Happiness and Income Inequality

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Abstract

This paper shows that the lack of growth in average well-being, despite substantial GDP per capita growth, in the US is not a paradox. It can be explained by changes in the income distribution and the concavity of the happiness function. Since 1975 in the United-States practically all of the income gains that have accrued to households have gone to the richest 20%; income inequality has increased significantly. During that time, in the US, the happiness gap between the rich and the poor has widened substantially; happiness has stagnated for the rich and fallen for the poor which is interpreted has rising happiness inequality. This pattern of spreading well-being between the income groups is also observed in Europe. These phenomena reflect the fact that although "money buys happiness", the relationship between the two is concave. Analysis suggests that the happiness function can be approximated by the log-linear form and confirms that there is no satiation in the function. The cost of extra happiness increases with an individual's wealth. The paper also explores and rejects the possibility that the paradox results from measurement error. Corrections for the slope of the happiness function are estimated for taxes and the transitory nature.

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1 Introduction

Well-being measures are receiving increasingly more attention from policy makers, especially in Europe. The British government has ordered a report on "the evidence relating to the causative factors associated with various concepts and components of (personal) well-being". The topic is so popular in England that the University of Sheffield now has a Centre for Well-being in Public Policy, dedicated to studying "how people's health and well-being can be defined, measured and improved in ways that help policy-makers determine the best use of scarce resources".[1]

Views concerning the usefulness of subjective well-being for research vary greatly within the academic community. At one end of the spectrum, some are calling for a paradigm shift, while others express profound scepticism. To better understand what can be learned from happiness research, economists need to understand how subjective well-being relates to income. Economic theory suggests that people derive utility from opportunities and more income typically means more opportunities. If "money doesn't buy happiness", subjective well-being is a very different measure of welfare than income or wealth.

Studying US data, Richard Easterlin was one of the first to note that although at some point in time richer individuals are happier, over time economic growth is not accompanied with an increase in aggregate happiness [Easterlin(1974)]. The apparent inconsistency between these two phenomena took his name and is referred to as the Easterlin Paradox. Numerous papers have since explored different explanations to this puzzle with many interpreting it as evidence that classical conceptions of utility need revision. The most popular explanation is that when assessing how happy or satisfied they are with their life, people make comparisons. They compare their own current circumstances with past ones [Rafeal Di Tella and MacCulloch(2004)] and with that of others [Andrew E. Clark and Shields(2008)].

Under the assumption of equivalence between well-being and utility, when individuals derive well-being from having more income than they did in the past, their preferences exhibit income adaptation and when they derive utility from having more income than others, their preferences exhibit social comparisons. Both phenomena find empirical support but they are somewhat challenging to identify [Luttmer(2004)], [Rafeal Di Tella and MacCulloch(2004)]. Measuring income adaptation requires micro-level panels therefore only a few data sources can be used. Measuring social comparison is challenging because the researcher has to

[1] http://www.shef.ac.uk/cwipp/index.html

construct the reference point of comparison (neighbors, average GDP/capita, hypothetical person, etc.). Furthermore, some of the expected empirical manifestations of these preferences, such as differences in cross and within country well-being-income gradients, are not observed in the data [Stevenson and Wolfers(2008a)].

Interpreting the Easterlin paradox as evidence that peoples' preferences exhibit income adaptation and social comparisons has led many to the conclusion that governments should stop pursuing economic growth and make income taxes more progressive [Layard(2005)]. The idea is that people adapt to growing incomes and that lowering income differences would raise average happiness. When individuals compare themselves to one another, the extra utility someone receives from having a high income comes at the expense of those who compare themselves with him. The pursuit of individual wealth should thus be discouraged by increasing tax rates at the top.

