1–10	0–10	0–10
μ_i	4.22–8.58 6.85 ± 0.96	3.94–8.49 6.58 ± 1.05	2.69–8.02 5.45 ± 1.11	6.28–7.48 6.81 ± 0.19
σ_i	1.39–3.08 2.10 ± 0.36	1.33–3.00 2.19 ± 0.33	0.86–3.22 1.94 ± 0.32	1.68–2.39 2.03 ± 0.10
g_i	0.24–0.43 0.32 ± 0.04	0.17–0.65 0.39 ± 0.10	0.17–0.65 0.38 ± 0.08	0.40–0.50 0.46 ± 0.02
Y_i	8.89–11.40 10.35 ± 0.45	6.75–11.75 9.36 ± 0.97	6.42–11.81 9.27 ± 1.17	10.24–11.06 10.60 ± 0.16
Social trust?	X	X	Partial	
View of inequality	X	X		
Emotions yesterday			X	

Table 2: SWL in the European Social Survey. The dependent variable is reported life satisfaction (0-10). σ_i is the standard deviation of life satisfaction in a given country/wave, g_i is the Gini coefficient for income, Y_i is the logarithm of GDP per capita (PPP in constant dollars), e_{ij} is a 5 level answer to a question asking for a preference for equality over freedom. Personal controls include gender, age, age squared, education (dummies), marital status (dummies), and unemployment dummies (current and in the past). Standard errors are corrected for clustering by country/wave.

	(1)	(2)	(3)	(4)	(5)	(6)
σ_i	-0.354^{***}	-0.209^{***}		-0.200^{***}	-0.164^{***}	-0.106^{***}
	(-16.85)	(-9.82)		(-8.77)	(-8.00)	(-4.35)
g_i			-0.070^{**}	-0.017	-0.019	-0.036^{*}
			(-3.33)	(-0.85)	(-1.17)	(-2.13)
Y_i		0.179^{***}	0.325^{***}	0.185^{***}	0.173^{***}	0.295^{***}
		(9.30)	(19.21)	(9.27)	(8.42)	(4.63)
e_{ij}					0.078	0.094^{**}
					(1.29)	(2.75)
$e_{ij}\sigma_i$					-0.216^{***}	-0.234^{***}
					(-4.73)	(-9.19)
$e_{ij}g_i$					0.049	0.056
					(0.93)	(1.39)
Personal controls		X	X	X	X	X
Country dummies						X
Observations	303853	303853	301960	301960	301960	301960
R^2	0.125	0.187	0.172	0.187	0.194	0.220

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: SWL in the World Values Survey. The dependent variable is reported life satisfaction (1-10). σ_i is the standard deviation of life satisfaction in a given country/wave, g_i is the Gini coefficient for income, Y_i is the logarithm of GDP per capita (PPP in constant dollars), e_{ij} is a 10 level answer to a question asking for the importance of reducing inequality. Personal controls include gender, age, age squared, education (dummies), and marital status (dummies). Standard errors are corrected for clustering by country/wave.

	(1)	(2)	(3)	(4)	(5)	(6)
σ_i	-0.224^{***}	-0.167^{***}		-0.174^{***}	-0.176^{***}	-0.109^{**}
	(-6.93)	(-5.87)		(-6.01)	(-6.53)	(-2.85)
g_i			-0.048	-0.007	-0.006	-0.244^{**}
			(-1.11)	(-0.18)	(-0.17)	(-2.99)
Y_i		0.183^{***}	0.284^{***}	0.210^{***}	0.213^{***}	0.232^{**}
		(5.60)	(8.34)	(5.81)	(6.03)	(2.84)
e_{ij}					0.075	0.012
					(1.51)	(0.27)
$e_{ij}\sigma_i$					-0.171^{***}	-0.125^{**}
					(-3.57)	(-3.04)
$e_{ij}g_i$					0.028	0.038
					(0.84)	(1.28)
Personal controls		X	X	X	X	X
Region dummies	X	X	X	X	X	
Country dummies						X
Observations	314903	271667	243875	243875	235587	235587
R^2	0.085	0.126	0.117	0.136	0.140	0.189

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4: SWL in the Gallup World Poll. The dependent variable is the Cantril ladder (0-10). σ_i is the standard deviation of the Cantril ladder in a given country/year, g_i is the Gini coefficient for income, Y_i is the logarithm of GDP per capita (PPP in constant dollars). Regions include the West, Asia, Latin America, and Middle-East and Africa. Personal controls include gender, age, age squared, education (dummies), and marital status (dummies). Standard errors are corrected for clustering by country/year.

	(1)	(2)	(3)	(4)	(5)
σ_i	-0.110^{***}	-0.095^{***}		-0.096^{***}	-0.045^{***}
	(-8.37)	(-9.49)		(-8.81)	(-4.15)
g_i			-0.057^{***}	-0.042^{**}	-0.089^{**}
			(-3.72)	(-2.76)	(-3.03)
Y_i		0.384^{***}	0.389^{***}	0.386^{***}	0.447^{***}
		(31.69)	(26.33)	(27.23)	(4.87)
Personal controls		X	X	X	X
Region dummies	X	X	X	X	
Country dummies					X
Observations	1341049	1256817	1133621	1133621	1133621
R^2	0.104	0.189	0.181	0.188	0.241

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 5: SWL in the Gallup-Healthways Well-Being Index. The dependent variable is the Cantril ladder (0-10). σ_i is the standard deviation of the Cantril ladder in a given state/year, g_i is the Gini coefficient for income, Y_i is the logarithm of GDP per capita (PPP in constant dollars). Personal controls include gender, age, age squared, education (dummies), and marital status (dummies). Standard errors are corrected for clustering by state/year.

