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The Easterlin Paradox at 50

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The Easterlin Paradox at 50*

Abstract

We use Gallup World Poll data from over 150 countries from 2009–2019 at both the individual and country levels to revisit the relationship between income and subjective wellbeing. Our inspiration is the paradox first proposed by Easterlin (1974), according to which higher incomes are associated with greater happiness in cross-sections, yet increases in a country's GDP per head do not necessarily increase its average wellbeing. In our analysis subjective wellbeing (or happiness) is measured by the Cantril ladder on a 0–10 scale. Across individuals, other things equal, one unit of log income raises subjective wellbeing by 0.4 points. In other words, doubling income raises wellbeing by 0.3 points out of 10. Across countries, a crude regression of wellbeing on log per capita income gives a higher coefficient of 0.6. But, once social variables like health and social support are introduced, the picture changes. In rich countries, income no longer has a significant independent effect, either in country cross-sections or in time series. For low-income countries the result is also clear cut – income raises happiness in both cross-section and time series, whether the social variables are controlled for or not. For middle-income countries the result is mixed.

JEL classification

E01, H24, H41, I14, I31, O10

Keywords

subjective wellbeing, income, GDP, Easterlin Paradox, public goods

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1. Introduction

Some fifty years ago Richard Easterlin wrote a famous article, propounding a paradox (Easterlin, 1974). In its modern form the paradox that is claimed is this:[1]

- At a point in time, richer people are happier than poorer people.
- But, over time, as populations grow richer, they do not necessarily grow happier.[2]

The time-series evidence which Easterlin offered came only from the US, and the fifty years since then confirm this picture of the US (see Layard and De Neve, 2023, Figure 13.3). But is it a general picture?[3]

In this paper we use the Gallup World Poll data from over 150 countries to investigate the hypothesis in a systematic way. The data are from 2009-2019. This is shorter than we would like, but we do our best to control for the business cycle by including unemployment as a covariate. We also include, as country covariates, five social variables which are also important determinants of wellbeing – social support, healthy life expectancy, freedom to make life choices, generosity, and lack of corruption.

Our main findings are these. For individuals the cross-section picture is clear – other things equal, richer people are happier than poorer people. Turning to country data, this differs between groups of countries.

For low-income countries, higher national incomes are significantly associated with higher average happiness even controlling for the social variables. This is true both across countries and over time. Higher income in those countries is associated with greater happiness, both in its own right and perhaps via the social variables themselves if these act as mediators.

However, in the cross-section of high-income countries, richer countries are not significantly happier than poorer countries once the social variables are included. If income is included in the regression without the social variables, it is associated with higher wellbeing. But this is because the social variables and income are positively correlated. If that correlation arises because those variables are positively affected by income, then income is having a positive effect – not through household income but through the social variables. But with the Gallup data one cannot establish whether the social variables are mediators, or on the contrary confounders that should be corrected for.

Over time in the high-income group, country income growth is not significantly correlated with country happiness growth. This supports the proposition for high-income countries that economic growth does not necessarily raise wellbeing.

Finally, the results for middle-income countries are more mixed. Richer middle-income countries are not significantly happier than poorer middle-income countries once the social variables are included. But over time, income growth in middle-income countries is significantly correlated with happiness growth, whether the social variables are included or not.

2. Data and Empirical Strategy

We analyse individual-level data from the Gallup World Poll (GWP). This covers 158 countries over the 2009-2019 period, and includes over 1.5 million individual observations. The empirical analysis of

[1] Some versions of the hypothesis do not include the word 'necessarily'.

[2] In other words in a regression of wellbeing on income the confidence limits for the coefficient should include zero. A stronger version of this proposition does not include the word 'necessarily', which implies that the confidence limits include no positive values. Both hypotheses become easier to establish the larger is the sample.

[3] There have been numerous previous attempts to investigate this – for example Sacks *et al.* (2010), (which is an update of Stevenson and Wolfers, 2008), Kaiser and Vendrik (2019), and Easterlin and O'Connor (2020).

the relationship between subjective wellbeing and income is carried out both for all countries in the sample, and then separately for the different country income groups in the World Bank classification. The list of countries, split by the four World Bank income groups, appears in **Appendix Table A.1**.

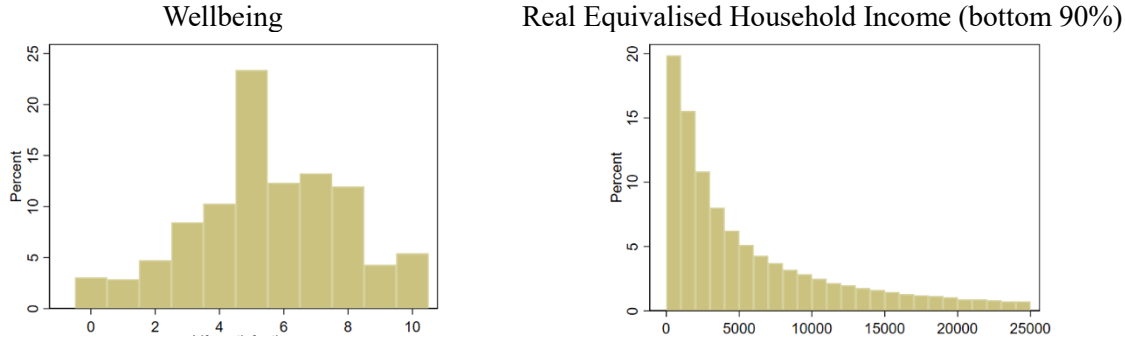
Our dependent variable is subjective wellbeing. This is measured in the Gallup World Poll by the responses to the Cantril Ladder question (Cantril, 1965) on a scale from 0 to 10:
Please imagine a ladder, with steps numbered from 0 at the bottom to 10 at the top. The top of the ladder represents the best 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?

2.1. Individual-level data

The left panel of **Figure 2.1** shows the individual distribution of subjective wellbeing as measured by the Cantril Ladder. The average reported subjective wellbeing in the dataset in the 2009-2019 period is 5.5, with a standard deviation of 2.4. Both the median and mode scores are 5.[4]

We wish to relate wellbeing to income. We measure the latter by the logarithm of real equivalised annual household income in Purchasing Power Parity Dollars (PPP Dollars).[5] The right panel of **Figure 2.1** depicts the distribution of this real equivalent household income in the bottom 90% of the individual-level distribution.[6] The summary statistics for wellbeing, income and the other variables that are used in the empirical analysis appear in **Appendix Table A.3**.

Figure 2.1. The World distribution of subjective wellbeing (left-hand panel) and real equivalised household income (right-hand panel)



Notes: Gallup World Poll, 2009-2019. Wellbeing is measured via the Cantril Ladder. Household income is equivalent annual household income in 2016 PPP Dollars.

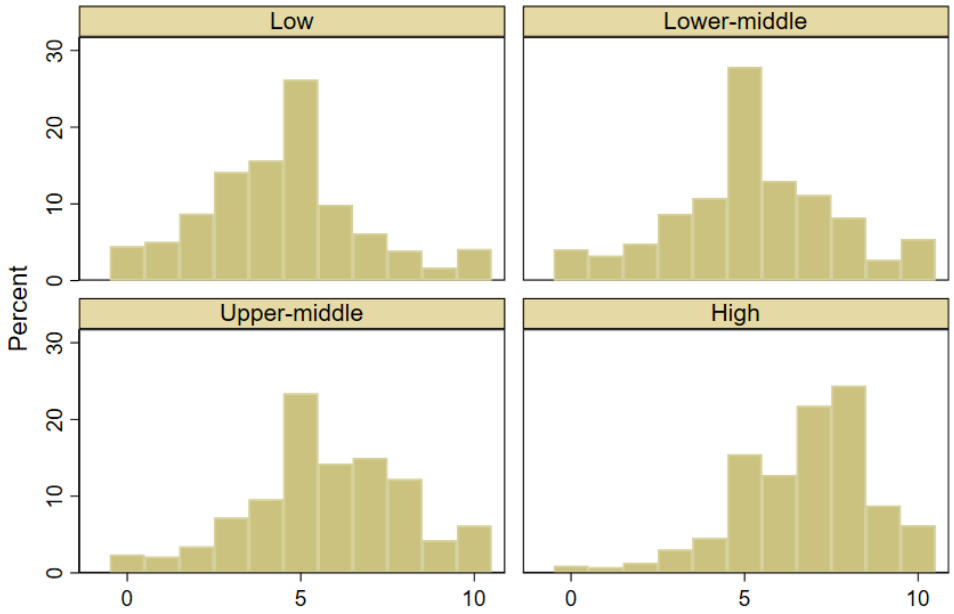
We will below systematically investigate the income-wellbeing relationship both for all countries and then for countries at different levels of economic development, using the four World Bank income-group classifications.

Figure 2.2 depicts the distributions of wellbeing by these country income groups. Average wellbeing is higher in richer groups, with figures of 4.5 (2.27), 5.2 (2.34), 5.7 (2.27) and 6.7 (1.94) for the low, lower-middle, upper-middle and high-income country groups respectively (standard deviations in

[4] **Appendix Table A.2** reports the number of individual observations for each country-year pair.
[5] Household annual pre-tax income in local currency is recorded as a continuous variable in the Gallup surveys. Gallup converts this figure into PPP Dollars using the latest-available individual consumption PPP conversion factors – the most recent PPP estimates produced by the World Bank (2014 for many countries) based on the 2011 International Comparison Program (ICP). In addition, the PPP rates are deflated using the US Dollar CPI, so that all income figures are in 2016 US Dollars. We convert the resulting figure to a household equivalised value using the OECD equivalence scale: the first household member is assigned a value of 1, each additional adult a value of 0.7, and each child 0.5.
[6] The 90th percentile figure for the distribution of World real equivalised household income in 2009-2019 GWP data is $24,900, while the 99.9th percentile figure is $372,600.

parentheses). **Appendix Figure A.1** in the Appendix plots the distribution of real equivalised household income by country-income group.

Figure 2.2. The distribution of subjective wellbeing by country income group



Notes: Gallup World Poll, 2009-2019. Wellbeing is measured via the Cantril Ladder. The country income groups come from the World Bank classification.

2.2. Country-level data

The analysis of the country-level relationship between income and subjective wellbeing uses the country-year average Cantril ladder scores from the Gallup World Poll. The average of these country-year scores is 5.46, with a standard deviation of 1.12. The income measure is real GDP per capita measured in US Dollars at purchasing power parity:[7] the average figure here is $20,351 with a standard deviation of 19,836. The aggregate dataset contains 1,467 country-year observations for 157 countries from 2009 to 2019.[8]

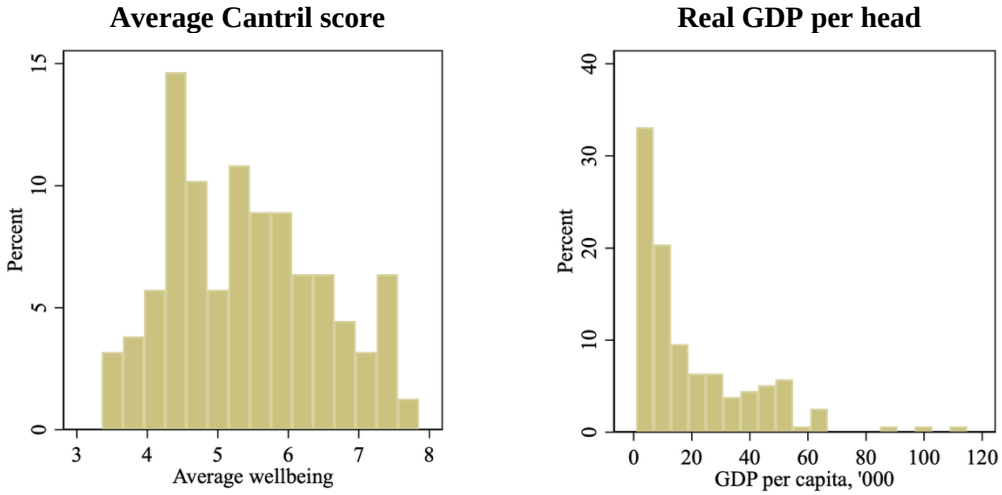
The distributions of the country-year wellbeing scores and levels of real GDP per head are depicted in

[7] Source: The World Bank World Development indicators data (base year 2015) complemented with information from the Penn World Tables (version 10).

[8] As compared to the individual-level data, which covers 158 countries, the country-level analysis omits two countries due to missing GDP per capita (Somalia and South Sudan) and adds one (Djibouti) for which there is no individual income information in the Gallup data but there is GDP data.

Figure 2.3. The separate distributions of GDP and wellbeing by the four World Bank income groups appear in **Appendix Figure A.2** and **Appendix Figure A.3**, respectively.

Figure 2.3. Left panel: The distribution of country-year average subjective wellbeing (0-10). Right panel: The distribution of country-year real GDP per capita



Notes: Gallup World Poll, 2009-2019. The figure is based on the average value for each of the 157 countries. The GDP figures come from the World Bank World Development indicators data complemented with the Penn World Tables (version 10). Average wellbeing is in bins of 0.3 on a 0-10 scale and GDP per capita in bins of $6,000, both starting from the lowest observed values in the data.

The summary country-year statistics for wellbeing, real GDP and a number of the other variables used in the empirical analysis appear in **Appendix Table A.4**. **Appendix Table A.5** lists the countries, the years in which they are observed, and the total number of observations per country. For the country-level analysis, we use the same variables as in the individual-level analysis to maintain comparability. For wellbeing and all controls, we take the average of individual reports for each year using the sample weights provided by the survey. Omitting the weights does not affect our results. This approach produces the average country-level wellbeing figure for each country-year observation. For the binary controls, it produces the share of respondents with a given characteristic in each country-year, e.g. being female, having a degree, or reporting health problems.

We will discuss below the role that a number of aggregate health and public-good variables play in the relationship between GDP per capita and subjective wellbeing at the country level. In the paper, we analyse five of these, inspired by Table 2.1 of the 2022 World Happiness Report (see Helliwell *et al*., 2022): social support, healthy life expectancy at birth, freedom to make life choices, generosity and perceptions of corruption.[9] For shorthand, we will call these five the 'WHR variables' or 'social variables'.[10] The definitions and descriptive statistics of these five variables appear in **Appendix Table A.6**.

Last, the descriptive statistics for the sample of countries with 10 or more observations in the 2009-2019 Gallup World Poll data are found in **Appendix Table A.7** and **Appendix Table A.8**. This is the sample that will be used for the panel country-level analysis.

[9] For some earlier evidence on the relationship between these kinds of social variables, albeit not identically measured, and subjective wellbeing, see Bartolini and Sarracino (2014).

[10] There is a sixth WHR-type variable that appears in the Gallup World Poll: Confidence in the Government. This variable is missing for a larger number of countries and years than the other five WHR variables. As in Helliwell *et al*. (2022) we therefore concentrate on the first five. We have checked that all of our cross-section and panel country-level results in Sections 3.2 and 3.3 below continue to hold in the smaller sample when we also introduce Confidence in the Government as a control variable.

2.3. Empirical Strategy

We will here provide three sets of results on the relationship between income and subjective wellbeing. The first two of these, which are less controversial, are cross-section at the individual and country levels (and will show that richer individuals/countries are associated with higher wellbeing scores). The third, which remains the subject of debate, is the relationship between income and subjective wellbeing within a country over time.

One issue regarding this third relationship is that there are any number of ways in which to model it. We will below use panel regressions, with one observation per country per year controlling for both time and country fixed effects, which is arguably a natural approach. The contribution that is closest to ours in this respect is the analysis of data up to 2007 by Sacks *et al.* (2010). We will compare our estimates to theirs throughout the paper.

Other work has instead explicitly estimated the correlation between the slopes in trend GDP and trend happiness (over a sufficient number of years). One example is Easterlin and O'Connor (2022*a*), who look at both World Values Survey and Gallup data. Their results (see their Figures 4 and 5) suggest a positive correlation between trend GDP and trend happiness in both datasets, which is reduced once transition countries (which are 'expansion only', as they did not experience a full economic cycle over the time period) are removed from the sample. In the case of the World Values Survey the relationship becomes flat once these countries are removed.[11]

An alternative to estimating slopes is to consider the difference between the first and last observation in a time series (over a sufficiently long period of time). This is the approach taken in Sarracino *et al*. (2026), who find no correlation overall between these differences in GDP and in the Cantril ladder using Gallup data. Even so, there is heterogeneity in this relationship, which is positive for a substantial portion of the countries examined (see their Figure 3). This analysis does present the disadvantage of not using all of the data points that are available per country. Easterlin and O'Connor (2022*b*) take a similar approach using 35 years of European Values Survey data on 10 European countries. The change in happiness over this period is not correlated with the change in GDP (although it is with the change in social-welfare generosity).

A distinct feature of these alternative approaches is that most of them do not use controls for the composition of the sample. The addition of demographic variables in our country-level panel regressions turns out to have only relatively little effect on the estimated coefficient on GDP per capita. However, the panel that we analyse covers 11 years, and we might expect demographic composition to change more in analyses covering 20 or 30 years of data.

Sections 3.1 to 3.3 below present our estimation results for the cross-sections of individuals and countries, and then the panel of countries over time.

3. Results

3.1. The Cross-Section of Individuals

We start with an analysis of how an individual's income is related to their wellbeing over the whole World in Gallup World Poll data, and then within a given country in a given year (by including country and year fixed effects). The analysis is first carried out for all available countries, and then separately for the countries in the four World Bank income groups.

There are three main take-aways from this analysis:

[11] While the estimation of trends uses all of the information in the data, it does produce generated data for both the dependent and independent variables. This typically requires bootstrap estimation.

- The worldwide coefficient on log income in cross-section data with subjective wellbeing measured by the Cantril ladder on a 0-10 scale is 0.4. This corresponds to around 0.17 of a standard deviation of the subjective wellbeing measure (which is 2.37 from **Appendix Table A.3**).
- This coefficient is reasonably similar across country income groups.
- The coefficient is also similar for men and women. Income does however seem to matter more in mid-life (ages 35 to 65).

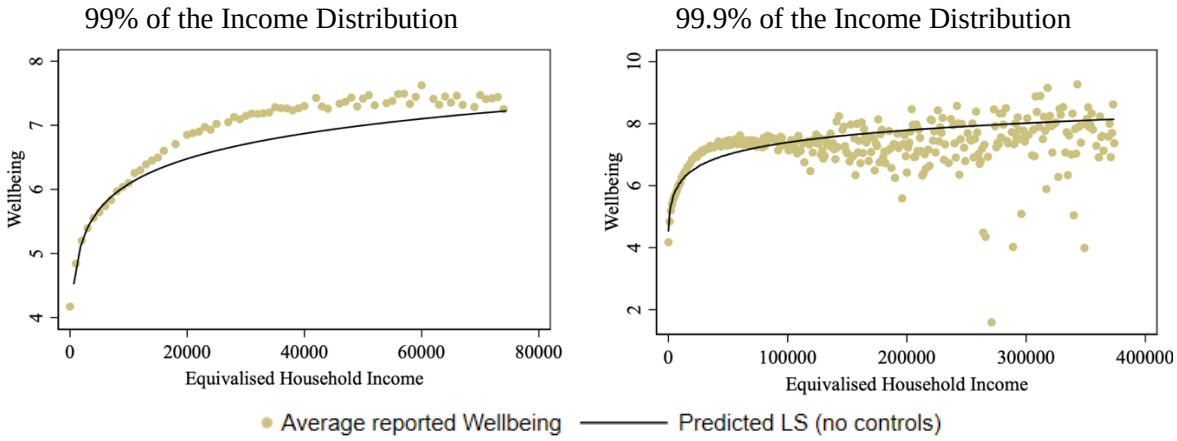
We begin by pooling individual data from all countries and all years over the 2009-2019 period, and regress individual wellbeing on log equivalent income without any other controls. We use all of the available data from respondents who report non-zero income in this regression, and do not trim the individual income distribution.

The results appear in column 1 of **Table 3.1**. The global coefficient on the logarithm of individual income in this wellbeing regression is 0.568, and very statistically significant. The size of this coefficient implies that doubling an individual's income is associated with higher wellbeing of approximately 0.4 on the 0 to 10 scale (or one-sixth of the standard deviation of wellbeing).[12]

This analysis uses the logarithm of income, which is very typical in the empirical analysis of wellbeing (see, for example, Clark *et al.*, 2018). To see whether the logarithmic functional form is a good description of the relationship between income and wellbeing, **Figure 3.1** compares the scatterplot of the raw data on wellbeing and income (by bins of one thousand Dollars) to the relationship predicted from the simple regression in **Table 3.1**.

The relationship in the raw data, as shown by the dots, is concave. The fitted value from the log regression specification matches the raw data well for the bottom three-quarters of the income distribution (*i.e.* for equivalent household incomes up to $11,500); it then underpredicts for most of the richer respondents (in the right-hand side of the figure, only one per cent of the sample has an income figure of over $75,000).

Figure 3.1. Raw averages of wellbeing scores for different incomes and the wellbeing levels predicted from a simple linear regression



Note: Average reported wellbeing is plotted by equivalised household income bands of one thousand PPP Dollars.

[12] As ln(2) ≈ 0.69, and the standard deviation of the Cantril Ladder is 2.37 from **Appendix Table A.3**. This figure is remarkably similar to the estimated instrumental variables effect of income on happiness in Ye *et al*. (2023) using data on monozygotic twins from the Chinese Twins Survey (column 3 of their Table 3) and that of lottery prizes on life satisfaction in Sweden in Figure 4 of Lindqvist *et al*. (2020).

Column 2 of in **Table 3.1** adds country and year fixed effects as control variables. We thus here estimate the income-wellbeing coefficient within a country and in a given year. Adding these controls reduces the income coefficient by 20% to 0.454.

