

## Subjective Well-Being and Income: Is There Any Evidence of Satiation?†

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In 1974 Richard Easterlin famously posited that increasing average income did not raise average well-being, a claim that became known as the Easterlin Paradox. However, in recent years new and more comprehensive data has allowed for greater testing of Easterlin's claim. Studies by us and others have pointed to a robust positive relationship between well-being and income across countries and over time (Deaton 2008; Stevenson and Wolfers 2008; Sacks, Stevenson, and Wolfers 2013). Yet, some researchers have argued for a modified version of Easterlin's hypothesis, acknowledging the existence of a link between income and well-being among those whose basic needs have not been met, but claiming that beyond a certain income threshold, further income is unrelated to well-being.

The existence of such a satiation point is claimed widely, although there has been no formal statistical evidence presented to support this view. For example Diener and Seligman (2004, p.5) state that "there are only small increases in well-being" above some threshold. While Clark, Frijters and Shields (2008, p.123) state more starkly that "greater economic prosperity at some point ceases to buy more happiness," a similar claim is made by Di Tella and MacCulloch (2008, p.17): "once basic needs have been satisfied, there is full adaptation to further economic growth." The income level beyond which further income no longer yields greater well-being is typically said to be somewhere between \$8,000 and \$25,000. Layard (2003, p.17) argues that

"once a country has over \$15,000 per head, its level of happiness appears to be independent of its income;" while in subsequent work he argued for a \$20,000 threshold (Layard 2005 p.32–33). Frey and Stutzer (2002, p.416) claim that "income provides happiness at low levels of development but once a threshold (around \$10,000) is reached, the average income level in a country has little effect on average subjective well-being."

Many of these claims of a critical level of GDP beyond which happiness and GDP are no longer linked come from cursorily examining plots of well-being against the level of per capita GDP. Such graphs show clearly that increasing income yields diminishing marginal gains in subjective well-being.<sup>1</sup> However this relationship need not reach a point of nirvana beyond which further gains in well-being are absent. For instance Deaton (2008) and Stevenson and Wolfers (2008) find that the well-being–income relationship is roughly a linear-log relationship, such that, while each additional dollar of income yields a greater increment to measured happiness for the poor than for the rich, there is no satiation point.

In this paper we provide a sustained examination of whether there is a critical income level beyond which the well-being–income relationship is qualitatively different, a claim referred to as the modified-Easterlin hypothesis.<sup>2</sup> As a

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<sup>1</sup> We should add a caveat, that this inference of "diminishing marginal well-being" requires taking a stronger stand on the appropriate cardinalization of subjective well-being (Oswald 2008).

<sup>2</sup> We should note that the term "modified-Easterlin hypothesis" is something of a misnomer, as Easterlin himself is not among those claiming a satiation point. Instead, Easterlin and Sawangfa (2009) make the even stronger claim that rising aggregate income is not associated with rising subjective well-being at *any* level of income. While incorrect, it is not uncommon, however, to attribute the "modified Easterlin hypothesis" to Easterlin, and indeed, his

statistical claim, we shall test two versions of the hypothesis. The first, a stronger version, is that beyond some level of basic needs, income is uncorrelated with subjective well-being; the second, a weaker version, is that the well-being–income link estimated among the poor differs from that found among the rich.

Claims of satiation have been made for comparisons between rich and poor people within a country, comparisons between rich and poor countries, and comparisons of average well-being in countries over time, as they grow. The time series analysis is complicated by the challenges of compiling comparable data over time and thus we focus in this short paper on the cross-sectional relationships seen within and between countries. Recent work by Sacks, Stevenson, and Wolfers (2013) provide evidence on the time series relationship that is consistent with the findings presented here.

To preview, we find no evidence of a satiation point. The well-being–income link that one finds when examining only the poor, is similar to that found when examining only the rich. We show that this finding is robust across a variety of datasets, for various measures of subjective well-being, at various thresholds, and that it holds in roughly equal measure when making cross-national comparisons between rich and poor countries as when making comparisons between rich and poor people within a country.

### I. Cross-Country Comparisons

We begin by evaluating whether countries at different levels of economic development have different average levels of subjective well-being. Our measure of economic development is the log of real GDP per capita, measured at purchasing power parity.<sup>3</sup> In our analysis we follow Layard (2003), and define “rich” as those people or countries with income greater than \$15,000 per capita, although the online Appendix shows

that our findings are not sensitive to considering alternative thresholds.