Within the happiness literature, much effort has been targeted at explaining the happiness-income puzzle with the Easterlin paradox almost systematically the starting point of analysis [Andrew E. Clark and Shields(2008)], [Frey and Stutzer(2002)]. Recently Stevenson and Wolfers presented evidence suggesting a positive relationship between GDP growth and average well-being [Stevenson and Wolfers(2008a)]. More precisely, they found that the income well-being gradient is the same within country, across country and over time. Their findings, they say, "put to rest the claim that economic growth doesn't lead to happiness and (...) undermine the role played by relative income comparisons".[2] Although it varies in strength, evidence that economic growth raises aggregate happiness can be found roughly everywhere outside the US. The authors conclude that "the failure of happiness to rise in the US remains a puzzling outlier". Thus the question: "Why has economic growth not raised average happiness in the US?".

Relying solely on classical economic theory, this paper proposes an explanation of the lack of serial correlation between economic growth and average happiness in the US. The interpretation builds on the concavity of the happiness function and takes into account the evolution of income inequality over the last few decades.[3] When the data is disaggregated by income group, happiness trends observed in the US and elsewhere are consistent with agents whose happiness depends solely on their own income, and not on past income or the income of

[2]Most theories of comparisons suggest that the within country income-well-being gradient should be smaller than the across country GDP-average-well-being gradient.

[3]The expression "happiness function" is used to describe the relationship between subjective well-being and income.

others.

1.1 A simple explanation of the Easterlin Paradox

The lack of growth in aggregate happiness despite the economic growth experienced in the US is not necessarily a paradox. If, as the economy grows, inequality increases in such a way that incomes fall for the poor, the *pull* on average happiness being exerted by the rich will be offset by the *drag* exerted by the poor. Although the income gains of the rich are larger in magnitude than the losses of the poor, average income is growing, the concavity of the function is such that the effects on well-being are similar. Figure 1 illustrates this intuition.

This interpretation of the Easterlin paradox builds on the following three propositions.

Proposition 1. *The happiness function is concave.*

Proposition 2. *Real income has risen for the rich and fallen for the poor.*

Proposition 3. *Happiness has risen for the rich and fallen for the poor.*

The paper shows that each proposition finds empirical support and extends the discussion about the importance of income equality in the conversion of economic growth into aggregate happiness to other countries. The analysis starts with a formal estimation of the curvature of the happiness function. The existence of a satiation point, or plateau, is assessed by examining the relationship between well-being and income among the richest. This is done to test the idea that the happiness-income puzzle reflects the fact that, after a certain point, "money doesn't buy happiness". The paper explores the evolution of the distribution of income and well-being in the US, revealing that real income has indeed fallen for the bottom and second income quintiles. Subjective well-being has followed a pattern similar to income in that the gap between the rich and poor has widened over the last four decades. The rising income gap between individuals at the top of the income distribution and their poorer counterparts over the last 35 years has parallelled an increasing happiness gap. Finally, analyses are conducted with data from Europe to confirm the important role of income inequality in the conversion of economic growth into aggregate well-being.

The second part of the paper explores the possibility that the Easterlin paradox is a result of measurement error. The idea is that even though measured income has been rising, true income may have remained flat, explaining the lack of growth in happiness. The slope of the happiness function is estimated for corrections for taxes and the transitory nature of income.

The paper is organized as follows: Section 2 describes the data used for the analysis. Specific descriptions of the subjective well-being and income measures are presented, along with an explanation of the method used for converting the qualitative subjective well-being answers to quantitative information . Section 3.1 presents an estimation of the degree of curvature of the happiness function and tests for the existence of a satiation point the well-being. A discussion of the evolution of the income distribution (3.2) and the rich-poor happiness gap (3.3) in the US follows. Section 3.5 uses European data to assess whether patterns observed in other countries confirm the importance of the concavity of the well-being function and income inequality in the conversion of economic growth into general subjective well-being. Section 4.1 investigates the effect of different corrections for the income variable. Finally, Section 5 concludes.

2 Data

Four sources of data are used in this paper. The General Social Survey (GSS) is a repeated micro-level cross section of about 1600 Americans covering the years from 1972 to 2006 (with some gaps). The Health and Retirement Study (HRS) is a bi-annual panel of roughly 22,000 retired Americans covering the years from 1992 to 2004. The Eurobarometer (EB) is a repeated cross-section of anywhere between 450 and 4250 respondents (averaging at about 1600) from different European nations from 1974 to 2004. The same countries are sampled annually with countries added over time. The German Socio Economic Panel (GSOEP) is an annual panel of about 2750 German adults; it gathers detailed socioeconomic information as well as a life satisfaction measure over a period ranging from 1984 to 2005.