Column 3 then adds exogenous individual variables: age (in quadratic form) and sex. The estimated relationship between the Cantril Ladder variable and age is U-shaped, with an estimated minimum at age 69. The finding of a U-shaped relationship between subjective wellbeing and age is standard in the literature: see, for example, Blanchflower (2021).[13] Women report higher subjective wellbeing scores than do men in the Gallup World Poll data (other things equal). This is often found to be the case: an early summary of the related literature is found in Nolen-Hoeksema and Rusting (1999).[14] The estimated income coefficient in this specification is virtually unchanged at 0.456.

Lastly, column 4 adds a number of endogenous variables: unemployment, education, marital status and health (this latter comes from a Yes/No question "*Do you have any health problems that prevent you from doing any of the things people your age normally can do?*"). These are potential mediators or confounders of the effect of income on subjective wellbeing: for example, income may produce better health, or those in worse health may earn less. The coefficient in this specification is further somewhat reduced to 0.403.[15]

[13] See Blanchflower *et al*. (2025) for evidence that the relationship between *illbeing* and age has followed a different pattern in more recent years, from 2020 to 2024.

[14] Montgomery (2022) and Oparina and Srisuma (2022) argue that this difference may be explained by men's and women's different reporting behaviour.

[15] There is an addition potential issue of Common Method Variance regarding health, which is (like the Cantril Ladder) a subjective evaluation. Excluding health from the controls in column (4) increases the estimated income coefficient only slightly to 0.423 (0.018).

Table 3.1. Individual-level Cross-section to explain the Cantril Ladder

	(1) No controls	(2) Country and Year	(3) Age, Sex, Country and Year	(4) All Demographic Controls, Country and Year
HH income (log)	0.568***	0.454***	0.456***	0.403***
	(0.056)	(0.020)	(0.019)	(0.018)
Age			-0.040***	-0.051***
			(0.003)	(0.003)
Age-squared / 100			0.029***	0.044***
			(0.003)	(0.003)
Female			0.126***	0.142***
			(0.015)	(0.014)
Unemployed				-0.450***
				(0.024)
Education (degree or above)				0.392***
				(0.021)
Partnered / Married				0.160***
				(0.017)
Health problems				-0.502***
				(0.025)
R^2	0.14	0.22	0.23	0.25
Observations	1,511,673	1,511,673	1,511,673	1,511,673

Notes: The controls in columns 3 and 4 include indicators for missing age and sex: country-year averages are applied for observations with missing age and the country-year modes for missing sex information. Columns 2 to 4 include country and year fixed effects. Standard errors in parentheses are clustered at the country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

We may worry about measurement error at the top and bottom of the income distribution. When we trim income, by dropping the top and bottom 1% of the distribution of income within each country, we find somewhat higher estimated coefficients on log equivalised household income. This is consistent with low-income respondents being happier than predicted from a regression of the non-trimmed 98% of respondents (or, equivalently, the Top 1% not being as happy as predicted).[16]

The income coefficients that we find above are broadly in line with those in the literature on the cross-section relationship between individual wellbeing and individual income. Sacks *et al.* (2010) use standardised wellbeing scores from the Gallup World Poll, World Values Survey and Pew Global Attitudes Survey and find estimated log income coefficients in standardised wellbeing regressions of 0.232, 0.227 and 0.283 for the three datasets respectively. Their specification is similar to that in column 3. To compare our results to theirs, we convert our estimated coefficient of 0.456 from the unstandardised regressions by dividing by the wellbeing standard deviation of 2.37: this produces a figure of 0.192, which is similar to 0.232. Clark *et al.* (2018) analyse British Cohort Study data, and find a coefficient on the log of equivalised household income of around 0.3 on the scale from 0 to 10 when only controlling for sex and age. This coefficient is lower than our global coefficient in column 3, which may indicate that the relationships are different in countries with different levels of income. This is what we investigate below.

Table 3.2 contains the results of the four specifications in **Table 3.1** above but separately for each country income group.[17] For comparison purposes, Column 1 reproduces the results for all countries. Columns 2 to 5 then refer to the four World Bank country income groups.

[16] The regression results for the trimmed sample appear in **Appendix Table B.1**.

[17] We omit the estimated coefficients on the control variables for brevity. The full set of results can be found in **Appendix Table B.2**.

Table 3.2. Individual-level Cross-section to explain the Cantril Ladder: by Country Income Group

	(1) All countries	(2) Low	(3) Lower-middle	(4) Upper-middle	(5) High
			Specification 1. No controls		
HH income (log)	0.568***	0.271**	0.438***	0.416***	0.584***
	(0.056)	(0.116)	(0.039)	(0.096)	(0.066)
			Specification 2. Country and Year FE		
HH income (log)	0.454***	0.372***	0.515***	0.528***	0.451***
	(0.020)	(0.040)	(0.028)	(0.042)	(0.040)
			Specification 3. Age, Sex, Country and Year FE		
HH income (log)	0.456***	0.372***	0.507***	0.533***	0.470***
	(0.019)	(0.040)	(0.025)	(0.039)	(0.040)
			Specification 4. All demographic controls, Country and Year FE		
HH income (log)	0.403***	0.348***	0.452***	0.448***	0.386***
	(0.018)	(0.037)	(0.024)	(0.034)	(0.035)
Observations	1,511,673	414,100	422,092	285,857	389,624
Countries	158	47	43	28	40

Notes: The controls in specifications 3 and 4 include indicators for missing age and sex: country-year averages are applied for observations with missing age and the country-year modes for missing sex information. Specifications 2 to 4 include country and year FEs. Standard errors in parentheses are clustered at the country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The estimated coefficient on log equivalised household income turns out to be similar across country income groups in **Table 3.2** (at least in Specification 2 onwards when country and year dummies are included), with there being no obvious gradient by country GDP.

Appendix C shows the results when we carry out the analysis separately by sex and age groups. The resulting coefficients (in **Appendix Table C.1** to **Appendix Table C.5**) are illustrated in Figures **Appendix Figure C.1** to **Appendix Figure C.4**. There is a very-notable hump-shaped relationship by age, with the estimated coefficient on log income being the largest in middle age. This hump shape is similar for men and women. These age and sex patterns appear in all of the four country income groups.

The canonical version of the Easterlin Paradox does not include a statement on how individuals' wellbeing responds to the **change** in individual income. The Gallup data does not allow us to explore this question, as it is a repeated cross-section. However, we do find this question important even though we cannot compare the results to those in the main body of the paper (all of which rely on the same Gallup data). We analyse the panel relationship between income and wellbeing using data from what are probably the three main panel surveys used in social science: the UK Household Longitudinal Survey (UKHLS), the Household, Income and Labour Dynamics in Australia (HILDA) and the German Socio-Economic Panel (SOEP). Since the analysis is carried out for different countries and time periods to the Gallup data, it is not incorporated in the main text of the paper and is presented in **Appendix E**.

Panel estimation, as is common, produces smaller estimated coefficients on log equivalised household income that are between one quarter and one half of those from pooled estimation of the same data. The income coefficients differ notably by age group, with smaller coefficients at younger and older ages and higher coefficients in mid-life (as was the case for the Gallup data in **Appendix C**); the coefficients are a little higher for women, but broadly similar across the sexes.

3.2. The Cross-section of Countries

We now move to the country-level experience. As for the individual-level analysis, we start by analysing the relationship between subjective wellbeing and income with no other controls. We then progressively include a number of control variables, analogously to **Table 3.1**. The measure of subjective wellbeing here is the country-year average Cantril ladder score, and the measure of income is real GDP per capita in PPP Dollars.

We have two main take-aways:

- There is a positive and almost-always significant cross-section relationship between log GDP per capita and country-average wellbeing both globally and within the four country-income groups.
- But this effect is greatly reduced when we control for the WHR variables because these are correlated with income. In high-income countries the effect of income on wellbeing becomes insignificant when these controls are included in the regression analysis.

We start by regressing country-year wellbeing on the country-year logarithm of real GDP per capita with no other controls. The results appear in column 1 of **Table 3.3**. The estimated coefficient on log GDP is 0.753, which is somewhat higher than the analogous estimated coefficient on log equivalised household income in an individual wellbeing equation (which was 0.568 with no other controls).

In **Table 3.3**, Specification 4*a* corresponds to Specification 4 in **Table 3.2**; Specification 4*b* is the same as Specification 4a but estimated only on the sample of countries that have information on the five WHR variables. These WHR variables are introduced in Specification 5. Thus, the sample size in Specifications 4*b* and 5 are the same.

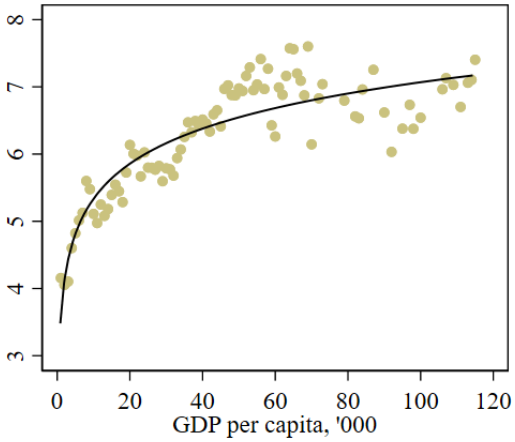
Table 3.3. Country-level Cross-section to explain the Cantril Ladder

	(1) No controls	(2) Year FE	(3) Age and Sex, Year FE	(4*a*) All Demographic Controls, All Countries	(4*b*) All Demographic Controls, WHR Sample	(5) All Controls WHR Sample
GDP per capita (log)	0.753***	0.754***	0.750***	0.614***	0.617***	0.349***
	(0.037)	(0.037)	(0.093)	(0.087)	(0.095)	(0.091)
Average age			-0.177	-0.254**	-0.293***	-0.211**
			(0.113)	(0.105)	(0.109)	(0.098)
Average age-squared			0.204*	0.281**	0.321***	0.236**
			(0.115)	(0.112)	(0.115)	(0.101)
Share of women			-1.835	-0.087	-2.194	-3.351
			(1.684)	(1.683)	(2.467)	(2.132)
Unemployed share				-4.654***	-5.020***	-2.253**
				(1.028)	(1.067)	(1.017)
Degree share				0.885	1.464*	1.188**
				(0.651)	(0.763)	(0.582)
Married share				-0.569	-0.383	-0.637
				(0.558)	(0.567)	(0.497)
Health problems share				-2.563***	-2.817***	-1.341**
				(0.602)	(0.632)	(0.555)
Social support						1.735***
						(0.400)
Healthy life expectancy at birth						0.029***
						(0.011)
Freedom to make life choices						1.277***
						(0.336)
Generosity						0.581**
						(0.270)
Perceptions of corruption						-0.371
						(0.304)
Constant	-1.601***	-1.454***	2.690	5.747***	7.526***	4.792**
	(0.343)	(0.345)	(1.913)	(1.933)	(2.028)	(2.042)
R^2	0.60	0.61	0.61	0.66	0.68	0.76
Observations	1467	1467	1467	1467	1306	1306

Note: Standard errors in parentheses are clustered at the country level. * p < 0.1, ** p < 0.05, *** p < 0.01.

We can take the estimates from Specification 1 and, as in **Figure 3.1**, plot predicted wellbeing against the values in the raw data. **Figure 3.2** depicts the results. As for individual income, the relationship in the raw data is concave.

Figure 3.2. Predicted and reported wellbeing by GDP per capita. **Gallup, 2009-2019, 157 countries.**



In Specification 2, in column 2 of **Table 3.3**, we add year dummies to the regression, which affects the estimated GDP coefficient only little. Specification 3 then includes the country-year average of age, age-squared and the share of women. The estimated coefficient does not change. In Specification 4, the estimated GDP coefficient is lower, being especially affected by the country-level health and unemployment variables. The estimated GDP coefficient in column 4 is around 0.6, which is larger than the figure of 0.4 for individual equivalised household income in Section 1.

The last specification in **Table 3.3** includes the following variables from the online Data Appendix for Table 2.1 of WHR 2022: social support, healthy life expectancy at birth, freedom to make life choices, generosity, and perceptions of corruption. These are available for almost all of the country-year pairs in the Gallup data we analyse. Including these country-level controls almost halves the estimated GDP coefficient (from 0.614 to 0.341). The interpretation here is either in terms of mediation, with higher GDP producing better health outcomes and social support for example, or in terms of confounding, with freedom providing the conditions for income growth and independently contributing to individual wellbeing. In general, the direction of causation between GDP and these social variables is not always obvious, as noted in Easterlin (2012). We discuss some of the evidence for mediation and confounding with respect to these five WHR variables in **Appendix H**.

We conclude that, within a given year, countries with higher GDP have higher average levels of wellbeing, as measured by the Cantril ladder. In addition, part of this correlation reflects the role of the five WHR variables (that either confound or mediate this relationship).

The results in the Gallup dataset continue to hold if, instead of log GDP per capita, we calculate the log of average real equivalised household income (the same income measure as used in the individual-level analysis) or the average of the log real equivalised household income figures. The comparison of the estimated coefficients using the three different country-level income measures appears in **Appendix Table D.1**.

Table 3.4 lists the estimates of Specifications 1 to 4, corresponding to columns 1 to 4 of **Table 3.3**, by country income group.[18] To help compare these groups to the pooled estimates in Figure 3.2, the GDP thresholds between the four income groups are at roughly 10, 20 and 30 thousand Dollars of real GDP per capita. The estimates for all countries combined, from **Table 3.3**, are shown in column 1 for comparison purposes. We use an F-test to formally test for differences in the coefficients of log GDP

[18] The detailed results for all of the specifications across income groups are listed in **Appendix Table D.2** to **Appendix Table D.7.**

per capita across country income groups, using seemingly unrelated estimation.[19] For Specification 1, the p-value for the equality of all coefficients is 0.11 (so that we cannot reject the hypothesis of coefficient equality).

In Specification 2, the coefficients on log GDP are positive and statistically significant (at the ten per cent level or better) in most income groups. It is notable that the estimated log GDP coefficient in high-income countries is larger than that in the other groups. For Specification 2, the p-value for the equality of all coefficients is 0.12.

Adding controls for age and sex in Specification 3 makes little difference to the estimated GDP coefficients. Here the p-value for the equality of the coefficients across income groups is 0.21. Introducing the potential mediators (or confounders) in Specification 4 reduces this coefficient (but less so in rich countries). The p-value for the equality of all coefficients is 0.075.

These findings are to a certain extent in line with those in the literature. Deaton (2008) finds a cross-section GDP coefficient of 0.84 in the 2006 Gallup data, using a regression with no controls. Our estimated coefficient is 0.75 from the same specification with a longer time frame. To compare our estimates to the results in Sacks *et al.* (2010), we adjust their coefficients by the standard deviations of the country-level wellbeing scores in the analyses.[20] Sacks *et al.* (2010), in their analysis of data up to 2007, find a coefficient of 0.85 for Gallup. We find a comparable coefficient of 0.75, using the 0 to 10 scale. As in our results, their coefficients are only little affected by controlling for age and sex.

Specification 5 in **Table 3.4** includes the five WHR variables, as above. In this specification the estimated GDP coefficient is insignificant in three of the four income groups. The exception is low-income countries, where the coefficient is 30% lower than in Specification 4 but remains statistically significant.[21] As such, higher income matters for wellbeing in low-income countries, even holding social support, life expectancy and so on constant. The p-value for the equality of all coefficients in this last specification is 0.28, so that given the size of the standard errors we cannot reject the hypothesis that the coefficients in the four country groups are the same.

The reduction in the size of the estimated GDP per capita coefficients mostly comes from the inclusion of controls for social support, healthy life expectancy, and freedom to make life choices, and, for high-income countries, the perception of corruption.[22]

Motivated by concerns that conventional cluster-robust inference may be unreliable with a limited number of clusters, we implement the wild cluster bootstrap-t procedure (Cameron *et al.*, 2008) to assess the robustness of our estimates. This non-parametric method provides more-accurate confidence intervals and p-values when the number of clusters is modest. The results confirm a statistically-significant and positive relationship between GDP per capita and wellbeing for low-income countries ($p = 0.009$), with a 95% confidence interval of [0.085, 0.694]. In contrast, the relationship is not

[19] We test coefficient equality using seemingly unrelated estimation (SUEST), which allows us to compare coefficients across separately-estimated models while accounting for correlated errors across equations. The test evaluates the joint hypothesis that all of the income group coefficients are equal.

[20] Sacks *et al.* (2010) use the country-average of standardised wellbeing scores, while our country-average scores are not standardised. Unlike the individual-level scores, country-average standardised scores do not in general have a standard deviation of 1. To compare the estimates, we divide the estimates from Sacks *et al.* (2010) by the standard deviation of the country-level averages of the standardised scores and then multiply by the standard deviation of the country-level averages of the non-standardised scores. The standard deviations for the WVS and EB scores are retrieved from the data kindly provided by Daniel Sacks. The standard deviation of the scores in Gallup are estimated using the data over the comparable period.

[21] Section 3.3 below carries out panel analysis, and only uses data on countries for which we have at least 10 observations over the (11-year) 2009-2019 period. To facilitate the comparison between the results from this panel analysis and the cross-section results in the current sections, **Appendix Table D.8** reproduces Specifications 4 and 5 from **Table 3.4** using only the observations that are retained for the panel analysis.

[22] **Appendix Table D.9** presents specifications in which the five WHR variable are added one at a time.

statistically distinguishable from zero for lower-middle (p = 0.993, 95% CI [−0.513, 0.573]), upper-middle (p = 0.605, 95% CI [−0.863, 0.912]), and high-income countries (p = 0.312, 95% CI [−0.352, 0.983]).

Table 3.4. Country-level Cross-section to explain the Cantril Ladder: by Country Income

	(1) All Countries	(2) Low	(3) Lower-middle	(4) Upper-middle	(5) High
			Specification 1: No Controls		
GDP per capita (log)	0.753***	0.631***	0.348*	0.362**	1.201***
	(0.037)	(0.116)	(0.191)	(0.169)	(0.372)
			Specification 2: Year FE		
GDP per capita (log)	0.754***	0.636***	0.348*	0.366**	1.199***
	(0.037)	(0.118)	(0.202)	(0.173)	(0.385)
			Specification 3: Age, Sex, Year FE		
GDP per capita (log)	0.750***	0.663***	0.592***	0.394**	1.289***
	(0.093)	(0.116)	(0.216)	(0.185)	(0.417)
			Specification 4*a*: All Demographic Controls		
GDP per capita (log)	0.614***	0.524***	0.259	0.329***	1.235***
	(0.087)	(0.103)	(0.241)	(0.095)	(0.406)
Countries:	157	45	44	28	40
Country-year obs.	1467	405	403	283	376
			Specification 4*b*: All Demographic Controls, Countries with WHR Information		
GDP per capita (log)	0.617***	0.520***	0.232	0.325***	1.144**
	(0.095)	(0.103)	(0.257)	(0.092)	(0.483)
Countries:	148	45	40	27	36
Country-year obs.	1306	391	347	259	309
			Specification 5: All Controls, Countries with WHR Information		
GDP per capita (log)	0.349***	0.365***	0.002	0.092	0.215
	(0.091)	(0.128)	(0.221)	(0.098)	(0.212)
Countries:	148	45	40	27	36
Country-year obs.	1306	391	347	259	309

Notes: The additional controls in Specification 3 are country-year average age, age-squared and the share of women. The controls in Specifications 4*a* and 4*b* are country-year average age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Specification 5 includes the controls from Specifications 4*a* and 4*b* and the five WHR variables (Social support, Healthy life expectancy at birth, Freedom to make life choices, Generosity, and Perceptions of corruption). Standard errors in parentheses are clustered at the country level. * p < 0.1, ** p < 0.05, *** p < 0.01.

3.3. The Panel of Countries.

There is one main take away here:

- Except in low-income countries, income has no significant effect on wellbeing over time, once the social variables are taken into account. But for low-income countries there is a significant effect with a coefficient of 0.35 when the social variables are controlled for.

We now use the same country-year data as above to estimate the relationship between GDP and average population wellbeing within the same country over time, *i.e.* a panel analysis at the country level. We restrict the sample to only include the countries for which we have at least 10 observations over time (which leads us to drop 51 countries: see Appendix Table A.5).

As we did for the cross-section country-level analysis, we split the sample into four country income-groups: these results appear in columns (2) through (5) of **Table 3.5**.

Table 3.5. Country-level Panel to explain the Cantril Ladder: by Country Income

	(1) All Countries	(2) Low	(3) Lower-middle	(4) Upper-middle	(5) High
			Specification 2: Country and Year FE		
GDP per capita (log)	0.618***	0.890**	1.877**	0.553***	1.209
	(0.106)	(0.322)	(0.765)	(0.060)	(0.787)
			Specification 3: Age, Sex, Country and Year FE		
GDP per capita (log)	0.615***	0.976***	1.708**	0.594***	1.212
	(0.109)	(0.342)	(0.733)	(0.066)	(0.833)
			Specification 4*a*: All Demographic Controls, All Countries		
GDP per capita (log)	0.591***	0.822***	1.324*	0.593***	0.701
	(0.069)	(0.291)	(0.719)	(0.040)	(0.743)
Countries:	106	24	30	24	28
Country-year obs.	1131	256	321	255	299
			Specification 4*b*: All Demographic Controls, Countries with WHR Information		
GDP per capita (log)	0.607***	0.818**	2.337***	0.588***	0.574
	(0.077)	(0.353)	(0.569)	(0.038)	(0.549)
Countries:	101	24	26	23	28
Country-year obs.	1000	245	271	233	251
			Specification 5: All Controls, Countries with WHR Information		
GDP per capita (log)	0.568***	1.085**	2.339***	0.373***	0.268
	(0.083)	(0.453)	(0.611)	(0.093)	(0.448)
Countries:	101	24	26	23	28
Country-year obs.	1000	245	271	233	251

Notes: Only Countries with 10 or More Observations. The additional controls in Specification 3 are country-year average age, age-squared and the share of women. The controls in Specifications 4*a* and 4*b* are country-year age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Specification 5 includes the controls from Specifications 4*a* and 4*b* and the five WHR variables (Social support, Healthy life expectancy at birth, Freedom to make life choices, Generosity, and Perceptions of corruption). Standard errors in parentheses are clustered at the country level. The full estimation results behind this table are presented in **Appendix Table G.1** to **Appendix Table G.5**. * p < 0.1, ** p < 0.05, *** p < 0.01.