We want to assess well-being measured in many different datasets, thus we standardize well-being responses by subtracting the mean, and dividing by the typical cross-section of happiness within a country at a point in time.<sup>4</sup> This approach yields “z-score” measures of well-being that are transparent, easy to calculate, and comparable across datasets measuring well-being on differing scales. It also ensures the estimated well-being–income gradient is roughly comparable to earlier research which had analyzed ordered probit regressions. However, the disadvantage of this approach is that it is clearly ad hoc, as it assumes, for instance, that the difference between being “very happy” and “pretty happy” is equivalent to the difference between “pretty happy” and “not too happy.”<sup>5</sup>

Figure 1 shows average levels of life satisfaction drawn from the five waves of the Gallup World Poll run between 2008 and 2012 and GDP per capita, plotted on a log scale. We have data on 155 countries, which account for over 95 percent of the world’s population, across the spectrum of levels of economic development. The correlation of these variables is 0.79, remarkably high. The solid line shows the results from a simple OLS regression, estimated for the full sample:

$$(1) \text{Well-being}_c = \alpha + \beta \log(\text{GDP}_c) + \epsilon_c.$$

The estimated well-being–income gradient ( $\beta$ ) is 0.335 (se = 0.018). The figure also plots a local linear regression as a dotted line, which allows for a non-parametric fit of the well-being–income relationship. If there were a “satiation point,” this non-parametric fit would flatten out once basic needs were met. Instead, the line steepens slightly among the rich nations. Indeed, the most striking finding is simply how closely the non-parametric fit lies to the OLS regression line. That is, the well-being–income relationship

citation for the IZA Prize says that: “Societies with higher material wealth are on average more satisfied than poorer ones, but once the participation in the workforce ensures a certain level of material wealth, guaranteeing basic needs, individual as well as societal well-being as a whole are no longer increasing with a growth of economic wealth.”

<sup>3</sup> For most countries GDP comes from the World Bank’s World Development Indicators. Detailed information about how we fill in missing data is available in Sacks, Stevenson, and Wolfers (2013).

<sup>4</sup> That is, the denominator in this “z-score” is the standard deviation of well-being after controlling for country and wave fixed effects.

<sup>5</sup> Fortunately, this issue turns out to be more troubling in theory than in practice; Stevenson and Wolfers (2008) show alternative approaches using instead ordered probits or logits yield estimates of national happiness averages that are highly correlated ( $\rho > 0.99$ ).

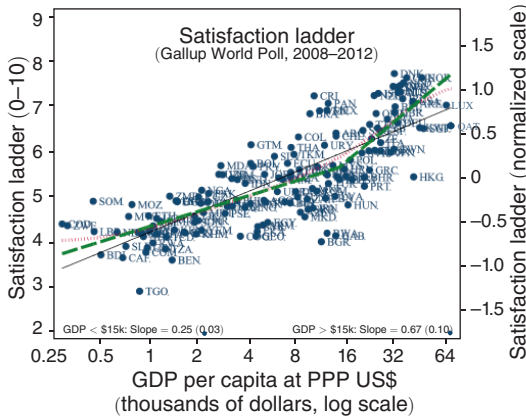


FIGURE 1. LIFE SATISFACTION AND INCOME AROUND THE WORLD

Notes: Author’s calculations, based on 2008–2012 waves of the Gallup World Poll. Solid line shows results from a simple OLS regression of satisfaction on log GDP per capita; the dashed line allow the slope to shift at a per capita GDP of \$15,000, respectively. The dotted line shows a lowess fit with bandwidth set to 0.8.

among poor nations appears to extend roughly equally among rich nations.<sup>6</sup>

Our more formal tests of the modified-Easterlin hypothesis come from regressions of the form:

$$\begin{aligned}
 (2) \text{ Well-being}_c &= \alpha \\
 &+ \beta_{poor} I(GDP_c < k) \\
 &\times (\log(GDP_c) - \log(k)) \\
 &+ \beta_{rich} I(GDP_c \geq k) \\
 &\times (\log(GDP_c) - \log(k)) + \epsilon_c,
 \end{aligned}$$

where the subscript  $c$  denotes country, the independent variables are the interaction of log real GDP per capita with a dummy variable indicating whether GDP per capita is above or below a cut-off level,  $k$ . The coefficient  $\beta_{poor}$  is the well-being–income gradient among “poor” countries (those with  $GDP < k$ ), and  $\beta_{rich}$  is the gradient

among “rich” countries (those with  $GDP \geq k$ ). By measuring  $\log(GDP)$  relative to a “cutoff,” this functional form allows for a change in the well-being–income gradient (i.e., a “kink” in the regression line) once GDP per capita exceeds the cutoff, but it rules out a discontinuous shift in well-being once per capita GDP exceeds  $k$ .<sup>7</sup> This specification allows us to test both the “strong” version of the modified-Easterlin hypothesis, which posits that  $\beta_{rich} = 0$ , and the “weak” version, suggesting  $\beta_{poor} > \beta_{rich}$ .