	(1)	(2)	(3)	(4)	(5)
σ_i	-0.062^{***}	-0.049^{***}		-0.055^{***}	-0.125^{***}
	(-11.06)	(-8.38)		(-9.46)	(-29.22)
g_i			0.009	0.023^{**}	-0.012
			(1.12)	(2.87)	(-1.50)
Y_i		-0.002	-0.002	-0.002	-0.021
		(-0.31)	(-0.36)	(-0.29)	(-1.21)
Personal controls		X	X	X	X
State dummies					X
Observations	1404982	1363274	1363274	1363274	1363274
R^2	0.004	0.056	0.054	0.056	0.061

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 6: Trust and SWL inequality. The dependent variable is 0-10 in the European Social Survey (ESS), and binary in the Gallup World Poll (GWP) and World Values Survey (WVS). μ_i is the mean SWL in a given country/wave, σ_i is the standard deviation of SWL in that country/wave, g_i is the Gini coefficient for income, and Y_i is the logarithm of GDP per capita (PPP in constant dollars). Coefficients are estimated using a logistic regression in WVS and GWP, and linear regression in ESS. Standardized variables are used in all regressions. Personal controls are the same as in Tables 3–4. Standard errors are corrected for clustering by country/wave.

	European Social Survey		Gallup World Poll		World Values Survey	
μ_i		0.093^{**}		0.149		0.008
		(2.94)		(1.43)		(0.10)
σ_i	-0.252^{***}	-0.205^{***}	-0.254^{***}	-0.218^{***}	-0.180^{**}	-0.177^{**}
	(−11.64)	(−7.73)	(−3.71)	(−3.29)	(−3.24)	(−2.62)
g_i	−0.029	−0.027	−0.048	−0.028	-0.199^{*}	-0.199^{*}
	(−1.88)	(−1.97)	(−0.50)	(−0.32)	(−2.10)	(−2.09)
Y_i	0.065^{***}	0.023	0.293^{**}	0.183	0.213^{***}	0.209^{**}
	(3.55)	(0.95)	(3.17)	(1.38)	(3.96)	(3.03)
Personal controls	X	X	X	X	X	X
Observations	302317		173006		232580	

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 7: The relationship between SWL inequality and worry, stress, and fear when walking alone. The table reports logit regression on whether the respondent felt worry or stress the day before, and whether he or she feels safe walking alone. μ_i is the mean SWL in a given country/wave. σ_i is the standard deviation of SWL, and Y_i is the logarithm of GDP per capita (PPP in constant dollars). Personal controls include gender, age, age squared, education (dummies), and marital status (dummies). Standard errors are corrected for clustering by country/wave.

	Worry		Stress		Feel Safe Walking Alone	
μ_i		-0.190^{***}		0.005		0.197^{***}
		(-7.06)		(0.14)		(6.00)
σ_i	0.156^{***}	0.119^{***}	0.194^{***}	0.195^{***}	-0.120^{***}	-0.085^{***}
	(9.57)	(7.18)	(9.08)	(8.42)	(-5.97)	(-4.02)
Y_i	-0.043^{*}	0.097^{***}	0.220^{***}	0.217^{***}	0.108^{**}	-0.031
	(-2.15)	(3.57)	(9.98)	(6.39)	(3.16)	(-0.72)
Region dummies	X	X	X	X	X	X
Personal dummies	X	X	X	X	X	X
Observations	1189093		1092930		1102859	

Standardized beta coefficients; t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 8: Potential distortion due to how SWL is reported. The headings refer, respectively, to the European Social Survey, the World Values Survey, the Gallup World Poll, and the Gallup-Healthways Well-Being Index. μ_i, σ_i are the mean and standard deviation of reported SWL in the different clusters in each survey. μ_i^* and σ_i^* are the estimated values of these parameters in a logistic model (Section 3.4). For each of these parameters the table lists the lowest and highest value, the mean, and the standard deviation. β_σ is the standardized beta coefficient of σ_i in Equation 2 and β_σ^* is the corresponding coefficient in Equation 9. The table lists the estimated coefficient with the t-statistic in parentheses.

	ESS	WVS	GWP	GHWBI
μ_i	4.22–8.58 6.85 ± 0.96	3.94–8.49 6.58 ± 1.05	2.69–8.02 5.45 ± 1.11	6.28–7.48 6.81 ± 0.19
σ_i	1.39–3.08 2.10 ± 0.36	1.33–3.00 2.19 ± 0.33	0.86–3.22 1.94 ± 0.32	1.68–2.39 2.03 ± 0.10
μ_i^*	3.85–8.76 6.88 ± 1.04	2.77–9.27 6.71 ± 1.19	2.46–8.05 5.52 ± 1.12	6.50–7.59 6.99 ± 0.18
σ_i^*	1.40–4.02 2.34 ± 0.43	1.32–5.40 2.49 ± 0.53	0.76–4.16 2.00 ± 0.42	1.81–2.50 2.09 ± 0.11
β_σ	-0.209*** (-9.82)	-0.167*** (-5.87)	-0.095*** (-9.49)	-0.049*** (-8.38)
β_σ^*	-0.148*** (-5.25)	-0.099** (-3.01)	-0.084*** (-8.03)	-0.034*** (-5.36)