At the World level, higher economic growth is significantly associated with a growth in wellbeing, contradicting the Easterlin hypothesis. But when we split the World into four different levels of development a very different picture emerges. In high-income countries, the estimated coefficient is large in the initial specifications and becomes progressively smaller with the introduction of control variables. However, the estimates are imprecise and we find no evidence of a significant effect of income on wellbeing in rich countries – whichever control variables are or are not included. This finding is consistent with the lack of an upward wellbeing trend in long-running single-country surveys in Australia, Germany, and the US despite the growth in real GDP per capita in these countries.[23] It should be underlined that the panels of countries in **Table 3.5** are only short, and it is therefore more difficult to distinguish long-run trends from business-cycle movements,[24] although we do include unemployment to help control for the cycle in specifications 4 and 5. In contrast to the findings for the richer countries, economic growth in low-income countries significantly increases wellbeing, whether there are control

[23] Clark *et al.* (2018). Figure 2.3. See also the World Happiness Report.

[24] In particular, eight of the thirteen countries identified as 'Expansion-Only Transition Countries' in Easterlin and O'Connor (2020), for which we do not observe an economic downturn, appear in the Upper-Middle income group: this may explain the large estimated income coefficient in this group.

variables or not. For middle-income countries this is also true without controls but the association disappears once the social variables are included. [25]

The comparison of Specification (4*b*) to Specification (5) reveals the role of the social variables. For the whole sample, the coefficient in Specification (4*b*) is 0.607, and adding the WHR variables with Specification (5) produces a figure of 0.568. The small GDP per capita coefficient for high-income countries in column (5) largely results from the inclusion of controls for social support and the perception of corruption. The control for freedom to make life choices produces a smaller coefficient in upper-middle and high-income countries. This is the same pattern as appeared in the cross-section of countries in **Appendix Table D.9**.

We again test for the equality of the coefficients on log GDP per capita across the four country groups. In Specification 2, the p-value from the F-test is 0.14. It then takes on the value of 0.2 for Specification 3, 0.57 for Specification 4*a*, 0.01 for Specification 4*b* and 0.001 for Specification 5. In these last two cases, we reject the hypothesis that all coefficients are equal.

The inclusion of the WHR variables makes less difference to the GDP coefficient in the panel regressions than it did in the cross-section regressions in Table 3.4. First, this may reflect the smaller variation in the WHR variables in panel data over our relatively-short 2009-2019 time period (so that they mediate/confound less): the between-country variation in these variables is two to seven times larger than the within-country variation. Second, the returns to higher GDP per capita could be very concave: in this case, GDP growth may bring very little benefit in terms of higher healthy life expectancy, for example, beyond some level of income. To investigate, **Appendix Figure G.1** plots the relationship between the change in the WHR variables and GDP per capita growth within countries. The arrows in these figures go from the first to the last observations per country. Arrows that point in the North-East direction indicate that real GDP per capita growth (which is what over 80% of countries experienced) went hand-in-hand with a rise in the variable concerned. The top-left panel of **Appendix Figure G.1** refers to healthy life expectancy at birth. Here it is the case that the majority of arrows do indeed point to the North-East, so that countries that became richer also experienced higher values of healthy life expectancy at birth. In addition, the relationship looks to be very concave: small rises in GDP at the left of the figure are associated with large rises in life expectancy, while the arrows to the right of the figure are much flatter.[26] The corresponding figures for freedom to make life choices and corruption also have arrows that point in mostly the same direction: as countries become richer their citizens consider that they have more freedom and perceive less corruption. The relationships for the last two variables, generosity and social support are on the contrary much messier.

4. Conclusion

We have investigated the relationship between income and subjective wellbeing in 11 waves of Gallup World Poll data. Across individuals the cross-sectional relationship between income and wellbeing is always significantly positive. Across the whole World, the coefficient when subjective wellbeing (0-10, Cantril Ladder) is regressed on log income is 0.4. This coefficient is remarkably similar for individuals in different country-income groups.

Turning to cross-country differences, countries with higher GDP per head also have higher average wellbeing scores, again both across the whole World and within the four country-income groups. The global coefficient with no controls is 0.6. However the picture changes sharply when we introduce the five 'social' variables from the World Happiness Report (healthy life expectancy, freedom, corruption,

[25] **Appendix Table G.6** presents specifications that add one WHR variable at a time.

[26] Preston (1975), updated by Deaton (2004), suggests that the country cross-sectional relationship between GDP and life expectancy is log-linear: this is known as the Preston Curve. The top-left panel of **Appendix Figure G.1** is consistent with a panel version of the cross-section Preston Curve.

social support, and generosity). In this case, GDP is no longer significantly correlated with wellbeing, except in low-income countries.

Moving to time series within countries, the analysis confirms the findings of a significant absolute effect of income in poor countries but no significant correlation in rich countries. And it was rich countries Easterlin was talking about. In middle-income countries the findings are somewhat contradictory. While (holding social variables constant) the cross-section showed no absolute effect of income, the time series show a positive effect.

We should stress that our cross-country estimates for high-income countries are imprecise and therefore consistent both with a substantial positive and negative effect of income growth among high-income countries. So one interpretation of an effect which is positive but not significantly different from zero is to say "Sometimes the effect is positive, but sometimes it is not." In general, all of the findings of no significant effects will depend on the sample size. Even though the sample includes all of the countries in the World it is still small, especially when we split countries up into groups. The estimated coefficients in the country cross-section and panel regressions do show some suggestive heterogeneity between these country-income groups, but statistical precision is only low and in many cases we cannot reject that the correlation is the same across them. Even so, we believe that examining the relationship between income and wellbeing separately by income group is a valuable exercise. The assumption that the GDP-wellbeing relationship is uniform across the World is a strong one, and the policy implications of mis-characterising this relationship are arguably substantial.

Given the short time series that we use, we interpret the results with caution, and we hope that future research with longer time series or more granular data will help to refine the estimates. It is also essential to understand the role of the five social variables here in terms of the correlation with GDP: Are they driven by GDP or do they on the contrary provide the conditions under which countries can grow? More causal evidence in this respect is key.

But two conclusions are surely of importance. For low-income countries, economic growth improves the human lot. For rich countries, it mainly does so (if it does) through its effects, not on household income, but on social institutions. These social institutions of health, social support, personal freedom, lack of corruption and a pro-social ethic are important at all levels of income. In poorer countries it is of course critical to raise household incomes. But in high-income countries there is no strong case in our data for increasing average household income at the expense of health and social support.

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Appendix A. Appendix for the Data Section.

Appendix Table A.1 Gallup World Poll Countries by Income Group (2006 World Bank classification)

Low-income countries (47 countries)
Afghanistan, Bangladesh, Benin, Burkina Faso, Burundi, Cambodia, Central African Republic, Chad, Comoros, Congo (Dem. Rep.), Cote d'Ivoire, Ethiopia, Gambia, Ghana, Guinea, Haiti, India, Kenya, Kyrgyz Republic, Lao PDR, Liberia, Madagascar, Malawi, Mali, Mauritania, Mongolia, Mozambique, Myanmar, Nepal, Niger, Nigeria, Pakistan, Rwanda, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Tajikistan, Tanzania, Togo, Uganda, Uzbekistan, Vietnam, Yemen, Zambia, Zimbabwe.
Lower-middle income countries (43 countries)
Albania, Algeria, Angola, Armenia, Azerbaijan, Belarus, Bhutan, Bolivia, Bosnia and Herzegovina, Cameroon, China, Colombia, Congo, Dominican Republic, Ecuador, Egypt, Arab Rep., El Salvador, Eswatini, Georgia, Guatemala, Honduras, Indonesia, Iran, Islamic Rep., Iraq, Jamaica, Jordan, Kosovo, Lesotho, Moldova, Morocco, Namibia, Nicaragua, North Macedonia, Paraguay, Peru, Philippines, Sri Lanka, Syrian Arab Republic, Thailand, Tunisia, Turkmenistan, Ukraine, West Bank and Gaza.
Upper-middle income countries (28 counties):
Argentina, Botswana, Brazil, Bulgaria, Chile, Costa Rica, Croatia, Gabon, Hungary, Kazakhstan, Latvia, Lebanon, Libya, Lithuania, Malaysia, Mauritius, Mexico, Montenegro, Panama, Poland, Romania, Russian Federation, Serbia, Slovak Republic, South Africa, Turkey, Uruguay, Venezuela.
High-income countries (40 countries):
Australia, Austria, Bahrain, Belgium, Canada, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong SAR (China), Iceland, Ireland, Israel, Italy, Japan, Korea (Rep.), Kuwait, Luxembourg, Malta, Netherlands, New Zealand, Norway, Portugal, Puerto Rico, Qatar, Saudi Arabia, Singapore, Slovenia, Spain, Sweden, Switzerland, Taiwan, Trinidad and Tobago, United Arab Emirates, United Kingdom, United States.

Appendix Table A.2 Sample composition by country and year. Individual-level data.

Country \ Year	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Afghanistan		989	993	1970	1000	942			967	968	1081
Albania		977	946	1018	984	977	989	976	986	940	1042
Algeria			1976	972		1000		958	958	952	1076
Angola					916	943					
Argentina	980	979	990	977	986	988	848	988	990	970	1043
Armenia	938	962	945	952	961	980	944	987	916	964	1005
Australia		982	987		987	958	976	973	974	965	998
Austria	967	974	968	991	989	981	978	875	967	974	990
Azerbaijan			947	964	968	978	988	972	968	979	1062
Bahrain	1041	981	1919	996	993	996	989	983	1055		1015
Bangladesh	924	995	993	1941	982	967	967	982	954	987	2828
Belarus	981	964	935	971	975	990	986	1006	1021	1020	1072
Belgium		922	934	942	971	980	976	989	978	1007	1019
Benin			972	924	949	919	939	939	867	889	968
Bhutan					989	1001	998				
Bolivia		954	964	938	977	972	977	784	973	947	953
Bosnia and Herzegovina		992	985	957	973	929	908	937	916	927	1021
Botswana		996	995	986	979		891	819	920	873	935
Brazil	1021	1033	1027	1947	999	995	996	971	962	950	2874
Bulgaria	919	964	971	970	977	971	974	974	974	971	1033
Burkina Faso		988	977	989	884	781	802	922	888	851	864
Burundi	996		877			838				773	
Cambodia		1000	1000	980	959	971	979	971	1488	967	899
Cameroon		1196	989	949	920	882	939	952	928	925	956
Canada	970	983	866	968	980	967	652	489	972	987	1007
Central African Republic		992	992					828	901		
Chad	998	994	992	990	992	984	942	922	887	805	1045
Chile	983	966	970	976	977	891	962	973	1015	975	1031
China	3781	3368	4102	6650	4133	4013	4153	4135	3581	3288	3391
Colombia	986	990	983	987	949	971	947	949	954	912	925
Comoros	970	996	1943	994						918	
Congo, Dem. Rep.	993		935	992	976	970	989	985	916		
Congo, Rep.			980	477	875	776	749	940	848	749	1030
Costa Rica	922	993	981	973	926	809	828	808	977	969	921
Cote d'Ivoire					842	889	827	948	949	905	943
Croatia		979	980	898	931	926	957	961	912	968	1061
Cyprus	477	979	975	496	491	939	983	943	958	1001	1016
Czech Republic	1024	953	961	974	976	973	992	983	989	970	
Denmark	980	981	994	986	745	973	979	984	970	983	1012
Dominican Republic	988	965	969	959	940	889	917	874	906	878	982
Ecuador	962			971	985	911	994	987	976	940	897
Egypt, Arab Rep.	1022	1033	3164		1147	996	986	999	976	994	2056
El Salvador	992	947	973	979	965	948	738	728	958	936	1001

Estonia			995	970	990	970	979	976	976	972	1055
Eswatini			979							883	999
Ethiopia				1498	960	911	933	948	990	995	2144
Finland		992	988	988	737	976	987	984	998	995	1013
France	960	980	972	1951	720	942	983	987	977	965	987
Gabon				873	892	864	906	941	928	896	1006
Gambia, The									937	899	997
Georgia	952	960	967	972		993	995	965	962	956	1025
Germany	961	992	8971	12915	737	979	973	842	981	977	975
Ghana	944	991	994		913	734	943	939	855	967	958
Greece	985	972	977	977	991	991	985	970	960	977	1065
Guatemala	980	969	952	918	961	916	697	719	943	851	830
Guinea			978	990	1003	997	985	890	823	833	1061
Haiti		383	454	474	436	347	312	303	446	394	
Honduras	941	953	952	989	947	934	897	613	951	879	832
Hong Kong SAR, China		728				944		941	958		
Hungary		998	1004	990	1002	971	958	958	988	988	1058
Iceland				971	485		568	512	481		495
India	2865	5658	3446	12244	2957	2932	2937	2967	2900	2910	6067
Indonesia	1069	1063	984	1964	981	956	945	959	958	954	2074
Iran, Islamic Rep.			907	990	904	957	954	965	963	994	1031
Iraq	912	883	1846	888	970	876	864	944	934	967	1063
Ireland	484	966	968	981	993	942	973	984	984	974	959
Israel	979	967	975	956	968	942	968	986	993	997	1078
Italy	944	921	920	1940	995	947	984	971	992	966	1018
Jamaica			437		427	373			430		459
Japan	980	971	978	969	947	953	942	957	933	959	976
Jordan	986	994	1969	999	991	988	997	983	990	982	959
Kazakhstan	932	877	890	899	899	918	952	957	971	957	1035
Kenya		980		992	984	932	913	988	987	970	931
Korea, Rep.	907	912	906	950	911	831	944	968	977	972	980
Kosovo		1000	861	997	928	960	950	966	965	976	1072
Kuwait					1007	985	980	979	978	974	989
Kyrgyz Republic	991	974	987	986	923	967	945	990	991	959	1024
Lao PDR			1000	903					770	2013	823
Latvia	494		975	943	963	971	971	969	953	968	1045
Lebanon	985	1006	1982	999	995	996	997	995	998	989	1028
Lesotho			993					766	826		808
Liberia								842	962	931	909
Libya							969	971	962	960	975
Lithuania	481	940	957	964	938	954	934	924	895	862	806
Luxembourg		951	953	964	485	931	981	976	978	983	1000
Madagascar			1000	983	1003	1002	993	986		945	985
Malawi	995		999	998	1000	975	938	978	976	956	928
Malaysia	942	992	949	985	982	968	956			960	992
Mali	995	993	947	933	886	844	846	942	938	884	1065

Malta		973	972	993	494	999	985	1003	995	1003	1014
Mauritania											1014
Mauritius			981			981		991	975	963	1000
Mexico	962		860	1628	779	916	1011	923	950	965	887
Moldova	937	968	949	925	967	962	930	975		949	993
Mongolia			966	947	976	974	982	973	981	988	1053
Montenegro		981	987	943	969	979	973	982	964	970	1069
Morocco				965	892		1009	905	843	725	837
Mozambique							707			894	849
Myanmar				1014	1020	1012	1016	1017	1516	965	1073
Namibia						752			969	953	972
Nepal	977		956	1816	1016	938	918	938	945	926	1883
Netherlands		972	928	990	740	981	960	984	992	993	1003
New Zealand		726	963	966	490	940	968		977	963	1001
Nicaragua	985		964	974	932	928	679	907	932	883	988
Niger	988	1000	997	975	994	984	969	920	836		917
Nigeria	909	1000		1811	928		891	950	944	947	2762
North Macedonia		983	879	964	963	971	995	827	954	971	1041
Norway				961		965	953	975	975	977	1000
Pakistan	1095	916	979	1937	981	968	1000	984	1516	982	1055
Panama	1004	950	957	985	971	884	909	720	954	920	969
Paraguay	980	972	970	971	986	987	934	997	984	975	1043
Peru	971	960	965	958	985	961	957	955	968	925	939
Philippines	987	984	977	1975	999	995	999	993	986	984	2070
Poland	912	935	982	940	947	956	943	957	947	974	1032
Portugal	952	944	947	954	974	990	1000	980	977	987	1011
Puerto Rico						461					
Qatar			953	955							
Romania		922	936	956	971	948	963	972	962	974	1038
Russian Federation	1890	3675	1807	2698	1830	1845	1915	1847	1884	1905	2848
Rwanda	991		953	976	936	932	895	962	938	951	
Saudi Arabia	962	1008	1002		970	995	1005	971	974	995	1039
Senegal	992	995	975	927	988	985	923	962	910	924	951
Serbia		985	953	986	989	949	953	963	951	948	1042
Sierra Leone								790	838	896	1067
Singapore	996	980	982	943			916	869	890	949	930
Slovak Republic		974	985	997	977	985	983	988	982	984	1034
Slovenia	490	977	981	986	991	999	989	985	977	987	1014
Somalia						753	920	1073			
South Africa		986	995	1976	938	949	968	952	967	940	927
South Sudan						605	664	742	773		
Spain	976	986	948	1984	998			986	981	978	1002
Sri Lanka	972	1011	982	1973	988	1028	1036		1030	1045	1028
Sudan	826	900	1977	997		890					
Sweden		978	968	980	734	968	975	959	982	978	999
Switzerland	955			979		978	470	976	983	986	961

Syrian Arab Republic	1006	923	1992	993	956		898				
Taiwan		931	979	978	992	970	967	964	970	988	1005
Tajikistan	968	961	966	971	932	971	969	974	930	2904	1051
Tanzania	983	998	989	997	1000	854	862	988	969	973	952
Thailand	995	985	1000	1978	996	991		960	937	952	1941
Togo			982			795	765	965	902	939	1072
Trinidad and Tobago									479		
Tunisia	973		1993	913	1037	947	970	965	951	945	915
Turkey	940	938	999	1957	973		963	979	959	982	1982
Turkmenistan			998	972	956	991	933	991	992	984	1082
Uganda		998	995	988		809	709	964	901	948	927
Ukraine	961	958	941	937	964	925	924	937	889	933	1035
United Arab Emirates	1020	1018	1940	1009	922	985	1854	1825	1780	1784	1336
United Kingdom	956	949	5701	11482	733	971	981	965	987	966	1003
United States	960	955	817	980		941	574	513	921	962	998
Uruguay	958	939	932	955	947	966	802	817	990	982	1050
Uzbekistan	931	955	981	971	978	950	983	966	988	975	1060
Venezuela, RB	962		953	962	965	868	900	963	992		
Vietnam	969		836	1699	939	910	911	997	886	933	1952
West Bank and Gaza	972	988	1948	980	982	953	982	968	944	965	1035
Yemen, Rep.	992	994	1952	976	959	933	925	977	959	947	1051
Zambia	943		999	995	1000	932	964	886	929	897	916
Zimbabwe		979		981	964	947	959	901	966	967	1051

Appendix Table A.3. Individual-level Data Summary Statistics

	Mean	SD
Panel A: All Observations		
Wellbeing: Cantril Ladder (0-10)	5.51	2.37
Equiv. HH income (Int $)	11,243	510,418
HH income (log)	8.26	1.56
Age	41.7	17.8
Female	0.54	0.50
Unemployed	0.06	0.24
Education (Degree or above)	0.17	0.37
Partnered / Married	0.58	0.49
Health problems	0.25	0.43
Observations	1,511,673	
Panel B: Top and Bottom 1% of Incomes Trimmed		
Wellbeing: Cantril Ladder (0-10)	5.51	2.36
Equiv. HH income (Int $)	9,470.41	16,301.81
HH income (log)	8.26	1.50
Age	41.70	17.83
Female	0.54	0.50
Unemployed	0.06	0.24
Education (Degree or above)	0.17	0.37
Partnered / Married	0.58	0.49
Health problems	0.25	0.43
Observations	1,481,791	

Appendix Table A.4. Country-level Data Summary Statistics. Gallup World Poll.

	Mean	SD
Average wellbeing	5.46	1.12
GDP pc	20350.71	19836.20
GDP pc (log)	9.37	1.16
Average age	39.54	5.42
Share of women	0.51	0.03
Unemployed, share	0.07	0.04
Education (degree or above), share	0.12	0.10
Partnered / Married, share	0.57	0.09
Health problems, share	0.25	0.08
Observations	1,467	
Countries	157	

Appendix Table A.5. Number of Observations per Country by World Bank Income Group. Gallup World Poll.