In Table 1 we report results where the cutoff level of per capita GDP,  $k$ , is set to \$15,000.<sup>8</sup> We repeat the results seen in Figure 1 in the first row. Subsequent rows show the results across different questions assessing well-being and different datasets. The well-being–income gradient in the Gallup World Poll clearly remains strong for the rich countries, and indeed, is somewhat stronger among countries whose per capita GDP exceeds \$15,000. These data clearly reject both the weak and strong versions of the modified-Easterlin hypothesis.

The next ten rows repeat the analysis using five rounds of the World Values Survey for both a life satisfaction question which mirrors that in the Gallup World Poll, and a question on happiness. The results roughly parallel those above, albeit with less statistical power.<sup>9</sup> In seven of the ten rows we can reject the strong claim that  $\beta_{rich} = 0$ . In two cases  $\beta_{rich}$  and  $\beta_{poor}$  are statistically significantly different from each other, however the well-being–income relationship is steeper among rich countries than the poor. Indeed, in all but two cases, the estimate of  $\beta_{rich}$  actually exceeds that for  $\beta_{poor}$  (rather than the other way around). In the two cases in which the point estimate of  $\beta_{poor}$  is larger, we cannot reject the null that  $\beta_{rich} = \beta_{poor}$ .

<sup>7</sup> We obtain similar results if instead we estimate the well-being–income gradient separately for rich and poor countries.

<sup>8</sup> Online Appendix Table 1 shows the results using alternative thresholds of \$8,000 and \$25,000, as well as the median level of GDP for the sample. Stevenson and Wolfers (2008) show estimates of ordered probit regressions estimating the well-being–income gradient for incomes above and below \$15,000, while Deaton (2008) tested thresholds of \$12,000 and \$20,000.

<sup>9</sup> In several countries the surveys were not nationally representative, focusing instead on urban areas or more educated members of society. Our analysis drops particularly unrepresentative observations as detailed in Stevenson and Wolfers (2008) and Sacks, Stevenson, and Wolfers (2013).

<sup>6</sup> Deaton (2008) and Stevenson and Wolfers (2008) make similar arguments using 2006 data from the Gallup World Poll.

TABLE 1—CROSS COUNTRY EVIDENCE

Well-being data	$\beta_{rich}$	$\beta_{poor}$	Difference
<i>Panel A. Gallup World Poll 2005–2012</i>			
Satisfaction ladder	0.674*** (0.103)	0.252*** (0.023)	0.422*** (0.123)
Life satisfaction	0.720*** (0.160)	0.361*** (0.051)	0.360* (0.198)
<i>Panel B. World Values Survey</i>			
Life satisfaction: 1981–1984 wave	0.185 (0.418)	0.668 (0.430)	–0.484 (0.772)
Life satisfaction: 1989–1993 wave	0.694*** (0.241)	0.515* (0.284)	0.179 (0.488)
Life satisfaction: 1994–1999 wave	0.640*** (0.185)	0.445*** (0.105)	0.195 (0.259)
Life satisfaction: 2000–2004 wave	0.755*** (0.152)	0.209*** (0.066)	0.546** (0.201)
Life satisfaction: 2005–2009 wave	0.176 (0.137)	0.254*** (0.056)	–0.078 (0.179)
Happiness: 1981–1984 wave	0.567 (0.387)	0.087 (0.338)	0.481 (0.685)
Happiness: 1989–1993 wave	0.945*** (0.231)	0.430 (0.281)	0.515 (0.472)
Happiness: 1994–1999 wave	0.599*** (0.184)	0.241** (0.106)	0.357 (0.260)
Happiness: 2000–2004 wave	0.796*** (0.164)	–0.068 (0.075)	0.864*** (0.222)
Happiness: 2005–2009 wave	0.332** (0.135)	0.055 (0.061)	0.277 (0.182)
<i>Panel C. Pew Global Attitudes Survey</i>			
Satisfaction ladder: 2002	0.716*** (0.205)	0.163** (0.079)	0.552** (0.270)
Satisfaction ladder: 2007	0.405** (0.175)	0.208*** (0.072)	0.197 (0.233)
Satisfaction ladder: 2010	0.279** (0.295)	0.248* (0.126)	0.031 (0.411)
<i>Panel D. ISSP</i>			
Happiness 2008	0.449*** (0.162)	–0.245 (0.190)	0.694** (0.292)
Happiness 2007	0.424*** (0.149)	–0.364** (0.148)	0.788*** (0.270)
Happiness 2001	0.713*** (0.232)	–0.247** (0.111)	0.960*** (0.252)
Happiness 1998	0.925*** (0.193)	–0.076 (0.223)	1.00*** (0.362)
Happiness 1991	0.923*** (0.262)	–0.177 (0.127)	1.10*** (0.370)