Country name	Years	N
Low-income group		
Afghanistan	2009 - 2019	11
Bangladesh	2009 - 2019	11
Benin	2011 - 2019	9
Burkina Faso	2010 - 2019	10
Burundi	2009 - 2018	4
Cambodia	2010 - 2019	10
Central African Republic	2010 - 2017	4
Chad	2009 - 2019	11
Comoros	2009 - 2019	6
Congo, Dem. Rep.	2009 - 2017	8
Cote d'Ivoire	2013 - 2019	7
Ethiopia	2012 - 2019	8
Gambia, The	2017 - 2019	3
Ghana	2009 - 2019	11
Guinea	2011 - 2019	9
Haiti	2010 - 2018	9
India	2009 - 2019	11
Kenya	2010 - 2019	9
Kyrgyz Republic	2009 - 2019	11
Lao PDR	2011 - 2019	5
Liberia	2010 - 2019	7
Madagascar	2011 - 2019	9
Malawi	2009 - 2019	10
Mali	2009 - 2019	11
Mauritania	2009 - 2019	11
Mongolia	2010 - 2019	10
Mozambique	2011 - 2019	5
Myanmar	2012 - 2019	8
Nepal	2009 - 2019	10
Niger	2009 - 2019	11
Nigeria	2009 - 2019	9
Pakistan	2009 - 2019	11
Rwanda	2009 - 2019	10
Senegal	2009 - 2019	11
Sierra Leone	2010 - 2019	9
Sudan	2009 - 2014	5
Tajikistan	2009 - 2019	11
Tanzania	2009 - 2019	11
Togo	2011 - 2019	7
Uganda	2009 - 2019	11

Country name	Years	N
Uzbekistan	2009 - 2019	11
Vietnam	2009 - 2019	10
Yemen, Rep.	2009 - 2019	11
Zambia	2009 - 2019	10
Zimbabwe	2010 - 2019	9
Lower-middle income group		
Albania	2010 - 2019	10
Algeria	2011 - 2019	7
Angola	2011 - 2014	4
Armenia	2009 - 2019	11
Azerbaijan	2011 - 2019	9
Belarus	2009 - 2019	11
Bhutan	2013 - 2015	3
Bolivia	2009 - 2019	11
Bosnia and Herzegovina	2010 - 2019	10
Cameroon	2010 - 2019	10
China	2009 - 2019	11
Colombia	2009 - 2019	11
Congo, Rep.	2011 - 2019	9
Djibouti	2009 - 2011	2
Dominican Republic	2009 - 2019	11
Ecuador	2009 - 2019	9
Egypt, Arab Rep.	2009 - 2019	11
El Salvador	2009 - 2019	11
Eswatini	2011 - 2019	3
Georgia	2009 - 2019	10
Guatemala	2009 - 2019	11
Honduras	2009 - 2019	11
Indonesia	2009 - 2019	11
Iran, Islamic Rep.	2011 - 2019	9
Iraq	2009 - 2019	11
Jamaica	2011 - 2019	5
Jordan	2009 - 2019	11
Kosovo	2010 - 2019	10
Lesotho	2011 - 2019	4
Moldova	2009 - 2019	10
Morocco	2011 - 2019	8
Namibia	2014 - 2019	4
Nicaragua	2009 - 2019	11
North Macedonia	2009 - 2019	11
Paraguay	2009 - 2019	11
Peru	2009 - 2019	11

Country name	Years	N
Philippines	2009 - 2019	11
Sri Lanka	2009 - 2019	10
Syrian Arab Republic	2009 - 2015	6
Thailand	2009 - 2019	10
Tunisia	2009 - 2019	11
Turkmenistan	2009 - 2019	10
Ukraine	2009 - 2019	11
West Bank and Gaza	2009 - 2019	11
Upper-middle income group		
Argentina	2009 – 2019	11
Botswana	2010 – 2019	10
Brazil	2009 – 2019	11
Bulgaria	2009 – 2019	11
Chile	2009 – 2019	11
Costa Rica	2009 – 2019	11
Croatia	2010 – 2019	10
Gabon	2012 – 2019	8
Hungary	2010 – 2019	10
Kazakhstan	2009 – 2019	11
Latvia	2009 – 2019	10
Lebanon	2009 – 2019	11
Libya	2015 – 2019	5
Lithuania	2009 – 2019	11
Malaysia	2009 – 2019	9
Mauritius	2011 – 2019	6
Mexico	2009 – 2019	11
Montenegro	2010 – 2019	10
Panama	2009 – 2019	11
Poland	2009 – 2019	11
Romania	2010 – 2019	10
Russian Federation	2009 – 2019	11
Serbia	2010 – 2019	10
Slovak Republic	2010 – 2019	10
South Africa	2010 – 2019	10
Turkey	2009 – 2019	11
Uruguay	2009 – 2019	11
Venezuela, RB	2009 – 2019	11
High-income group		
Australia	2010 - 2019	9
Austria	2009 - 2019	11
Bahrain	2009 - 2019	10
Belgium	2010 - 2019	10

Country name	Years	N
Canada	2009 - 2019	11
Cyprus	2009 - 2019	11
Czech Republic	2009 - 2018	10
Denmark	2009 - 2019	11
Estonia	2011 - 2019	9
Finland	2010 - 2019	10
France	2009 - 2019	11
Germany	2009 - 2019	11
Greece	2009 - 2019	11
Hong Kong	2009 - 2017	7
Iceland	2012 - 2019	6
Ireland	2009 - 2019	11
Israel	2009 - 2019	11
Italy	2009 - 2019	11
Japan	2009 - 2019	11
Korea, Rep.	2009 - 2019	11
Kuwait	2013 - 2019	7
Luxembourg	2010 - 2019	10
Malta	2010 - 2019	10
Netherlands	2010 - 2019	10
New Zealand	2010 - 2019	10
Norway	2012 - 2019	7
Portugal	2009 - 2019	11
Puerto Rico	2014 - 2014	1
Qatar	2011 - 2012	2
Saudi Arabia	2009 - 2019	11
Singapore	2009 - 2019	9
Slovenia	2009 - 2019	11
Spain	2009 - 2019	9
Sweden	2009 - 2019	11
Switzerland	2009 - 2019	8
Taiwan	2010 - 2019	10
Trinidad and Tobago	2011 - 2017	3
United Arab Emirates	2009 - 2019	11
United Kingdom	2009 - 2019	11
United States	2009 - 2019	11

Appendix Table A.6. Country-level Data Summary Statistics for the Sample with WHR variables

	Mean	SD
Average wellbeing	5.43	1.16
GDP pc	19364.04	19415.60
GDP pc (log)	9.31	1.16
Average age	39.62	5.46
Share of women	0.51	0.02
Unemployed, share	0.07	0.04
Education (degree or above), share	0.11	0.09
Partnered / Married, share	0.56	0.09
Health problems, share	0.25	0.07
WHR Variables:		
Social support	0.81	0.12
Healthy life expectancy at birth	63.07	6.79
Freedom to make life choices	0.75	0.14
Generosity	-0.00	0.16
Perceptions of corruption	0.75	0.19
Observations	1306	

Notes: The WHR variables come from Helliwell *et al*. (2022), where they are described as follows. "*Social support* is the national average of the binary responses (0 = No, 1 = Yes) to the Gallup World Poll (GWP) 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?" *Freedom to make* life choices is the national average of binary responses (0 = No, 1 = Yes) to the GWP question "Are you satisfied or dissatisfied with your freedom to choose what you do with your life?". *Generosity* is the residual of regressing the national average of GWP responses to the donation question "Have you donated money to a charity in the past month?" on log GDP per capita. *Perceptions of corruption* are the average of binary answers to two GWP questions: "Is corruption widespread throughout the government in this country or not?" and "Is corruption widespread within businesses in this country or not?" Where data for government corruption are missing, the perception of business corruption is used as the overall corruption-perception measure. The time series for *healthy life expectancy* at birth is constructed based on data from the World Health Organization (WHO) Global Health Observatory data repository, with data available for 2000, 2010, 2015, and 2019. Interpolation and extrapolation are used to match this report's sample period (2005-2021)."

Appendix Table A.7. Country-level Data Summary Statistics for Countries with 10 or more observations

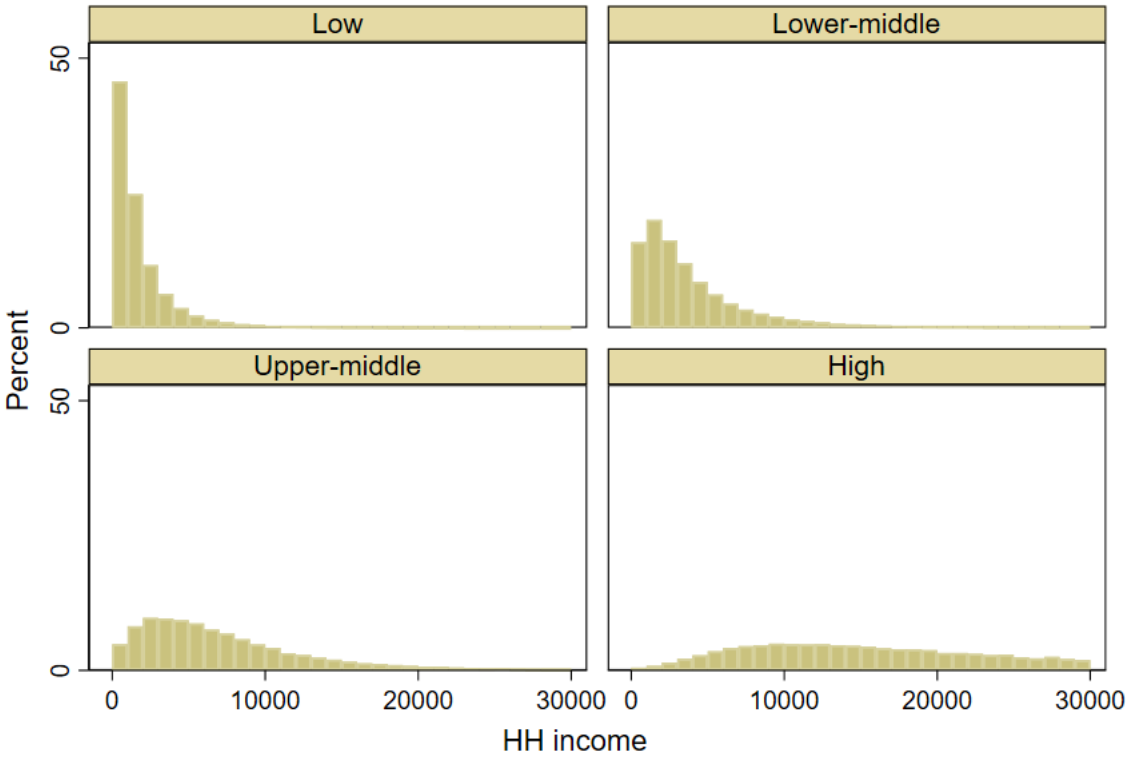
	Mean	SD
Average wellbeing	5.58	1.08
GDP pc	21192.33	18850.45
GDP pc (log)	9.49	1.08
Average age	40.23	5.42
Share of women	0.51	0.03
Unemployed, share	0.07	0.04
Education (degree or above), share	0.13	0.10
Partnered / Married, share	0.58	0.09
Health problems, share	0.25	0.07
Observations	1131	

Appendix Table A.8. Country-level Data Summary Statistics for Countries with 10 or more observations and the WHR variables

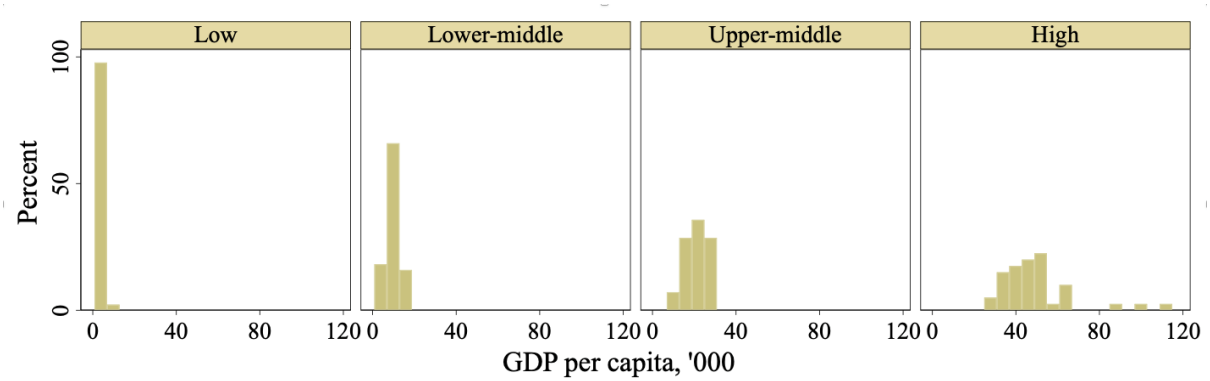
	Mean	SD
Average wellbeing	5.57	1.12
GDP pc	20611.90	18827.43
GDP pc (log)	9.45	1.09
Average age	40.39	5.44
Share of women	0.52	0.02
Unemployed, share	0.07	0.04
Education (degree or above), share	0.12	0.09
Partnered / Married, share	0.57	0.09
Health problems, share	0.25	0.07
WHR Variables:		
Social support	0.83	0.11
Healthy life expectancy at birth	64.13	5.89
Freedom to make life choices	0.75	0.14
Generosity	-0.01	0.16
Perceptions of corruption	0.76	0.19
Observations	1000	

Note: See notes to Appendix Table A.6.

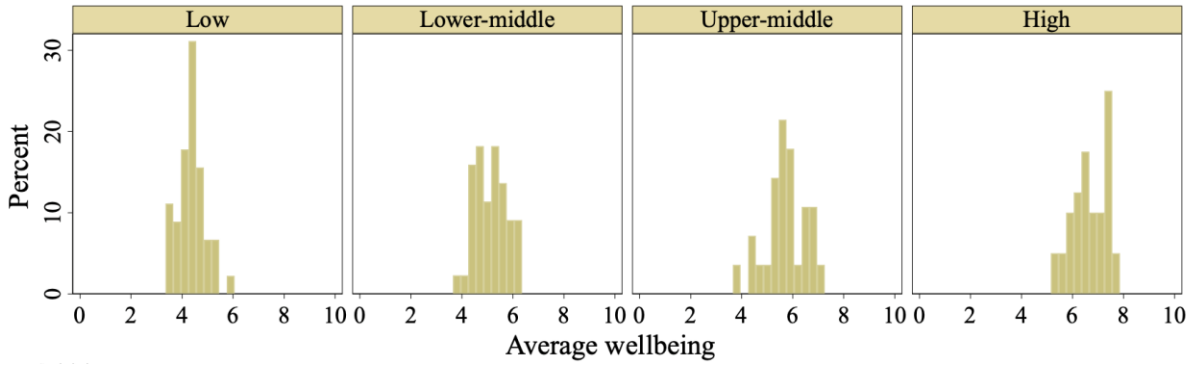
Appendix Figure A.1. The Distribution of Equivalised Household Income (Bottom 90% of the Global Distribution) by Country Income Group



Appendix Figure A.2. Real GDP per Capita by Income Group: The Whole Distribution



Appendix Figure A.3. The Distribution of Country-Year Average Wellbeing by Income Group



Appendix B. Appendix for the Section Results: Individual cross-section.

Appendix Table B.1. Replication of Table 3.1 with the Top and Bottom 1% of Incomes Trimmed

	No Controls	FE	Age, Sex, FE	All Demographic Controls
HH income (log)	0.592***	0.508***	0.509***	0.451***
	(0.063)	(0.021)	(0.020)	(0.019)
Age-squared / 100			-0.040***	-0.051***
			(0.003)	(0.003)
Age-squared / 100			0.029***	0.043***
			(0.003)	(0.003)
Female			0.130***	0.146***
			(0.015)	(0.015)
Unemployed				-0.435***
				(0.023)
Education (degree or above)				0.367***
				(0.021)
Partnered / Married				0.163***
				(0.017)
Health problems				-0.494***
				(0.025)
Constant	0.648	0.624***	1.466***	2.092***
	(0.528)	(0.153)	(0.155)	(0.149)
R^2	0.14	0.22	0.24	0.25
Observations	1481791	1481791	1481791	1481791

Notes: The logarithm on household income is calculated as a logarithm of (1+income). The controls in columns 3 and 4 include indicators for missing age and sex: country-year averages are applied for observations with missing age and the country-year modes for missing sex information. Standard errors in parentheses are clustered at country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table B.2. Full Results from Table 3.2.

	All countries	Low	Lower-middle	Upper-middle	High
Specification 1. No Controls					
HH income (log)	0.568***	0.271**	0.438***	0.416***	0.584***
	(0.056)	(0.116)	(0.039)	(0.096)	(0.066)
Specification 2. Country and Year FE					
HH income (log)	0.454***	0.372***	0.515***	0.528***	0.451***
	(0.020)	(0.040)	(0.028)	(0.042)	(0.040)
Specification 3. Age, Sex, Country and Year FE					
HH income (log)	0.456***	0.372***	0.507***	0.533***	0.470***
	(0.019)	(0.040)	(0.025)	(0.039)	(0.040)
Age	-0.040***	-0.028***	-0.061***	-0.046***	-0.035***
	(0.003)	(0.003)	(0.005)	(0.004)	(0.004)
Age-squared / 100	0.029***	0.025***	0.048***	0.028***	0.026***
	(0.003)	(0.003)	(0.006)	(0.004)	(0.004)
Female	0.126***	0.072**	0.199***	0.134***	0.127***
	(0.015)	(0.029)	(0.035)	(0.023)	(0.022)
Specification 4. All Demographic Controls, Country and Year FE					
HH income (log)	0.403***	0.348***	0.452***	0.448***	0.386***
	(0.018)	(0.037)	(0.024)	(0.034)	(0.035)
Age	-0.051***	-0.029***	-0.068***	-0.061***	-0.057***
	(0.003)	(0.003)	(0.005)	(0.005)	(0.004)
Age-squared / 100	0.044***	0.029***	0.060***	0.048***	0.049***
	(0.003)	(0.004)	(0.006)	(0.004)	(0.003)
Female	0.142***	0.088***	0.213***	0.150***	0.154***
	(0.014)	(0.028)	(0.034)	(0.024)	(0.022)
Unemployed	-0.450***	-0.250***	-0.469***	-0.527***	-0.637***
	(0.024)	(0.035)	(0.042)	(0.037)	(0.044)
Education (degree or above)	0.392***	0.505***	0.353***	0.417***	0.313***
	(0.021)	(0.061)	(0.030)	(0.030)	(0.033)
Partnered / Married	0.160***	0.007	0.095***	0.219***	0.339***
	(0.017)	(0.017)	(0.028)	(0.025)	(0.022)
Health problems	-0.502***	-0.238***	-0.514***	-0.583***	-0.745***
	(0.025)	(0.023)	(0.038)	(0.031)	(0.033)
Observations	1,511,673	414,100	422,092	285,857	389,624
Countries	158	47	43	28	40

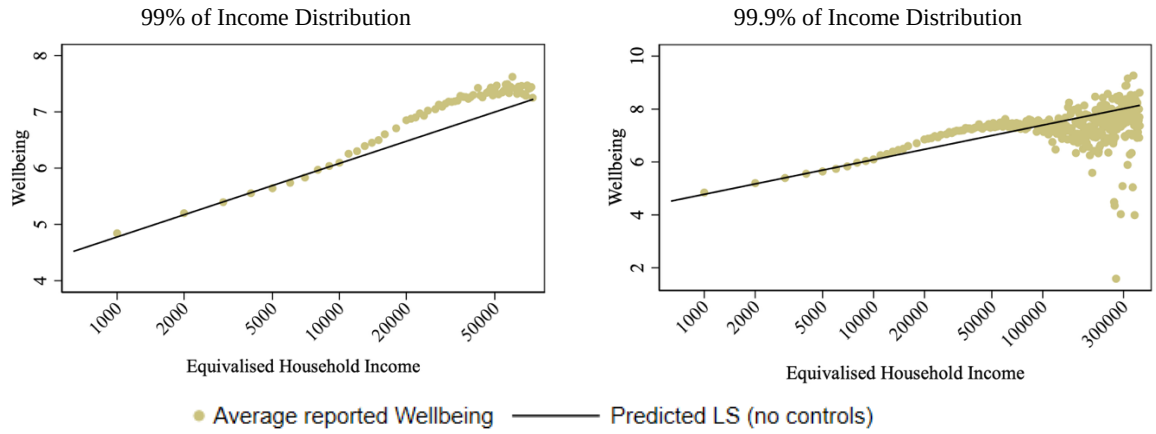
Notes: The controls in specifications 3 and 4 include indicators for missing age and sex: country-year averages are applied for observations with missing age and the country-year modes for missing sex information. Standard errors in parentheses are clustered at country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table B.3. Individual-level Cross-section. Literature

Author	Outcome measure	Income measure	Controls	Data	Coefficient
Clark *et al.* (2018) Table 2.1	Non-standardised Life satisfaction (0 to10)	Log of Equivalised HH income	[1] Sex and age [2] Qualification, employment, criminality, partnered, physical and emotional health	BCS (ages 34 and 42)	[1] 0.30 [2] 0.20
Clark *et al.* (2018) Table 2.2	Non-standardised Life satisfaction (0 to10)	Log of Equivalised HH income	Individual and year fixed effects, individual characteristics: age, sex, marital status, employment, physical and mental health	BHPS (1991-2008), SOEP (1984-2015), HILDA (2001-2015), BRFSS (2005-2013).	0.16 (BHPS) 0.24 (SOEP) 0.16 (HILDA) 0.31 (BRFSS)
Sacks *et al.* (2010)	Standardised: Ladder Question (GWP and Pew), Life satisfaction (WVS)	Log of HH income	[1] country and wave dummies only [2] A quartic in age, interacted with sex, country and wave dummies	Gallup World Poll (2006), World Values Survey (1980-2004) and Pew Global Attitudes Survey (2002)	Standardised coefficients [1] 0.24 (GWP), 0.22 (WVS), 0.28 (Pew) [2] 0.23 (GWP), 0.23 (WVS), 0.28 (Pew)

Notes: The results reported are the those from within-country regressions of wellbeing on the logarithm of income. British Cohort Study (BCS), UK; British Household Panel Survey (BHPS), UK; German Socio-Economic Panel (SOEP), Germany; Household, Income and Labor Dynamics in Australia (HILDA), Australia; Behavioral Risk Factor Surveillance System (BRFSS), USA. For comparison purposes, our non-standardised Cantril coefficient on the log of household income is 0.4 (the standardised figure is 0.17).

Appendix Figure B.1. Raw averages of wellbeing scores for different incomes and the wellbeing levels predicted from a simple linear regression (log scale)

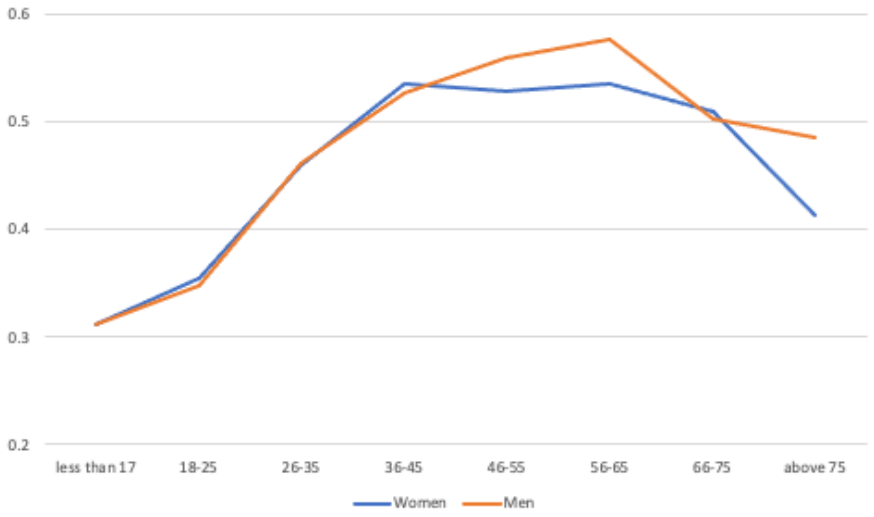


Note: Average reported wellbeing is plotted by equivalised household income bands of one thousand PPP Dollars, log scale.

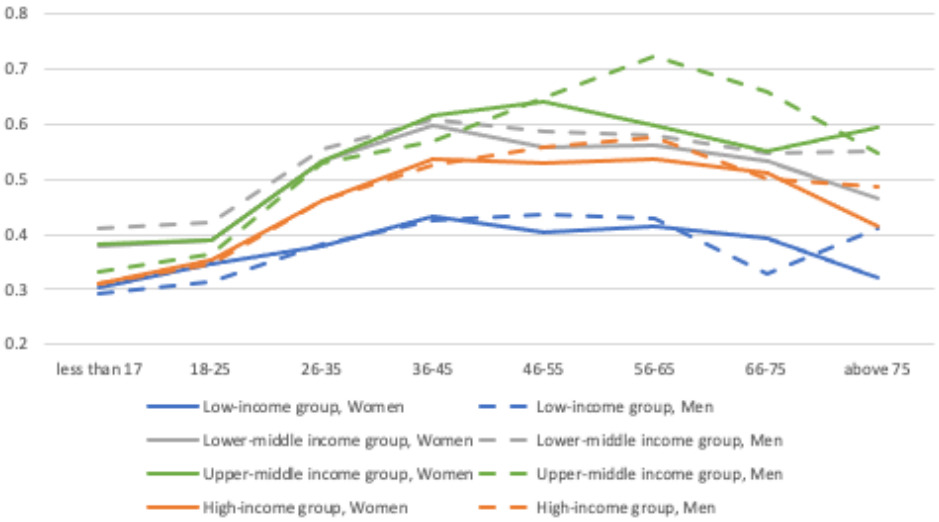
Appendix C. Individual Cross-section: Separate Analyses by Gender and Age

Appendix Table C.1 to **Appendix Table C.5** report the income coefficients for women and men of different ages in all countries, and then for the countries in different income groups. The coefficients come from separate regressions for the various sex-age subsamples.

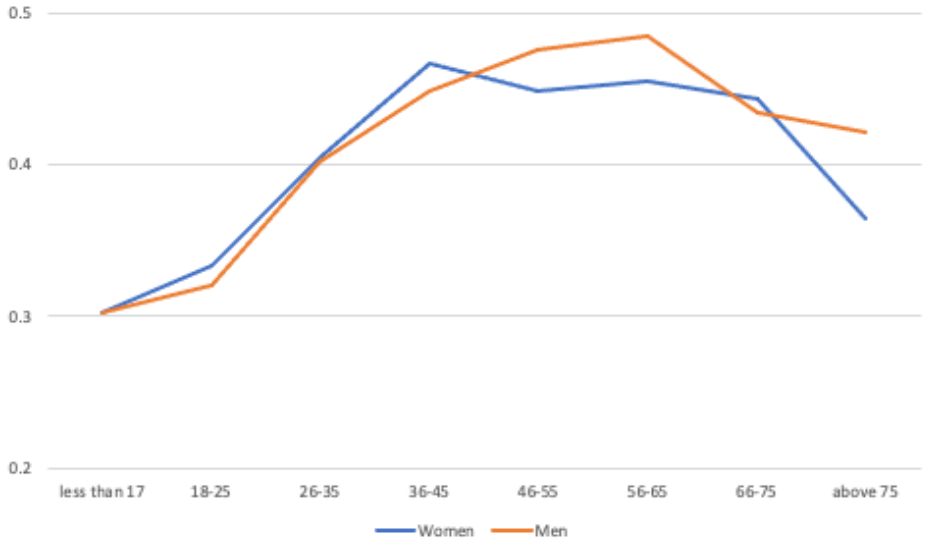
Appendix Figure C.1. Coefficients on Income for Women and Men of Different Ages. All Countries. Specification: Country and Year FE



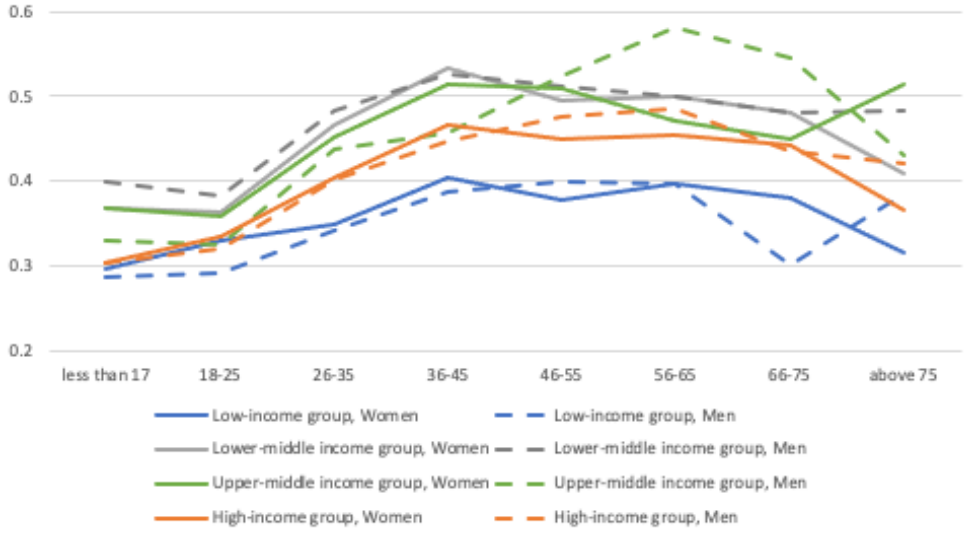
Appendix Figure C.2. Coefficients on Income for Women and Men of Different Ages by Country-income Group. Specification: Country and Year FE



Appendix Figure C.3. Coefficients on Income for Women and Men of Different Ages. All Countries. Specification: All Demographic Controls



Appendix Figure C.4. Coefficients on Income for Women and Men of Different Ages by Country-income Group. Specification: All Demographic Controls



Appendix Table C.1. Results for Different Sexes / Ages. All Countries

	No controls	Country and Year	Age, Country and Year	All Demographic Controls
	Panel A: Women, all ages			
HH income (log)	0.569***	0.458***	0.456***	0.405***
Obs: 811256	(0.056)	(0.020)	(0.019)	(0.018)
	Panel A1: Women, age up to 17			
HH income (log)	0.533***	0.311***		0.303***
Obs: 38462	(0.069)	(0.023)		(0.022)
	Panel A2: Women, age 18-25			
HH income (log)	0.537***	0.354***		0.334***
Obs: 138630	(0.069)	(0.021)		(0.020)
	Panel A3: Women, age 26-35			
HH income (log)	0.572***	0.460***		0.404***
Obs: 173320	(0.068)	(0.021)		(0.020)
	Panel A4: Women, age 36-45			
HH income (log)	0.627***	0.535***		0.467***
Obs: 143756	(0.064)	(0.021)		(0.020)
	Panel A5: Women, age 46-55			
HH income (log)	0.639***	0.529***		0.449***
Obs: 119536	(0.041)	(0.022)		(0.020)
	Panel A6: Women, age 56-65			
HH income (log)	0.665***	0.536***		0.455***
Obs: 99591	(0.044)	(0.025)		(0.023)
	Panel A7: Women, age 66-75			
HH income (log)	0.693***	0.510***		0.443***
Obs: 64030	(0.054)	(0.033)		(0.030)
	Panel A8: Women, age above 75			
HH income (log)	0.619***	0.414***		0.365***
Obs: 33931	(0.052)	(0.041)		(0.037)
	Panel B: Men, all ages			
HH income (log)	0.569***	0.457***	0.458***	0.401***
Obs: 700417	(0.057)	(0.020)	(0.020)	(0.018)
	Panel B1: Men, age up to 17			
HH income (log)	0.547***	0.311***		0.303***
Obs: 37031	(0.074)	(0.024)		(0.023)
	Panel B2: Men, age 18-25			
HH income (log)	0.513***	0.348***		0.320***
Obs: 122228	(0.073)	(0.025)		(0.023)
	Panel B3: Men, age 26-35			
HH income (log)	0.566***	0.461***		0.402***
Obs: 149577	(0.060)	(0.022)		(0.020)
	Panel B4: Men, age 36-45			
HH income (log)	0.614***	0.526***		0.448***
Obs: 126263	(0.062)	(0.023)		(0.023)
	Panel B5: Men, age 46-55			
HH income (log)	0.634***	0.559***		0.475***
Obs: 102738	(0.049)	(0.022)		(0.020)
	Panel B6: Men, age 56-65			
HH income (log)	0.648***	0.577***		0.485***
Obs: 84319	(0.044)	(0.024)		(0.022)
	Panel B7: Men, age 66-75			
HH income (log)	0.664***	0.502***		0.434***

Obs: 53822	(0.045)	(0.028)	(0.028)
	Panel B8: Men, age above 75		
HH income (log)	0.637***	0.486***	0.421***
Obs: 24439	(0.035)	(0.038)	(0.036)

Appendix Table C.2. Results for Different Sexes / Ages. Low-income Group

	No controls	Country and Year	Age, Country and Year	All Demographic Controls
	Panel A: Women, all ages			
HH income (log)	0.289**	0.377***	0.376***	0.355***
Obs: 210887	(0.120)	(0.038)	(0.038)	(0.036)
	Panel A1: Women, age up to 17			
HH income (log)	0.250**	0.304***		0.297***
Obs: 16225	(0.108)	(0.037)		(0.037)
	Panel A2: Women, age 18-25			
HH income (log)	0.266**	0.347***		0.331***
Obs: 54039	(0.116)	(0.037)		(0.035)
	Panel A3: Women, age 26-35			
HH income (log)	0.273**	0.379***		0.349***
Obs: 59062	(0.121)	(0.040)		(0.037)
	Panel A4: Women, age 36-45			
HH income (log)	0.300**	0.433***		0.405***
Obs: 36320	(0.135)	(0.043)		(0.042)
	Panel A5: Women, age 46-55			
HH income (log)	0.360***	0.403***		0.377***
Obs: 22446	(0.107)	(0.050)		(0.049)
	Panel A6: Women, age 56-65			
HH income (log)	0.386***	0.414***		0.396***
Obs: 14204	(0.135)	(0.047)		(0.048)
	Panel A7: Women, age 66-75			
HH income (log)	0.356**	0.393***		0.381***
Obs: 5929	(0.151)	(0.037)		(0.038)
	Panel A8: Women, age above 75			
HH income (log)	0.352**	0.322***		0.315***
Obs: 2662	(0.146)	(0.062)		(0.063)
	Panel B: Men, all ages			
HH income (log)	0.254**	0.369***	0.369***	0.339***
Obs: 203213	(0.112)	(0.043)	(0.042)	(0.040)
	Panel B1: Men, age up to 17			
HH income (log)	0.236**	0.291***		0.286***
Obs: 15175	(0.107)	(0.036)		(0.036)
	Panel B2: Men, age 18-25			
HH income (log)	0.207*	0.313***		0.292***
Obs: 47206	(0.111)	(0.049)		(0.046)
	Panel B3: Men, age 26-35			
HH income (log)	0.253**	0.383***		0.341***
Obs: 53722	(0.113)	(0.041)		(0.037)
	Panel B4: Men, age 36-45			
HH income (log)	0.279**	0.426***		0.387***
Obs: 37500	(0.120)	(0.048)		(0.048)
	Panel B5: Men, age 46-55			
HH income (log)	0.304**	0.436***		0.400***
Obs: 23762	(0.118)	(0.048)		(0.048)
	Panel B6: Men, age 56-65			
HH income (log)	0.329***	0.428***		0.397***
Obs: 15709	(0.115)	(0.058)		(0.057)
	Panel B7: Men, age 66-75			
HH income (log)	0.268***	0.330***		0.302***

Obs: 7223	(0.099)	(0.059)	(0.057)
	Panel B8: Men, age above 75		
HH income (log)	0.431***	0.412***	0.386***
Obs: 2916	(0.094)	(0.052)	(0.053)

Appendix Table C.3. Results for Different Sexes / Ages. Lower-middle Income Group

	No controls	Country and Year	Age, Country and Year	All Demographic Controls
	Panel A: Women, all ages			
HH income (log)	0.415***	0.515***	0.502***	0.452***
Obs: 232817	(0.042)	(0.026)	(0.023)	(0.023)
	Panel A1: Women, age up to 17			
HH income (log)	0.307***	0.377***		0.369***
Obs: 11653	(0.063)	(0.040)		(0.041)
	Panel A2: Women, age 18-25			
HH income (log)	0.354***	0.391***		0.364***
Obs: 41712	(0.042)	(0.027)		(0.027)
	Panel A3: Women, age 26-35			
HH income (log)	0.459***	0.532***		0.467***
Obs: 52297	(0.041)	(0.028)		(0.026)
	Panel A4: Women, age 36-45			
HH income (log)	0.524***	0.597***		0.533***
Obs: 43268	(0.040)	(0.027)		(0.027)
	Panel A5: Women, age 46-55			
HH income (log)	0.459***	0.558***		0.494***
Obs: 27005	(0.045)	(0.031)		(0.029)
	Panel A6: Women, age 56-65			
HH income (log)	0.453***	0.562***		0.499***
Obs: 14204	(0.051)	(0.032)		(0.032)
	Panel A7: Women, age 66-75			
HH income (log)	0.372***	0.534***		0.480***
Obs: 14877	(0.083)	(0.041)		(0.042)
	Panel A8: Women, age above 75			
HH income (log)	0.301***	0.464***		0.409***
Obs: 6761	(0.088)	(0.051)		(0.045)
	Panel B: Men, all ages			
HH income (log)	0.469***	0.527***	0.515***	0.454***
Obs: 189275	(0.039)	(0.030)	(0.028)	(0.027)
	Panel B1: Men, age up to 17			
HH income (log)	0.375***	0.412***		0.398***
Obs: 11522	(0.059)	(0.045)		(0.044)
	Panel B2: Men, age 18-25			
HH income (log)	0.395***	0.421***		0.382***
Obs: 35114	(0.055)	(0.038)		(0.035)
	Panel B3: Men, age 26-35			
HH income (log)	0.508***	0.555***		0.483***
Obs: 39598	(0.036)	(0.032)		(0.032)
	Panel B4: Men, age 36-45			
HH income (log)	0.562***	0.608***		0.526***
Obs: 33661	(0.041)	(0.035)		(0.037)
	Panel B5: Men, age 46-55			
HH income (log)	0.525***	0.585***		0.511***
Obs: 28048	(0.043)	(0.033)		(0.032)
	Panel B6: Men, age 56-65			
HH income (log)	0.481***	0.580***		0.500***
Obs: 22462	(0.047)	(0.033)		(0.033)
	Panel B7: Men, age 66-75			
HH income (log)	0.463***	0.546***		0.481***

Obs: 13141	(0.053)	(0.036)	(0.037)
	Panel B8: Men, age above 75		
HH income (log)	0.450***	0.550***	0.482***
Obs: 5729	(0.071)	(0.050)	(0.052)

Appendix Table C.4. Results for Different Sexes / Ages. Upper-middle Income Group

	No controls	Country and Year	Age, Country and Year	All Demographic Controls
	Panel A: Women, all ages			
HH income (log)	0.407***	0.542***	0.545***	0.461***
Obs: 162620	(0.103)	(0.041)	(0.038)	(0.033)
	Panel A1: Women, age up to 17			
HH income (log)	0.364***	0.383***		0.369***
Obs: 5521	(0.118)	(0.041)		(0.040)
	Panel A2: Women, age 18-25			
HH income (log)	0.384***	0.390***		0.358***
Obs: 22986	(0.112)	(0.034)		(0.033)
	Panel A3: Women, age 26-35			
HH income (log)	0.485***	0.533***		0.451***
Obs: 31595	(0.106)	(0.040)		(0.036)
	Panel A4: Women, age 36-45			
HH income (log)	0.509***	0.617***		0.514***
Obs: 28265	(0.112)	(0.044)		(0.039)
	Panel A5: Women, age 46-55			
HH income (log)	0.451***	0.640***		0.509***
Obs: 25038	(0.094)	(0.045)		(0.038)
	Panel A6: Women, age 56-65			
HH income (log)	0.427***	0.598***		0.472***
Obs: 23067	(0.108)	(0.058)		(0.053)
	Panel A7: Women, age 66-75			
HH income (log)	0.389***	0.549***		0.450***
Obs: 16596	(0.107)	(0.056)		(0.053)
	Panel A8: Women, age above 75			
HH income (log)	0.449***	0.594***		0.514***
Obs: 9552	(0.130)	(0.069)		(0.069)
	Panel B: Men, all ages			
HH income (log)	0.431***	0.528***	0.528***	0.441***
Obs: 123237	(0.090)	(0.044)	(0.042)	(0.037)
	Panel B1: Men, age up to 17			
HH income (log)	0.311***	0.332***		0.329***
Obs: 5289	(0.098)	(0.048)		(0.047)
	Panel B2: Men, age 18-25			
HH income (log)	0.371***	0.365***		0.324***
Obs: 19663	(0.106)	(0.036)		(0.034)
	Panel B3: Men, age 26-35			
HH income (log)	0.479***	0.530***		0.438***
Obs: 25054	(0.101)	(0.050)		(0.047)
	Panel B4: Men, age 36-45			
HH income (log)	0.491***	0.567***		0.456***
Obs: 21662	(0.091)	(0.051)		(0.048)
	Panel B5: Men, age 46-55			
HH income (log)	0.506***	0.647***		0.523***
Obs: 18591	(0.089)	(0.051)		(0.042)
	Panel B6: Men, age 56-65			
HH income (log)	0.573***	0.724***		0.581***
Obs: 16306	(0.083)	(0.054)		(0.047)
	Panel B7: Men, age 66-75			
HH income (log)	0.467***	0.657***		0.546***

Obs: 11309	(0.111)	(0.062)	(0.061)
	Panel B8: Men, age above 75		
HH income (log)	0.399**	0.548***	0.431***
Obs: 5363	(0.150)	(0.123)	(0.120)

Appendix Table C.5. Results for Different Sexes / Ages. High-income Group

	No controls	Country and Year	Age, Country and Year	All Demographic Controls
	Panel A: Women, all ages			
HH income (log)	0.596***	0.448***	0.460***	0.372***
Obs: 162620	(0.074)	(0.046)	(0.045)	(0.039)
	Panel A1: Women, age up to 17			
HH income (log)	0.150***	0.151***		0.148***
Obs: 5063	(0.040)	(0.033)		(0.033)
	Panel A2: Women, age 18-25			
HH income (log)	0.256***	0.245***		0.225***
Obs: 19893	(0.052)	(0.041)		(0.039)
	Panel A3: Women, age 26-35			
HH income (log)	0.531***	0.460***		0.355***
Obs: 30366	(0.058)	(0.043)		(0.036)
	Panel A4: Women, age 36-45			
HH income (log)	0.643***	0.536***		0.414***
Obs: 35903	(0.063)	(0.041)		(0.039)
	Panel A5: Women, age 46-55			
HH income (log)	0.716***	0.548***		0.418***
Obs: 36808	(0.077)	(0.046)		(0.040)
	Panel A6: Women, age 56-65			
HH income (log)	0.834***	0.559***		0.435***
Obs: 35315	(0.098)	(0.062)		(0.054)
	Panel A7: Women, age 66-75			
HH income (log)	0.857***	0.527***		0.436***
Obs: 26628	(0.129)	(0.084)		(0.074)
	Panel A8: Women, age above 75			
HH income (log)	0.609***	0.334***		0.283***
Obs: 14956	(0.138)	(0.077)		(0.067)
	Panel B: Men, all ages			
HH income (log)	0.581***	0.460***	0.477***	0.398***
Obs: 184692	(0.060)	(0.035)	(0.036)	(0.031)
	Panel B1: Men, age up to 17			
HH income (log)	0.134**	0.122***		0.119***
Obs: 5045	(0.052)	(0.038)		(0.038)
	Panel B2: Men, age 18-25			
HH income (log)	0.300***	0.290***		0.270***
Obs: 20245	(0.049)	(0.034)		(0.034)
	Panel B3: Men, age 26-35			
HH income (log)	0.516***	0.444***		0.371***
Obs: 31203	(0.052)	(0.036)		(0.028)
	Panel B4: Men, age 36-45			
HH income (log)	0.636***	0.537***		0.425***
Obs: 33440	(0.058)	(0.036)		(0.034)
	Panel B5: Men, age 46-55			
HH income (log)	0.740***	0.614***		0.490***
Obs: 32337	(0.067)	(0.047)		(0.038)
	Panel B6: Men, age 56-65			
HH income (log)	0.850***	0.634***		0.492***
Obs: 29842	(0.081)	(0.049)		(0.043)
	Panel B7: Men, age 66-75			
HH income (log)	0.787***	0.513***		0.430***
Obs: 22149	(0.106)	(0.063)		(0.059)

	Panel B8: Men, age above 75		
HH income (log)	0.695***	0.436***	0.368***
Obs: 10431	(0.117)	(0.076)	(0.069)

Appendix D. Appendix for the Section Results: Country Cross-section

Appendix Table D.1. Gallup cross-section for log GDP per capita and average log real equivalised household income. Country-level.