\*\*\*Significant at the 1 percent level.

\*\*Significant at the 5 percent level.

\*Significant at the 10 percent level.

TABLE 2—INCOME AND SATISFACTION IN THE UNITED STATES

Annual household income	Very happy (percent)	Fairly happy (percent)	Not too happy (percent)
<\$10k	35	44	21
\$10k–\$20k	42	42	15
\$20k–\$30k	43	52	5
\$30k–\$40k	55	41	4
\$40k–\$50k	46	46	9
\$50k–\$75k	55	40	5
\$75k–\$100k	60	36	4
\$100k–\$150k	60	40	0
\$150k–\$250k	70	30	0
\$250k–\$500k	83	17	0
>\$500k	100	0	0

Note: Author's calculations, based on Gallup Poll conducted December 6–9, 2007.

There are two other useful cross-country studies that are worth analyzing, the Pew Global Attitudes studies, which posed the satisfaction ladder question in 44 countries in 2002, 47 countries in 2007, and 22 countries in 2010, and the International Social Survey Program, which asked a consistent happiness question in 1991, 1998, 2001, 2007, and 2008. Each of these datasets strongly reject the null that  $\beta_{rich} = 0$ . Moreover, to the extent that the well-being–income relationship changes, it appears stronger for rich countries. Somewhat paradoxically, the ISSP data appear to show a negative well-being–income gradient among poor nations, but this is entirely due to a single influential observation, the Philippines (whose influence is even greater given that these samples contain mostly medium- and high-income countries).

All told, comparisons of average levels of subjective well-being and GDP per capita across countries suggest that the well-being–income relationship observed among poor countries holds in at least equal measure among rich countries. In the few cases where we cannot reject  $\beta_{rich} = 0$ , we also cannot reject  $\beta_{rich} = \beta_{poor}$ . Our larger datasets emphatically reject the weak and strong forms of the modified-Easterlin hypothesis, while the smaller samples are sufficiently imprecise as to provide no statistically significant evidence in support of (or against) it.

## II. Within-Country Cross-Sectional Comparisons

We now turn to analyzing the relationship between well-being and income that one obtains

when comparing rich and poor people within a country. We begin by analyzing data from the United States, and in particular, the Gallup poll conducted on December 6–9, 2007. These data are particularly useful because the top income code is unusually high, allowing respondents to report household income in categories up to \$500,000. If we are to find evidence of satiation, these data seem like the right place to look. Table 2 shows a simple cross-tab of happiness and household income. The positive association between family income and reported well-being is remarkably consistent.<sup>10</sup> Online Appendix Table 2 shows that a similar finding holds when asking instead about life satisfaction.

When we analyze these data more formally in regressions (not shown) we find no evidence of a significant break in either the happiness–income relationship, nor in the life satisfaction–income relationship, even at annual incomes up to half a million dollars. This finding contrasts with a claim made by Frey and Stutzer (2002, p.409) whose informal visual assessment of data from the General Social Survey (for 1972–1974 and 1994–1996) led them to conclude that “the same proportional increase in income yields a lower increase in happiness at higher income levels.” In our re-analysis of that same dataset (not shown) we used data from all years, but even with these larger samples could not reject the null that proportional increases in income continue to yield the same increase in happiness at higher income levels.