	(1) No Controls	(2) Year FE	(3) Age and Sex, Year FE	(4) All Demographic Controls
Panel A: GDP per capita				
GDP per capita (log)	0.769***	0.770***	0.800***	0.671***
	(0.036)	(0.036)	(0.090)	(0.083)
Panel B: Average log household income (equivalence scale)				
Average of log HH income (eq. scale)	0.729***	0.730***	0.810***	0.640***
	(0.032)	(0.032)	(0.071)	(0.085)
Panel C: Log of average household income (equivalence scale)				
Log of average HH income (eq. scale)	0.775***	0.777***	0.783***	0.623***
	(0.033)	(0.033)	(0.069)	(0.081)
Obs: 1,415				

Notes: Columns 2 to 4 are cross-section regressions with year FEs. The additional controls in Specification 3 are country-year average age, age-squared and the share of women. The controls in Specification 4 are country-year age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Standard errors in parentheses are clustered at the country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table D.2. Full results of Table 3.4 Specification 1.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.753***	0.631***	0.348*	0.362**	1.201***
	(0.037)	(0.116)	(0.191)	(0.169)	(0.372)
Constant	-1.601***	-0.604	2.014	2.140	-6.245
	(0.343)	(0.908)	(1.759)	(1.746)	(3.999)
R^2	0.602	0.257	0.038	0.047	0.232
Observations	1467	405	403	283	376
Countries	157	45	44	28	40

Appendix Table D.3. Full results of Table 3.4 Specification 2.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.754***	0.636***	0.348*	0.366**	1.199***
	(0.037)	(0.118)	(0.202)	(0.173)	(0.385)
Constant	-1.454***	-0.441	2.188	2.340	-6.273
	(0.345)	(0.921)	(1.828)	(1.811)	(4.097)
R^2	0.605	0.287	0.049	0.055	0.238
Observations	1467	405	403	283	376
Countries	157	45	44	28	40

Appendix Table D.4. Full results of Table 3.4 Specification 3.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.750***	0.663***	0.592***	0.394**	1.289***
	(0.093)	(0.116)	(0.216)	(0.185)	(0.417)
Average age	-0.177	-0.492***	-0.062	0.238	-0.016
	(0.113)	(0.137)	(0.212)	(0.445)	(0.173)
Average age-squared	0.204*	0.664***	0.001	-0.261	0.054
	(0.115)	(0.169)	(0.239)	(0.457)	(0.176)
Share of women	-1.835	-2.652	7.033	-2.064	-0.315
	(1.684)	(3.209)	(5.083)	(5.161)	(2.635)
Constant	2.690	8.154***	-1.296	-1.338	-7.586
	(1.913)	(2.125)	(4.965)	(9.013)	(6.331)
R^2	0.610	0.341	0.096	0.069	0.281
Observations	1467	405	403	283	376
Countries	157	45	44	28	40

Appendix Table D.5. Full results of Table 3.4 Specification 4*a*.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.614***	0.524***	0.259	0.329***	1.235***
	(0.087)	(0.103)	(0.241)	(0.095)	(0.406)
Average age	-0.254**	-0.687***	-0.002	-0.308	0.055
	(0.105)	(0.132)	(0.230)	(0.214)	(0.190)
Average age-squared	0.281**	0.828***	-0.017	0.335	-0.027
	(0.112)	(0.161)	(0.251)	(0.232)	(0.196)
Share of women	-0.087	-2.786	8.985*	3.714	-0.835
	(1.683)	(2.964)	(4.661)	(3.972)	(2.962)
Unemployed share	-4.654***	-2.809*	-2.097	-7.795**	-3.258
	(1.028)	(1.602)	(1.611)	(2.845)	(2.490)
Degree share	0.885	4.134***	0.884	0.436	0.236
	(0.651)	(1.451)	(1.427)	(1.866)	(0.873)
Married share	-0.569	0.621	-1.135	-0.873	-1.051
	(0.558)	(0.667)	(0.891)	(1.521)	(1.101)
Health problems share	-2.563***	-0.549	-4.165***	-8.584***	1.590
	(0.602)	(0.554)	(1.038)	(1.514)	(1.722)
Constant	5.747***	13.404***	0.496	9.620*	-7.623
	(1.933)	(2.058)	(5.284)	(4.824)	(6.125)
R^2	0.658	0.421	0.274	0.415	0.314
Observations	1467	405	403	283	376
Countries	157	45	44	28	40

Appendix Table D.6. Full results of Table 3.4 Specification 4*b*.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.617***	0.520***	0.232	0.325***	1.144**
	(0.095)	(0.103)	(0.257)	(0.092)	(0.483)
Average age	-0.293***	-0.696***	-0.038	-0.327	-0.085
	(0.109)	(0.131)	(0.265)	(0.249)	(0.187)
Average age-squared	0.321***	0.838***	0.010	0.358	0.128
	(0.115)	(0.161)	(0.286)	(0.270)	(0.184)
Share of women	-2.194	-2.872	9.940*	4.036	-3.691
	(2.467)	(2.995)	(4.969)	(4.518)	(6.533)
Unemployed share	-5.020***	-2.609	-2.830*	-7.294**	-6.011*
	(1.067)	(1.615)	(1.520)	(2.651)	(3.094)
Degree share	1.464*	4.010***	1.525	0.585	0.506
	(0.763)	(1.387)	(1.372)	(1.961)	(1.094)
Married share	-0.383	0.639	-0.672	-0.720	-0.494
	(0.567)	(0.675)	(1.042)	(1.528)	(1.231)
Health problems share	-2.817***	-0.528	-4.676***	-8.810***	0.138
	(0.632)	(0.559)	(1.204)	(1.530)	(2.123)
Constant	7.526***	13.610***	0.973	9.835*	-2.411
	(2.028)	(2.078)	(5.849)	(5.514)	(6.931)
R^2	0.680	0.405	0.324	0.421	0.384
Observations	1306	391	347	259	309
Countries	148	45	40	27	36

Appendix Table D.7. Full results of Table 3.4 Specification 5.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.349***	0.365***	0.002	0.092	0.215
	(0.091)	(0.128)	(0.221)	(0.098)	(0.212)
Average age	-0.211**	-0.638***	0.199	-0.129	0.041
	(0.098)	(0.126)	(0.226)	(0.153)	(0.106)
Average age-squared	0.236**	0.778***	-0.225	0.065	-0.023
	(0.101)	(0.141)	(0.238)	(0.161)	(0.098)
Share of women	-3.351	-7.320***	6.382	7.849*	-5.249
	(2.132)	(2.426)	(4.319)	(4.035)	(4.130)
Unemployed share	-2.253**	-1.042	-0.450	-3.075	-2.000
	(1.017)	(1.667)	(1.299)	(2.109)	(2.249)
Degree share	1.188**	3.039**	1.256	-0.670	0.856
	(0.582)	(1.416)	(1.525)	(1.108)	(0.778)
Married share	-0.637	0.946	-1.524	0.177	-0.418
	(0.497)	(0.602)	(0.905)	(1.134)	(0.633)
Health problems share	-1.341**	0.291	-2.930**	-1.734	0.295
	(0.555)	(0.581)	(1.126)	(1.252)	(1.214)
Social support	1.735***	1.608***	1.310*	4.468***	4.626***
	(0.400)	(0.414)	(0.653)	(1.388)	(1.219)
Healthy life expectancy at birth	0.029***	0.002	0.023	0.117***	0.024
	(0.011)	(0.011)	(0.016)	(0.021)	(0.023)
Freedom to make life choices	1.277***	0.531	2.184***	2.187***	-0.114
	(0.336)	(0.428)	(0.563)	(0.713)	(0.706)
Generosity	0.581**	0.404	-0.168	-0.099	1.430***
	(0.270)	(0.363)	(0.362)	(0.500)	(0.471)
Perceptions of corruption	-0.371	-0.089	0.899	-0.996	-0.581
	(0.304)	(0.449)	(0.534)	(0.839)	(0.384)
Constant	4.792**	13.961***	-4.837	-6.676*	0.460
	(2.042)	(2.507)	(4.313)	(3.707)	(3.108)
R^2	0.760	0.477	0.530	0.753	0.706
Observations	1306	391	347	259	309
Countries	148	45	40	27	36

Appendix Table D.8. Replication of Table 3.4 for countries with at least 10 years of observations.

	(1)	(2)	(3)	(4)	(5)
	All Countries	Low	Lower-middle	Upper-middle	High
Specification 4*a*: All Demographic Controls.					
GDP per capita (log)	0.667***	0.590***	0.230	0.357***	1.456**
	(0.115)	(0.172)	(0.244)	(0.090)	(0.560)
Countries:	106	24	30	24	28
Specification 4*b*: All Demographic Controls, Countries with WHR information.					
GDP per capita (log)	0.659***	0.588***	0.166	0.352***	1.307**
	(0.127)	(0.169)	(0.248)	(0.088)	(0.583)
Countries:	101	24	26	23	28
Specification 5: Gallup: All Controls, Countries with WHR Information					
GDP per capita (log)	0.388***	0.626**	0.084	0.114	0.170
	(0.112)	(0.238)	(0.288)	(0.101)	(0.252)
Countries:	101	24	26	23	28

Notes: Specifications 4 to 5 are cross-section regressions with year FEs. The controls in Specification 4 are country-year age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Specification 5 includes the controls from Specification 4 and WHR variables (Social support, Healthy life expectancy at birth, Freedom to make life choices, Generosity, Perceptions of corruption, Confidence in national government). Standard errors in parentheses are clustered at the country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table D.9. Extension of Table 3.4 with specifications adding one WHR variable at a time.

	All countries	Low	Lower-middle	Upper-middle	High
Specification 4*b*: All Demographic Controls, Countries with WHR Information					
GDP per capita (log)	0.617***	0.520***	0.232	0.325***	1.144**
	(0.095)	(0.103)	(0.257)	(0.092)	(0.483)
Specification 4*b* + Social support					
GDP per capita (log)	0.475***	0.367***	0.058	0.277***	0.568*
	(0.090)	(0.114)	(0.207)	(0.094)	(0.299)
+ Healthy life expectancy at birth					
GDP per capita (log)	0.397***	0.360***	-0.130	0.221**	0.533*
	(0.088)	(0.123)	(0.196)	(0.092)	(0.310)
+ Freedom to make life choices					
GDP per capita (log)	0.343***	0.375***	-0.047	0.088	0.386
	(0.091)	(0.123)	(0.208)	(0.088)	(0.296)
+ Generosity					
GDP per capita (log)	0.354***	0.357***	-0.048	0.076	0.439*
	(0.088)	(0.119)	(0.209)	(0.101)	(0.253)
+ Perceptions of corruption: Specification 5					
GDP per capita (log)	0.349***	0.365***	0.002	0.092	0.215
	(0.091)	(0.128)	(0.221)	(0.098)	(0.212)
Observations	1306	391	347	259	309
Countries	148	45	40	27	36

Notes: Specifications 4 to 5 are cross-section regressions with year FEs. The controls in Specification 4*a* are country-year age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Standard errors in parentheses are clustered at the country level. * p < 0.1, ** p < 0.05, *** p < 0.01.

Appendix Table D.10. Country cross-section. Literature

Author	Outcome measure	Income measure	Controls	Data	Coefficient
Deaton (2008)	Average country life satisfaction (0 to 10)	Log of per capita GDP	No controls	Gallup (2006)	0.84
Sacks *et al.* (2010)	Standardised: Ladder Question (GWP and Pew), Life satisfaction (WVS) [Comparable coefficients]	Log of per capita GDP	[c1] No controls [c2] Age and sex	Gallup World Poll, World Values Survey and Pew Global Attitudes Survey (until 2007)	[c1] Gallup: 0.36 [0.85] WVS: 0.36 [0.82] Pews: 0.21 [c2] Gallup: 0.38 [0.80] WVS: 0.36 [0.82] Pews: 0.23

Notes: The standard deviations of country-average wellbeing scores used in Sacks *et al.* (2010) are 0.49 in the WVS, 0.39 in EB and 0.47 in Gallup. The SD for WVS and EB scores are retrieved from the data kindly provided by Daniel Sacks. The SD of the scores in Gallup are estimated using the data over the comparable period.

The comparable coefficients are those from the analysis of the country-level averages of standardised scores, divided by the SD of country-level averages of standardised scores and multiplied by the SD of country-level averages of non-standardised scores. The coefficients are comparable with the results presented in the paper.

Appendix E. Individual panel analysis.

We analyse the panel relationship between income and wellbeing using data from what are probably the three main panel surveys used in social science: the UK Household Longitudinal Survey (UKHLS), the Household, Income and Labour Dynamics in Australia (HILDA) and the German Socio-Economic Panel (SOEP). The dependent variable in this analysis is life satisfaction.

The UKHLS, combined with the British Household Panel Survey (BHPS), has life-satisfaction information annually from 1996 to 2019 (apart from 2001). Dropping observations with missing values yields an annual sample of approximately 11,500 for the BHPS and 33,500 for the UKHLS.[27] The HILDA survey covers the period from 2001 to 2019, and includes an average of 12,000 yearly observations.[28] Last, we analyse West-German respondents in the SOEP, producing information on 14,000 adults in each year between 1985 and 2019.[29]

Each of three datasets includes **life satisfaction** information. In the UKHLS and BHPS, life satisfaction is measured on a 1 to 7 scale. Respondents are asked: *How dissatisfied or satisfied are you with your life overall?* To facilitate the comparability of results between the three datasets, we adjust this scale to run from 0 to 10 (by taking the score on the 1-7 scale, subtracting one and multiplying the result by 10/6). Average life satisfaction on this new scale is 7 with a standard deviation of 2.4 (the corresponding figures on the original scale are 5.2 and 1.4). HILDA respondents are asked *How satisfied are you with your life*, with responses on a 0 to 10 scale, where 0 is totally dissatisfied and 10 is totally satisfied. Average life satisfaction in HILDA is 7.9 with standard deviation of 1.5. The SOEP life satisfaction is on the same 0-10 scale, from the following question: *We would like to ask you about your satisfaction with your life in general, please answer according to the following scale: 0 means completely dissatisfied and 10 means completely satisfied: How satisfied are you with your life, all things considered?* Average life satisfaction in the SOEP is 7.25 with a standard deviation of 1.76. The distributions of life satisfaction in the three datasets are depicted in **Appendix Figure E.1**.

As in the individual-level analysis in Section 3.1, we use data on equivalised real gross household income (in 2019 currency units) adjusted using the OECD equivalence scale.[30] **Appendix Figure E.2** shows the distribution of income in the bottom 90% of the income distribution for all three countries. The summary statistics for wellbeing, income and all of the other variables that are used in the analysis appear in **Appendix Table E.1**.

[27] In all three datasets we drop respondents under age 18, corresponding to an average of 518 observations per wave in the BHPS and 1,171 in the UKHLS. We also drop proxy respondents, an average of 490 respondents per BHPS wave and 2,609 per UKHLS wave, and those with missing life-satisfaction data, an average of 441 per BHPS and 3,795 per UKHLS wave. Removing observations without recorded education drops an average of 197 and 308 observations in the BHPS and UKHLS per wave respectively. We also remove observations without health data, 605 and 58 per respective BHPS and UKHLS wave. In the final merged BHPS/UKHLS dataset 3,315 observations are dropped due to zero or missing income. We last dropped the 17,958 respondents who only appear in one wave.

[28] We dropped an average of 46 respondents aged under 18 per wave. We also drop respondents without life-satisfaction information (on average 10 per wave), and respondents under age 18 (729 per wave). We also remove observations without health data, 1,554 per wave, which is mostly due to missing self-completion questionnaires. In the final dataset that includes all waves we removed 828 observations that did not record income. We also dropped 5,185 observations of the respondents who only appeared in the dataset once.

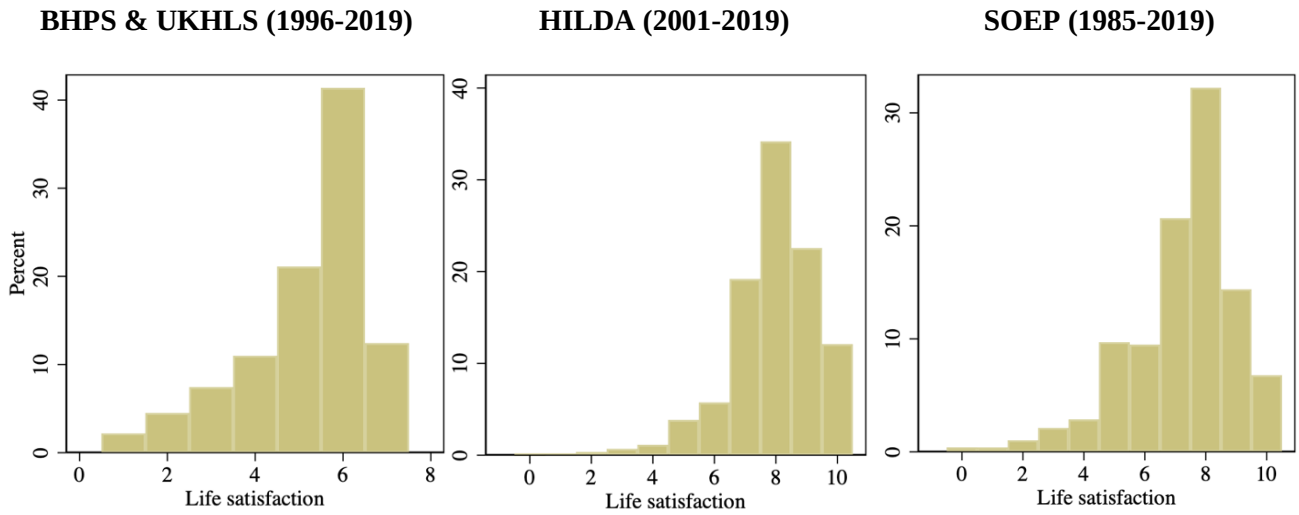
[29] We removed an average of 372 respondents under 18 per wave. We drop respondents for whom we do not have wellbeing data, on average 164 per wave (out of which 104 per wave due to the question not being included in the version of the survey). We also remove observations without education data – 497 per wave, marital status 110 per wave and health 1,260 per wave. In the final dataset that includes all waves we removed 31,866 observations that did not record income. We also dropped 17,228 observations of the respondents who only appeared in the dataset once.

[30] We have replicated the analysis with net income in from the HILDA and SOEP datasets. The results are qualitatively unchanged. The net-income series is not consistent across the BHPS and the UKHLS, so we cannot carry out this exercise for the UK data.

Appendix Table E.1. Summary statistics

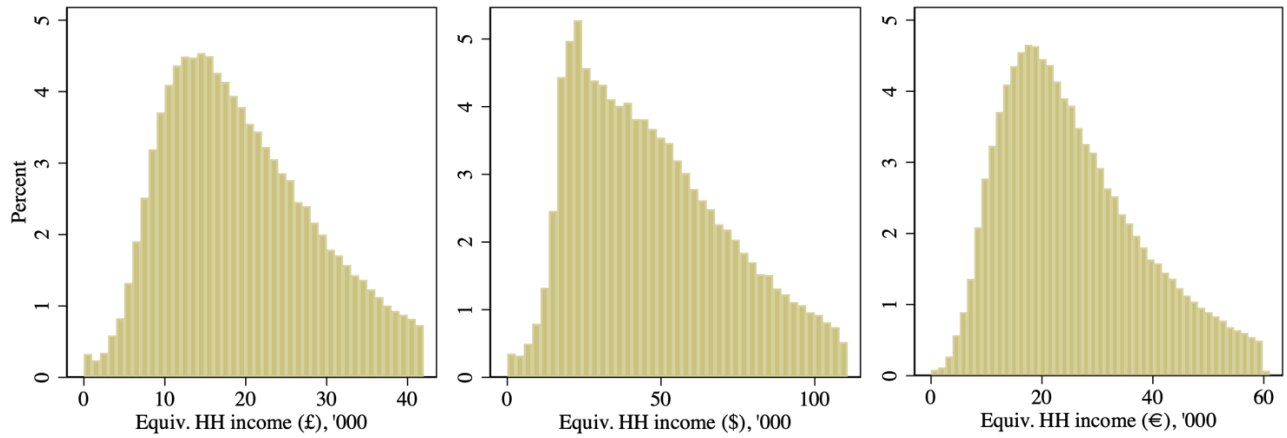
	BHPS & UKHLS		HILDA		SOEP	
	Mean	SD	Mean	SD	Mean	SD
Life satisfaction	6.97	2.38	7.92	1.45	7.25	1.75
Equiv. HH income (£ / AUS$ / €)	23257	16791	59246	55978	30124	27947
HH income (log)	9.85	0.68	10.73	0.72	10.11	0.63
Age	48.93	17.69	46.73	17.79	47.07	16.99
Female	0.56	0.50	0.53	0.50	0.53	0.50
Unemployed	0.04	0.20	0.03	0.17	0.04	0.20
Education (degree or above)	0.34	0.47	0.25	0.43	0.18	0.38
Partnered / Married	0.67	0.47	0.67	0.47	0.63	0.48
Health limits activities/ Disabled	0.25	0.43	0.19	0.39	0.11	0.31
Observations	508,011		238,421		459,975	

Appendix Figure E.1. The distribution of life satisfaction in the BHPS/UKHLS, HILDA and SOEP.



Appendix Figure E.2. Distribution of equivalised real household income in the BHPS/UKHLS, HILDA and SOEP: Bottom 90%.

BHPS & UKHLS (1996-2019) **HILDA (2001-2019)** **SOEP (1985-2019)**



Note: Household income is equivalence-scale adjusted real annual household income in the local currency.

Results

We begin by estimating cross-section regressions, pooling the individual data from all years within each dataset and regressing individual life satisfaction on log equivalent household income without any other controls. The results are presented in column 1 of **Appendix Table E.2**. The coefficient on the logarithm of equivalised household income is 0.347 in the UK, 0.122 in Australia and 0.443 in Germany. This is equivalent to 0.146 standard deviations of life satisfaction in the UK, 0.084 SD in Australia and 0.253 SD in Germany.[31]

For comparability reasons, we can restrict the analysis for all three panels to the same time period (2001-2019): this restriction overall makes little difference to the estimated coefficients.

These figures are higher than those in the pooled dataset of individuals in high-income countries from the Gallup sample (**Table 3.2**), which was 0.584 or 0.301 SD of wellbeing. Both the countries and years covered are not the same: there are far more countries in the Gallup sample, but also fewer years (2009-2019). With respect to the time period, if we constrain the analysis in **Appendix Table E.2** to cover the Gallup 2009-2019 period only, the estimated coefficients on the logarithm of household income is 0.401 in the UK, 0.144 in Australia and 0.399 in Germany: see **Appendix Table E.3**: corresponding to 0.164 standard deviations of life satisfaction in the UK, 0.101 SD in Australia and 0.235 SD in Germany. These numbers are not materially different to those for all of the available panel data years in **Appendix Table E.2**: the difference between **Appendix Table E.2** and the Gallup results may well then reflect the different countries that appear in the datasets rather than the different years that they cover.

[31] In unreported results, we have estimated the specifications in columns (1) and (2) using the US General Social Survey, which is repeated cross-section. The estimated coefficient on equivalised household income for the GSS is around 0.4, similar to the values in **Appendix Table E.2** for the UK and Germany.

Appendix Table E.2. BHPS/UKHLS, HILDA and SOEP. Individual-level. Pooled and Panel Life Satisfaction Regressions

	(1) Pooled No controls	(2) Pooled Year dummies	(3) Panel Year dummies	(4) Panel Age, year dummies	(5) Panel All demographic controls
			BHPS & UKHLS (1996-2019)		
HH income (log)	0.347***	0.359***	0.078***	0.083***	0.063***
Obs: 508,011	(0.008)	(0.008)	(0.007)	(0.007)	(0.007)
SD 2.38	0.146	0.151	0.033	0.035	0.026
			HILDA (2001-2019)		
HH income (log)	0.122***	0.125***	0.070***	0.075***	0.061***
Obs: 238,421	(0.004)	(0.009)	(0.006)	(0.006)	(0.006)
SD 1.45	0.084	0.086	0.048	0.052	0.042
			SOEP (1985-2019)		
HH income (log)	0.443***	0.455***	0.208***	0.215***	0.191***
Obs: 469,575	(0.004)	(0.009)	(0.008)	(0.009)	(0.008)
SD 1.75	0.253	0.260	0.119	0.123	0.109

Notes: Life satisfaction is on a 0-10 scale in all datasets. Columns 3 to 5 are panel regressions with individual and year fixed effects. The additional controls in Specifications 4 to 5 include indicators for missing age, country-year averages are imputed to missing age and country-year modes for missing sex. Standard errors in parentheses are clustered at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Table E.3. BHPS/UKHLS, HILDA and SOEP. Restricted to the years of the Gallup Survey (2009-2019). Pooled and Panel Life Satisfaction Regressions. Standardised coefficients in grey.

	(1) Pooled No controls	(2) Pooled Year Dummies	(3) Panel Year Dummies	(4) Panel Age, Year dummies	(5) Panel All Demographic Controls
			BHPS & UKHLS (2009-2019)		
HH income (log)	0.401***	0.402***	0.073***	0.073***	0.055***
Obs: 369,202	(0.010)	(0.010)	(0.008)	(0.008)	(0.008)
SD 2.451	0.164	0.164			
			HILDA (2009-2019)		
HH income (log)	0.144***	0.143***	0.056***	0.059***	0.049***
Obs: 153,323	(0.005)	(0.010)	(0.007)	(0.007)	(0.007)
SD 1.423	0.101	0.100			
			SOEP (2009-2019)		
HH income (log)	0.399***	0.399***	0.111***	0.117***	0.103***
Obs: 202,612	(0.006)	(0.011)	(0.012)	(0.012)	(0.012)
SD 1.696	0.235	0.235			

Notes: Columns 3 to 5 are panel regressions with individual and year dummies. The additional controls in Specifications 4 to 5 include indicators for missing age, country-year averages are imputed to missing age and country-year modes for missing sex. Standard errors in parentheses are clustered at the individual level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

The second comparability analysis between Gallup and the three large panels is to restrict the Gallup data to the UK, Australia and Germany. The results from doing so appear in **Appendix Table E.4** below. This produces figures that are mostly lower than the 0.584 estimate for all high-income

countries, but still look to be different from those in the single-country panels. We suspect that these differences reflect sampling procedures and composition between the different surveys.

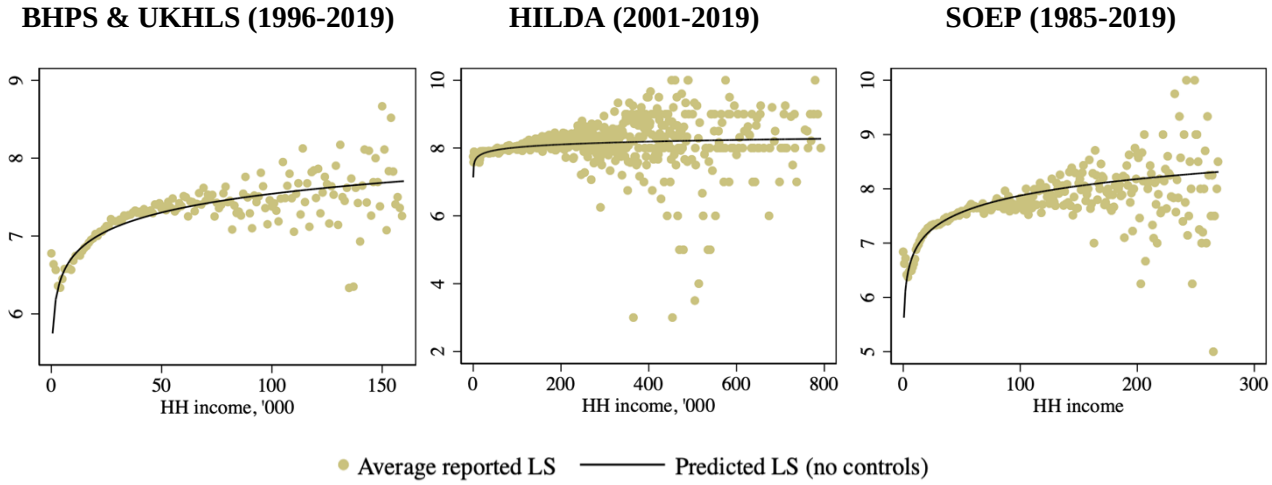
Appendix Table E.4. Gallup. 2009-2019. Individual-level. Pooled Life Satisfaction Regressions

	(1) No Controls	(2) Year Dummies
	United Kingdom	
HH income (log)	0.234***	0.237***
Obs: 25,694	(0.016)	(0.016)
SD 1.824	0.128	0.130
	Australia	
HH income (log)	0.352***	0.360***
Obs: 8,800	(0.032)	(0.032)
SD 1.710	0.206	0.211
	Germany	
HH income (log)	0.587***	0.591***
Obs: 30,303	(0.022)	(0.022)
SD 1.795	0.327	0.329

Note: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

As in Section 3.1, we plot the raw life satisfaction scores against the values predicted by our simple model that only controls for the logarithm of income. **Appendix Figure E.3** presents the results for the bottom 99.9% of income distribution.

Appendix Figure E.3. Predicted and reported life satisfaction for different levels of income in the BHPS/UKHLS, HILDA and SOEP: Bottom 99.9% of the income distribution.



Note: Average reported life satisfaction is presented in bins by thousands of the local currency.

Column 3 of **Appendix Table E.2** takes advantage of the panel nature of the three datasets and shows estimates from panel regressions with both individual and year fixed effects: the estimated coefficients here refer to the income-wellbeing relationship within the same individual over time.

The estimated coefficients on log equivalised household income are much smaller in the panel regressions in column 3 than in their cross-section counterparts in column 2: 0.078 for the UK, 0.070 for Australia and 0.208 for Germany.

Column 4 also controls for the age group.[32] The resulting estimated income coefficients barely change (0.083 for the UKHLS, 0.075 for the HILDA and 0.215 for the SOEP).

Column 5 then adds variables that may mediate or confound the effect of income on subjective wellbeing: unemployment, education, marital status and physical health. We do find some change in the estimated coefficients with their introduction, although this is only small in size. The coefficient in this specification is reduced to 0.063, 0.061 and 0.191 for the UKHLS, HILDA and SOEP respectively.[33]

The income coefficients that we find for the UK and Germany are higher than those in Clark *et al.* (2018). However, the specifications they use are very different, including a more-detailed set of individual characteristics (including mental health), many of which may mediate the relationship between income and wellbeing. Their panel coefficients on income are 0.04 and 0.08 in the UKHLS and the SOEP. Even though we do not control for mental health, our estimate for HILDA is similar to that in Clark *et al.* (2018).

The panel income coefficients are positive and significant in all of the three large panel datasets. They are systematically smaller than the pooled estimates in the same datasets, and the pooled estimated income coefficient in Gallup. The panel income coefficient ranges from 0.06 to 0.2, and is 20-50% of the analogous pooled coefficient.

As for the analysis of the Gallup data, we can trim the top and bottom 1% of the income distribution to account for possible outliers. As was the case for the Gallup data in Section 3.1, trimming leads to larger estimated coefficients on equivalised household income. While the percentage change in the panel coefficients is sometimes large, these remain fairly small in absolute value (being 0.11, 0.08 and 0.21 in the trimmed version of column 5 of **Appendix Table E.2**).

We have also considered age and sex differences in the estimated income coefficient. These are illustrated in **Appendix Figure F.1** to **Appendix Figure F.3**. These different estimated coefficients come from separate regressions by age and sex subsamples. The income coefficients in pooled regressions differ notably by age group, with smaller coefficients at younger and older ages and higher coefficients in mid-life; the coefficients are a little higher for women, but broadly similar across the sexes (**Appendix Figure F.1**). Panel estimation produces smaller coefficients, as noted above, but the same conclusions hold (**Appendix Figure F.2**). Last, adding controls to the panel regressions reduces the size of the coefficients somewhat but retains the same patterns by age and sex (**Appendix Figure F.3**).

To conclude, the pooled estimation from the three large panel surveys produces coefficients that are not overly dissimilar to those from Gallup. In **Appendix Table E.2**, column 2 (controlling for the survey year), the unstandardised coefficients are .359, .125 and .455 (corresponding to 0.15, 0.086 and 0.26 of a standard deviation of life satisfaction). In **Table 3.2** of the main text, the corresponding estimated coefficient for high-income countries with country and year dummies only was 0.451 (0.232 standardised).

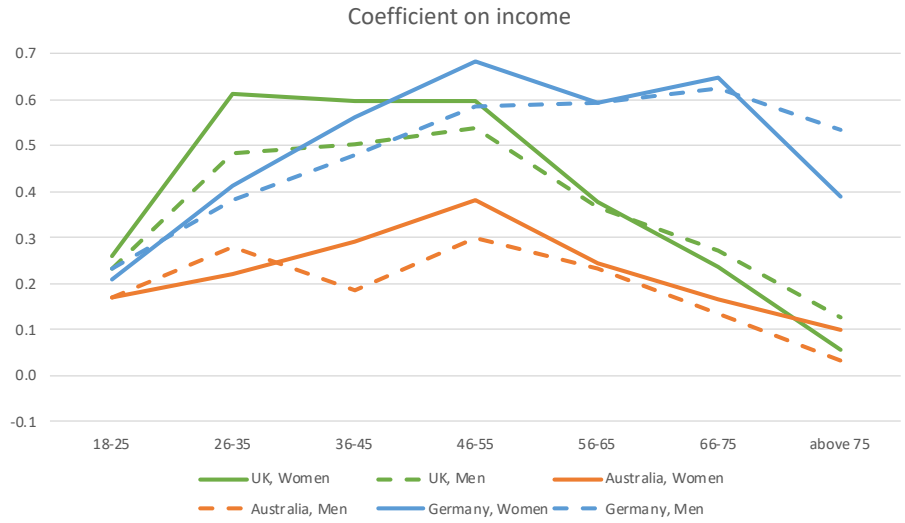
Panel estimation, as is common, produces smaller estimated coefficients on log equivalised household income that are between one quarter and one half of those from pooled estimation of the same data.

[32] We obtain similar estimates when we use age and age-squared instead of the age group dummies.

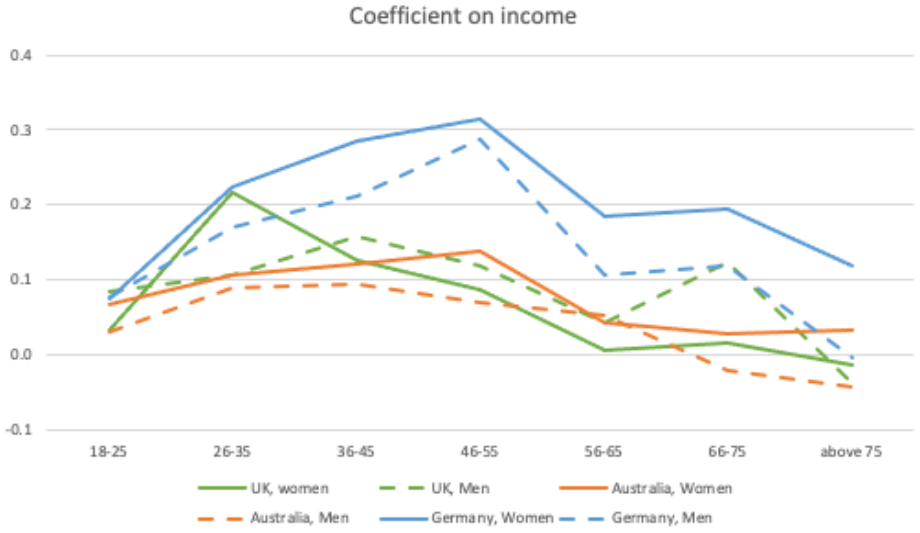
[33] Health may be considered as a perhaps obvious mediator of the relationship between income and life satisfaction. However, excluding health from the controls in column (5) makes only a marginal difference to the estimated coefficients.

Appendix F. Separate analyses by gender and age for Appendix E.

Appendix Figure F.1. Income coefficients for women and men of different ages. Pooled regressions with year dummies.



Appendix Figure F.2. Income coefficients for women and men of different ages. Panel regressions with year dummies.



Appendix Figure F.3. Income coefficients for women and men of different ages. Panel regressions with all demographic controls.

Appendix Table F.1. BHPS & UKHLS (1996-2019). Pooled and Panel Results for different sexes / ages.

	Pooled No Controls	Pooled Year Dummies	Panel Year Dummies	Panel Age, Year Dummies	Panel All Demographic Controls
			Panel A: Women, all ages		
HH income (log)	0.364***	0.380***	0.078***	0.083***	0.065***
Obs: 283057	(0.012)	(0.012)	(0.009)	(0.009)	(0.009)
			Panel A1: Women, age 18-25		
HH income (log)	0.255***	0.262***	0.033		0.018
Obs: 30160	(0.025)	(0.025)	(0.023)		(0.023)
			Panel A2: Women, age 26-35		
HH income (log)	0.609***	0.612***	0.216***		0.194***
Obs: 44885	(0.024)	(0.024)	(0.025)		(0.025)
			Panel A3: Women, age 36-45		
HH income (log)	0.594***	0.598***	0.125***		0.097***
Obs: 53561	(0.025)	(0.026)	(0.024)		(0.025)
			Panel A4: Women, age 46-55		
HH income (log)	0.584***	0.597***	0.087***		0.066***
Obs: 52533	(0.027)	(0.028)	(0.022)		(0.022)
			Panel A5: Women, age 56-65		
HH income (log)	0.319***	0.378***	0.007		-0.006
Obs: 44919	(0.025)	(0.025)	(0.022)		(0.022)
			Panel A6: Women, age 66-75		
HH income (log)	0.161***	0.236***	0.016		0.018
Obs: 34922	(0.032)	(0.033)	(0.036)		(0.036)
			Panel A7: Women, above 75		
HH income (log)	0.063	0.056	-0.014		-0.012
Obs: 22077	(0.043)	(0.044)	(0.040)		(0.040)
			Panel B: Men, all ages		
HH income (log)	0.328***	0.337***	0.079***	0.083***	0.061***
Obs: 283057	(0.012)	(0.012)	(0.010)	(0.010)	(0.010)
			Panel A1: Men, age 18-25		
HH income (log)	0.227***	0.232***	0.085***		0.058**
Obs: 24428	(0.027)	(0.028)	(0.027)		(0.027)
			Panel A2: Men, age 26-35		
HH income (log)	0.477***	0.483***	0.106***		0.079***
Obs: 33429	(0.027)	(0.027)	(0.028)		(0.028)
			Panel A3: Men, age 36-45		
HH income (log)	0.502***	0.504***	0.157***		0.133***
Obs: 41557	(0.027)	(0.027)	(0.025)		(0.025)
			Panel A4: Men, age 46-55		
HH income (log)	0.528***	0.537***	0.118***		0.074***
Obs: 41854	(0.030)	(0.031)	(0.025)		(0.024)
			Panel A5: Men, age 56-65		
HH income (log)	0.341***	0.367***	0.042**		0.023
Obs: 36643	(0.025)	(0.026)	(0.020)		(0.020)
			Panel A6: Men, age 66-75		
HH income (log)	0.206***	0.273***	0.123***		0.123***
Obs: 30153	(0.032)	(0.032)	(0.037)		(0.037)
			Panel A7: Men, above 75		
HH income (log)	0.083*	0.128***	-0.038		-0.036
Obs: 16890	(0.046)	(0.048)	(0.056)		(0.056)

Appendix Table F.2. HILDA (2001-2019). Pooled and Panel Results for women / men of different ages.

	Pooled No Controls	Pooled Year Dummies	Panel Year Dummies	Panel Age, Year Dummies	Panel All Demographic Controls
			Panel A: Women, all ages		
HH income (log)	0.138***	0.143***	0.084***	0.088***	0.066***
Obs: 127261	(0.012)	(0.012)	(0.008)	(0.008)	(0.008)
			Panel A1: Women, age 18-25		
HH income (log)	0.176***	0.172***	0.066***		0.052***
Obs: 17270	(0.022)	(0.023)	(0.020)		(0.019)
			Panel A2: Women, age 26-35		
HH income (log)	0.216***	0.221***	0.107***		0.066***
Obs: 22573	(0.023)	(0.023)	(0.022)		(0.022)
			Panel A3: Women, age 36-45		
HH income (log)	0.283***	0.291***	0.122***		0.085***
Obs: 23569	(0.028)	(0.029)	(0.024)		(0.024)
			Panel A4: Women, age 46-55		
HH income (log)	0.366***	0.380***	0.139***		0.113***
Obs: 22785	(0.028)	(0.028)	(0.022)		(0.021)
			Panel A5: Women, age 56-65		
HH income (log)	0.219***	0.246***	0.042**		0.035**
Obs: 18765	(0.025)	(0.025)	(0.018)		(0.018)
			Panel A6: Women, age 66-75		
HH income (log)	0.143***	0.167***	0.028		0.030
Obs: 13267	(0.030)	(0.030)	(0.022)		(0.022)
			Panel A7: Women, above 75		
HH income (log)	0.080**	0.098***	0.033		0.035
Obs: 9032	(0.033)	(0.033)	(0.027)		(0.027)
			Panel B: Men, all ages		
HH income (log)	0.110***	0.110***	0.055***	0.061***	0.057***
Obs: 111160	(0.013)	(0.013)	(0.008)	(0.008)	(0.008)
			Panel A1: Men, age 18-25		
HH income (log)	0.179***	0.171***	0.030		0.026
Obs: 15356	(0.026)	(0.026)	(0.024)		(0.025)
			Panel A2: Men, age 26-35		
HH income (log)	0.279***	0.279***	0.088***		0.085***
Obs: 19598	(0.028)	(0.028)	(0.024)		(0.023)
			Panel A3: Men, age 36-45		
HH income (log)	0.190***	0.184***	0.094***		0.106***
Obs: 20462	(0.028)	(0.028)	(0.026)		(0.025)
			Panel A4: Men, age 46-55		
HH income (log)	0.285***	0.298***	0.070***		0.073***
Obs: 20385	(0.029)	(0.029)	(0.022)		(0.021)
			Panel A5: Men, age 56-65		
HH income (log)	0.211***	0.232***	0.053***		0.048***
Obs: 16678	(0.025)	(0.025)	(0.018)		(0.018)
			Panel A6: Men, age 66-75		
HH income (log)	0.109***	0.135***	-0.022		-0.017
Obs: 11771	(0.029)	(0.030)	(0.019)		(0.020)
			Panel A7: Men, above 75		
HH income (log)	0.019	0.033	-0.042*		-0.038
Obs: 6910	(0.039)	(0.039)	(0.023)		(0.023)

Appendix Table F.3. SOEP (1985-2019). Pooled and Panel Results for women / men of different ages.