Looking beyond the United States, we can use the individual country data in the Gallup World Poll to examine the within-country well-being–income gradients in each nation. In Figure 2 we perform separate local linear (“lowess”) regressions estimating the satisfaction–income relationship non-parametrically for each of the world's 25 most populous countries. These results are shown for those respondents whose annual household income lies between the tenth and ninetieth percentiles of their national income distributions. While there are differences in the location of these non-parametric fits, and even some differences in the slopes, the more remarkable feature is simply that for

<sup>10</sup> While 100 percent of those reporting annual incomes over \$500,000 are in the top bucket of “very happy,” it is important to note that there are only eight individuals in this category.

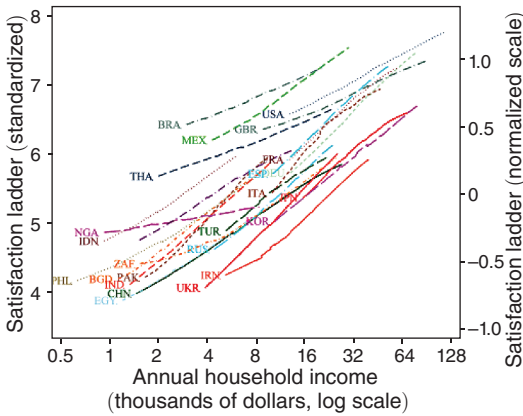


FIGURE 2. WELL-BEING AND INCOME, WITHIN THE 25 LARGEST COUNTRIES

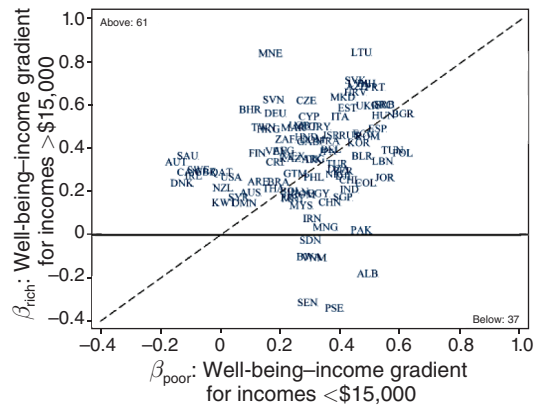


FIGURE 3. THE WELL-BEING-INCOME AMONG THE RICH AND POOR IN EACH COUNTRY

every country the relationship estimated at low incomes appears to hold in roughly equal measure at higher incomes. In particular, there is no evidence that the slope flattens out beyond any particular “satiating point” in any nation.

In order to provide a more formal assessment, we repeat the earlier exercise, estimating an analog to equation (2), but analyzing individual well-being and household income, rather than national averages, and allowing the slope to change for household incomes above \$15,000 per annum. We repeat this exercise for 98 countries in which we have at least 200 respondents both above and below the threshold. We report the results of these 98 regressions compactly in Figure 3. The vertical axis shows  $\beta_{rich}$ , the estimated well-being–income gradient over the “rich” part of the sample, while the horizontal axis shows  $\beta_{poor}$ , the gradient over the “poor” part of the sample. The strong form of modified-Easterlin hypothesis suggests that the well-being–income gradient is zero for the rich part of the sample, suggesting that the data should cluster along the horizontal axis. The weaker form of this hypothesis suggests a sharp break in this gradient among the “rich,” and hence that most country-level estimates will lie beneath the 45-degree line. In fact, we find 61 nations above this line, and only 37 below.

We also try various alternative specifications, changing the cutoff level of  $k$  across countries (using alternative cutoffs at \$8,000 and \$25,000); in others,  $k$  depends on parameters of a country’s

income distribution—it’s median, twenty-fifth or seventy-fifth percentile. In no case do we find evidence in favor of the modified-Easterlin hypothesis.

### III. Conclusions

While the idea that there is some critical level of income beyond which income no longer impacts well-being is intuitively appealing, it is at odds with the data. As we have shown, there is no major well-being dataset that supports this commonly-made claim. To be clear, our analysis in this paper has been confined to the sorts of evaluative measures of life satisfaction and happiness that have been the focus of proponents of the (modified) Easterlin hypothesis. In an interesting recent contribution, Kahneman and Deaton (2010) have shown that in the United States, people earning above \$75,000 do not appear to enjoy either more positive affect or less negative affect than those earning just below that. We are intrigued by these findings, although we conclude by noting that they are based on very different measures of well-being, and so they are not necessarily in tension with our results. Indeed, those authors also find no satiation point for evaluative measures of well-being.

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