	Pooled No Controls	Pooled Year Dummies	Panel Year Dummies	Panel Age, Year Dummies	Panel All Demographic Controls

		Panel A: Women, all ages			
HH income (log)	0.466***	0.477***	0.228***	0.237***	0.214***
Obs: 242748	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
		Panel A1: Women, age 18-25			
HH income (log)	0.202***	0.211***	0.075***		0.069***
Obs: 26038	(0.021)	(0.021)	(0.024)		(0.024)
		Panel A2: Women, age 26-35			
HH income (log)	0.375***	0.414***	0.224***		0.201***
Obs: 42679	(0.021)	(0.021)	(0.024)		(0.024)
		Panel A3: Women, age 36-45			
HH income (log)	0.521***	0.561***	0.286***		0.255***
Obs: 53348	(0.022)	(0.022)	(0.028)		(0.028)
		Panel A4: Women, age 46-55			
HH income (log)	0.659***	0.684***	0.314***		0.279***
Obs: 46045	(0.025)	(0.025)	(0.031)		(0.031)
		Panel A5: Women, age 56-65			
HH income (log)	0.573***	0.592***	0.184***		0.170***
Obs: 33782	(0.025)	(0.026)	(0.029)		(0.029)
		Panel A6: Women, age 66-75			
HH income (log)	0.661***	0.650***	0.194***		0.187***
Obs: 25174	(0.036)	(0.037)	(0.048)		(0.047)
		Panel A7: Women, above 75			
HH income (log)	0.422***	0.390***	0.118*		0.119*
Obs: 15682	(0.060)	(0.060)	(0.062)		(0.061)
		Panel B: Men, all ages			
HH income (log)	0.421***	0.434***	0.182***	0.190***	0.165***
Obs: 217227	(0.013)	(0.013)	(0.012)	(0.012)	(0.012)
		Panel A1: Men, age 18-25			
HH income (log)	0.214***	0.232***	0.077***		0.073***
Obs: 24883	(0.024)	(0.024)	(0.027)		(0.027)
		Panel A2: Men, age 26-35			
HH income (log)	0.358***	0.381***	0.171***		0.148***
Obs: 36021	(0.023)	(0.023)	(0.025)		(0.024)
		Panel A3: Men, age 36-45			
HH income (log)	0.439***	0.478***	0.211***		0.202***
Obs: 45280	(0.025)	(0.025)	(0.032)		(0.032)
		Panel A4: Men, age 46-55			
HH income (log)	0.544***	0.586***	0.288***		0.247***
Obs: 42833	(0.027)	(0.028)	(0.036)		(0.035)
		Panel A5: Men, age 56-65			
HH income (log)	0.578***	0.593***	0.106***		0.092***
Obs: 32557	(0.026)	(0.027)	(0.027)		(0.027)
		Panel A6: Men, age 66-75			
HH income (log)	0.623***	0.626***	0.118***		0.134***
Obs: 23439	(0.034)	(0.034)	(0.041)		(0.041)
		Panel A7: Men, above 75			
HH income (log)	0.549***	0.534***	-0.003		0.047
Obs: 12214	(0.057)	(0.058)	(0.068)		(0.069)

Appendix G. Appendix for the Country Panel Results.

Appendix Table G.1. Full result for **Table 3.5**. Specification 2.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.618***	0.890**	1.877**	0.553***	1.209
	(0.106)	(0.322)	(0.765)	(0.060)	(0.787)
Constant	-0.379	-2.451	-11.177	-0.488	-6.156
	(0.856)	(2.573)	(6.923)	(0.644)	(8.574)

R^2	0.902	0.676	0.778	0.847	0.887
Observations	1131	256	321	255	299
Countries	106	24	30	24	28

Appendix Table G.2. Full result for **Table 3.5**. Specification 3.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.615***	0.976***	1.708**	0.594***	1.212
	(0.109)	(0.342)	(0.733)	(0.066)	(0.833)
Average age	-0.059	-0.256*	-0.335	0.373	0.019
	(0.072)	(0.126)	(0.206)	(0.237)	(0.080)
Average age-squared	0.081	0.403***	0.320	-0.258	-0.033
	(0.066)	(0.141)	(0.217)	(0.218)	(0.070)
Share of women	-2.536	-8.671***	1.759	-6.934*	-0.322
	(2.160)	(3.052)	(4.447)	(3.882)	(3.493)
Constant	1.824	4.477	-3.363	-6.644	-6.063
	(2.111)	(3.148)	(8.783)	(6.039)	(10.319)
R^2	0.903	0.704	0.785	0.857	0.887
Observations	1131	256	321	255	299
Countries	106	24	30	24	28

Appendix Table G.3. Full result for **Table 3.5**. Specification 4*a*.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.591***	0.822***	1.324*	0.593***	0.701
	(0.069)	(0.291)	(0.719)	(0.040)	(0.743)
Average age	-0.110*	-0.256*	-0.304	0.196	-0.063
	(0.066)	(0.138)	(0.196)	(0.162)	(0.095)
Average age-squared	0.119*	0.412***	0.285	-0.132	0.034
	(0.061)	(0.146)	(0.208)	(0.153)	(0.080)
Share of women	-2.777	-9.855***	0.007	-7.960*	1.534
	(1.942)	(2.850)	(4.294)	(4.409)	(2.578)
Unemployed share	-4.307***	-2.378	-4.519**	-6.086***	-3.378**
	(0.866)	(1.705)	(1.713)	(1.577)	(1.421)
Degree share	0.257	5.154	-0.514	1.630	0.835
	(0.740)	(3.106)	(1.138)	(1.436)	(0.681)
Married share	0.025	-0.465	-0.891	0.402	0.854
	(0.381)	(1.287)	(0.524)	(0.871)	(0.644)
Health problems share	-0.554	-1.102	0.168	0.156	-1.269**
	(0.514)	(0.715)	(1.057)	(0.899)	(0.553)
Constant	3.804**	6.761**	1.374	-0.725	0.347
	(1.846)	(3.075)	(8.645)	(4.387)	(9.627)
R^2	0.910	0.720	0.801	0.881	0.898
Observations	1131	256	321	255	299
Countries	106	24	30	24	28

Appendix Table G.4. Full result for **Table 3.5**. Specification 4*b*.

	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.607***	0.818**	2.337***	0.588***	0.574
	(0.077)	(0.353)	(0.569)	(0.038)	(0.549)
Average age	-0.068	-0.260*	-0.162	0.159	-0.034
	(0.075)	(0.145)	(0.239)	(0.146)	(0.106)
Average age-squared	0.095	0.416**	0.164	-0.083	0.004
	(0.069)	(0.158)	(0.244)	(0.132)	(0.092)
Share of women	-4.459**	-9.702***	0.359	-9.023*	3.835
	(2.050)	(2.956)	(4.396)	(4.444)	(2.979)
Unemployed share	-4.124***	-2.368	-2.523	-5.867***	-4.605***
	(0.949)	(1.793)	(1.532)	(1.621)	(1.565)
Degree share	0.487	5.722*	-0.340	1.894	0.386
	(0.723)	(3.220)	(1.225)	(1.555)	(0.828)
Married share	0.036	-0.380	-1.002	0.690	0.366
	(0.424)	(1.376)	(0.679)	(0.877)	(0.665)
Health problems share	-0.288	-0.581	0.182	0.618	-0.469
	(0.531)	(0.632)	(1.134)	(1.013)	(0.599)
Constant	3.437*	6.577*	-13.188	0.201	0.279
	(1.871)	(3.318)	(7.868)	(4.008)	(7.569)
R^2	0.916	0.714	0.821	0.887	0.926
Observations	1000	245	271	233	251
Countries	101	24	26	23	28

Appendix Table G.5. Full result for **Table 3.5**. Specification 5.

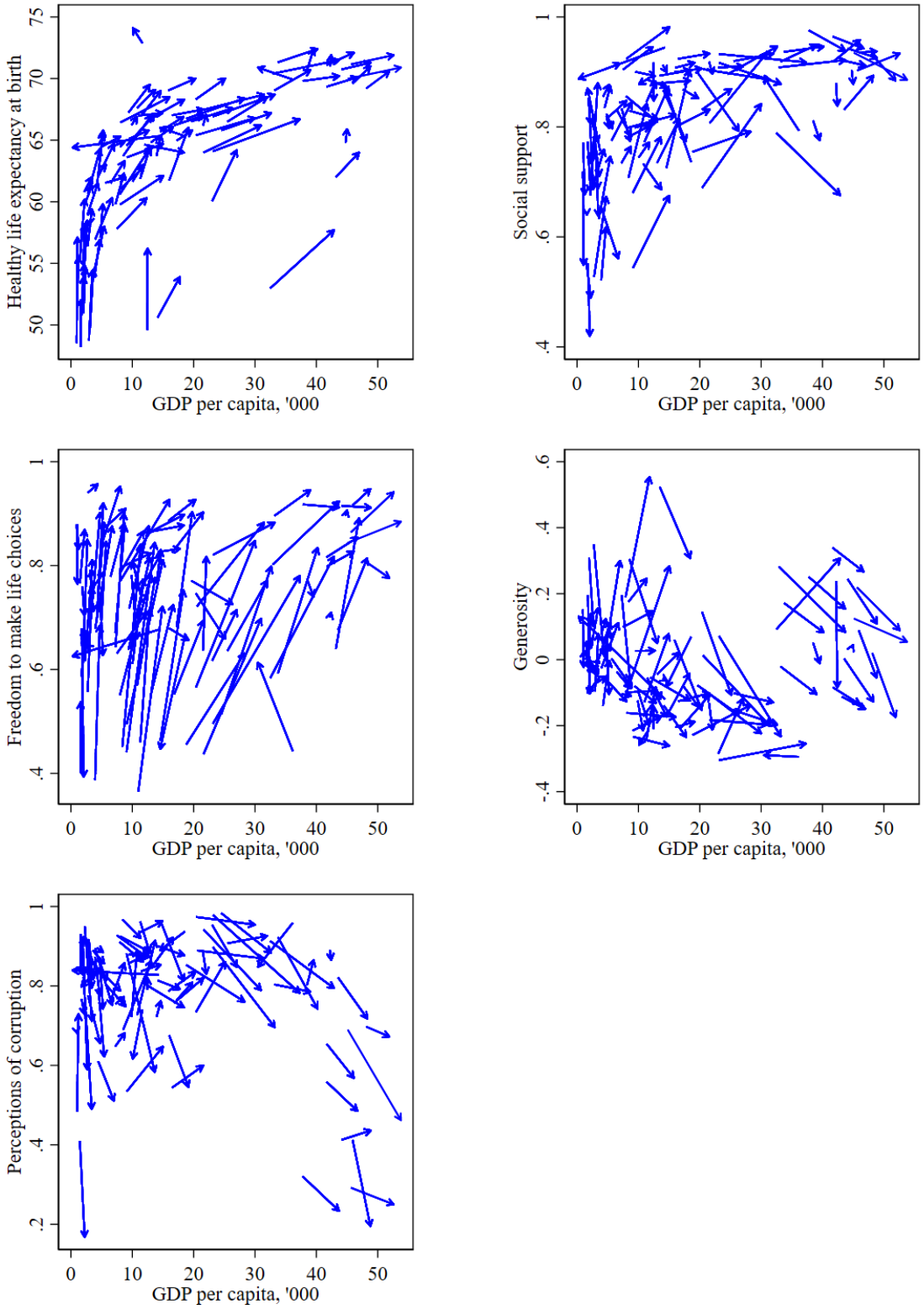
	All Countries	Low	Lower-middle	Upper-middle	High
GDP per capita (log)	0.568***	1.085**	2.339***	0.373***	0.268
	(0.083)	(0.453)	(0.611)	(0.093)	(0.448)
Average age	-0.107	-0.439***	-0.145	0.082	-0.086
	(0.070)	(0.145)	(0.183)	(0.111)	(0.090)
Average age-squared	0.118*	0.590***	0.144	-0.056	0.043
	(0.065)	(0.162)	(0.188)	(0.101)	(0.077)
Share of women	-4.476**	-8.966***	0.175	-5.397**	1.449
	(1.729)	(2.610)	(3.679)	(2.373)	(2.591)
Unemployed share	-3.374***	-1.919	-1.161	-4.499***	-3.692***
	(0.893)	(1.795)	(1.364)	(1.395)	(1.056)
Degree share	0.277	4.036	-0.647	1.016	0.102
	(0.655)	(3.163)	(1.017)	(1.302)	(0.689)
Married share	0.007	-0.561	-1.092*	0.378	0.736
	(0.418)	(1.206)	(0.536)	(0.635)	(0.589)
Health problems share	0.312	0.259	0.886	-0.874	-0.214
	(0.503)	(0.738)	(1.055)	(0.864)	(0.701)
Social support	1.925***	0.889	2.553**	3.071***	1.974***
	(0.449)	(0.767)	(0.982)	(0.791)	(0.589)
Healthy life expectancy at birth	-0.027	-0.137*	0.042	0.040	0.033
	(0.036)	(0.069)	(0.064)	(0.050)	(0.083)
Freedom to make life choices	0.633**	0.235	0.331	1.916**	1.618**
	(0.299)	(0.424)	(0.444)	(0.749)	(0.601)
Generosity	0.431	0.670	0.253	0.084	-0.258
	(0.260)	(0.513)	(0.517)	(0.398)	(0.347)
Perceptions of corruption	-0.736**	-0.526	-1.094**	-1.239*	-0.606
	(0.307)	(0.625)	(0.423)	(0.604)	(0.483)
Constant	4.546*	13.933***	-17.496*	-2.032	1.284
	(2.404)	(3.983)	(8.709)	(4.042)	(6.863)
R^2	0.925	0.741	0.845	0.919	0.939
Observations	1000	245	271	233	251
Countries	101	24	26	23	28

Appendix Table G.6. Extension of Table 3.5 with specifications that add one WHR variable at a time.

	All Countries	Low	Lower-middle	Upper-middle	High
Specification 4*b*: All Demographic Controls, Countries with WHR Information					
GDP per capita (log)	0.618***	0.890**	1.877**	0.553***	1.209
	(0.106)	(0.322)	(0.765)	(0.060)	(0.787)
Specification 4*b* + Social support					
GDP per capita (log)	0.578***	0.904**	2.265***	0.513***	0.762
	(0.079)	(0.361)	(0.541)	(0.033)	(0.556)
+ Healthy life expectancy at birth					
GDP per capita (log)	0.585***	1.126**	2.287***	0.485***	0.673
	(0.084)	(0.434)	(0.573)	(0.059)	(0.535)
+ Freedom to make life choices					
GDP per capita (log)	0.535***	1.083**	2.213***	0.369***	0.532
	(0.079)	(0.431)	(0.607)	(0.062)	(0.386)
+ Generosity					
GDP per capita (log)	0.576***	1.081**	2.262***	0.373***	0.476
	(0.082)	(0.442)	(0.607)	(0.089)	(0.427)
+ Perceptions of corruption: Specification 5					
GDP per capita (log)	0.568***	1.085**	2.339***	0.373***	0.268
	(0.083)	(0.453)	(0.611)	(0.093)	(0.448)
Observations	1000	245	271	233	251
Countries	101	24	26	23	28

Notes: Specifications 4 to 5 are panel regressions with country and year FEs. The controls in Specification 4 are country-year age, age-squared, the share of women, unemployed, degree holders, married or partnered respondents and the share of respondents who reported health problems. Specification 5 includes the controls from Specification 4 and WHR variables (Social support, Healthy life expectancy at birth, Freedom to make life choices, Generosity, Perceptions of corruption, Confidence in national government). Standard errors in parentheses are clustered at the country level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix Figure G.1. The relationship between the change in the WHR variables and GDP per capita growth: first to last observation over the 2009-2019 period. Bottom 90% of the global GDP per capita distribution.



Appendix Table G.7. Country panel. Literature

Author	Outcome measure	Income measure	Controls	Data	Coefficient
Sacks *et al.* (2010)	Standardised: Ladder Question (GWP), Life satisfaction (EB) [Comparable coefficients]	Log of per capita GDP	No controls	World Values Survey and Eurobarometer (until 2007)	WVS: 0.51 [1.16] EB: 0.17 [0.49]

Notes: The standard deviations of country-average wellbeing scores used in Sacks *et al.* (2010) are 0.49 in the WVS, 0.39 in EB and 0.47 in Gallup. The SD for WVS and EB scores are retrieved from the data kindly provided by Daniel Sacks. The SD of the scores in Gallup are estimated using the data over the comparable period.

The comparable coefficients are those from the analysis of the country-level averages of standardised scores, divided by the SD of country-level averages of standardised scores and multiplied by the SD of country-level averages of non-standardised scores. The coefficients are comparable with the results presented in the paper.

Appendix H. The WHR-5 Variables: Mediation and Confounding

Introducing the WHR-5 variables in column (5) of Table 3.3 sharply reduces the estimated coefficient on GDP from that in column (4*b*). Which of these two estimated coefficients should we prefer? The answer depends on the causal relationship between the WHR-5 variables and income. Take, for example, the variable Freedom to make life choices, which we call F below. There are two possible causal relationships.

i) F is a mechanism. In this case GDP → F → H. Freedom is one of the reasons why higher income brings greater wellbeing. Controlling for F turns this mechanism off, and produces an (incorrect) smaller estimated coefficient on GDP.

ii) F is a confounder. Greater freedom makes economies more productive, and individuals value freedom independently of its effect on income.

In this case, part of the correlation between GDP and happiness reflects the independent contribution of freedom. Controlling for F in the regression addresses this confounding and produces the correct correlation between GDP and H.

Controlling for freedom in case i) will underestimate the true correlation between happiness and GDP, while in case ii) it will produce the correct correlation.

Our first WHR-5 variable is social support, which is measured as having relatives or friends to count on for help. The direction of correlation here is unclear. While richer countries have more developed formal support systems (and therefore rely less on informal support), the question here refers to the *availability* of informal support rather than its use. Nevertheless, the greater mobility in rich countries may reduce the availability of friendship networks. Regarding confounding, informal support networks may contribute to economic growth via their effects on health and consumption (as emphasised for formal social support in Barr, 2004).

It should be noted that the confounding relationship here is based on a positive relationship between social support and GDP, while the mediation analysis rather suggests a negative relationship. In the latter case, holding social support constant should increase the estimated coefficient on GDP. That the estimated coefficient actually falls in Table 3.3 with the introduction of social support is more consistent with social support being a confounder.

The second variable is healthy life expectancy. Here there is an obvious bi-directional relationship, with richer countries being able to afford better healthcare, and at the same time a healthier workforce being more productive.

With respect to freedom, the institutions that protect individual freedoms have been shown to be a catalyst for economic growth, as argued by Acemoglu *et al*. (2001). Conversely, Glaeser *et al*. (2004) suggest that economic growth can enhance institutional quality, leading to a virtuous cycle where growth and freedoms reinforce each other. Again, both mediation and confounding are possible.

Existing literature has underlined that social capital can affect economic growth (Helliwell and Putnam, 1995, and Zak and Knack, 2001). There is also a substantial literature on the correlation between social capital and wellbeing: a recent contribution is Sarracino and Slater (2025). One element of social capital is generosity towards others. In the World Happiness Report, as noted in Table A.5, generosity is defined as the residual from a regression of having donated money to a charity in the past month on log GDP per capita. As such it is already corrected for GDP, and perhaps unsurprisingly its inclusion in the regression does not change the estimated GDP per capita coefficient in Appendix Table D.9.

The last WHR-5 variable is perceptions of corruption. There is a well-established link between corruption and economic development: see Svensson (2005) for a comprehensive review of the

literature and World Bank (1997) for early empirical evidence. Empirical work provides support for causation in both directions: economic development can reduce corruption (Treisman, 2000), while higher perceived corruption can decrease investment and hinder growth (Mauro, 1995, and Treisman, 2000).

A useful recent summary of the links between a variety of institutions and life satisfaction appears in Berggren and Bjørnskov (2023).

The table below shows the correlations between the WHR variables, wellbeing and GDP at the country level.

Appendix Table H.1. Correlation Matrix: Income, wellbeing and social variables

	Average wellbeing	GDP per capita (log)	Social support	Healthy life expectancy at birth	Freedom to make life choices	Generosity	Perceptions of corruption
Average wellbeing	1.00						
GDP per capita (log)	0.78***	1.00					
Social support	0.70***	0.69***	1.00				
Healthy life expectancy at birth	0.72***	0.80***	0.62***	1.00			
Freedom to make life choices	0.52***	0.34***	0.40***	0.36***	1.00		
Generosity	0.20***	0.03	0.06*	0.03	0.33***	1.00	
Perceptions of corruption	-0.42***	-0.31***	-0.22***	-0.29***	-0.48***	-0.29***	1.00

Note: Pairwise correlations. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$