2.1 Well-Being

Table 1 reports the questionnaire items used to measure subjective well-being in each of the surveys. With the exception of the HRS, the items are somewhat similar. The HRS measures come from answers to a subset of questions from the Center for Epidemiologic Studies of Depression (CES-D), aimed at measuring depressive symptoms. The questions ask "Now think about the past week and the feelings you have experienced. Please tell me if each of the following was true (Yes/No) for you much of the time this past week? Much of the time during the past week you have felt - sad, happy, depressed and enjoyed life".

When estimating the degree of curvature of the happiness function, simply converting the

qualitative answers into numbers would not be appropriate because the choice of scale could affect the estimation.[4] For that reason this paper turns to the method used by Stevenson and Wolfers for aggregating well-being scores across groups [Stevenson and Wolfers(2008a)]. The idea is to use the coefficients from ordered probit regressions of subjective well-being on group dummies (with no other controls) as the average well-being for that group. The following makes the procedure explicit.

$$SWB_{it} = \beta_0 + I_{it}\Delta_k + \epsilon_{it}$$

The subscripts i and t denote individuals and time periods. SWB_{it} is the subjective well-being of the respondent. The variable I_{it} is a $n \times k$ matrix of binary group membership indicators and Δ_k is a $k \times 1$ vector of coefficients. The coefficients, δ, are interpreted as well-being indices that capture shifts in an underlying normally distributed latent well-being variable. Unless otherwise specified, the ordered probits are estimated on the entire sample (all years, countries, etc.). Depending on the grouping variables used, the procedure allows for different levels of aggregation, i.e. Δ_k can take different lengths.

δ_{nt} Country×year averages$(k = t \times j)$

δ_{jnt} Income groups × countries × year averages $(k = j \times n \times t)$

For the curvature analysis, the groups are either the income categories in the survey or twenty equally weighted bins (each with 5% of the income distribution) used as group dummies if the income variable is continuous, as it is the case in the HRS and GSOEP,. These subjective well-being indices are also employed to present the data graphically.

2.2 Income

Table 2 reports the wording of the questionnaire items used to collect the information about the respondents' income. The GSOEP and the HRS are the only two sources of data to have non-categorical income measures. The GSS, the WVS and the EB rely on roughly 5 to 15 income categories per country-wave. For these surveys the income variable is converted into a numerical figure by assigning the value that corresponds to the mid-point of the income categories chosen by the respondent. The highest income bracket is converted by adding half of the distance between the top and bottom bounds of the previous category to the lowest bound of the top category.[5] For most surveys, the income categories do not change annually

[4]For example, the GSS is usually coded according to: "Not too Happy"=1, "Pretty Happy"=2 and "Very Happy"=3.

[5]For example, if the previous to last category is $45,000 to $55,000 and the top category is $55,001 and up, the numerical figure attributed to respondents that chose the top income category is $60,000.

year but do so relatively frequently, at least once every five years.

For the GSS, a net of tax income measure is obtained using the National Bureau of Economic Research TAXSIM 8 software.[6] The available criteria used for the tax simulation are the year, the number of dependents, the marital status and the respondent's nominal household income.

GDP per capita and CPI, used to convert nominal into real figures, come from the World Penn Tables [of Pennsilvanya(2007)] and the OECD web site [OECD(2007)].

3 Analysis

This section provides empirical evidence in support of **Propositions 1, 2** and **3**. The analysis starts by exploring the properties of the well-being function. The evolution of the income and happiness distribution in the US over the last forty years follows. European data is then analyzed to investigate the role of income inequality in the conversion of economic growth into well-being. Finally, formal estimations of the well-being income gradient are reported for different corrections in the measurement of the income variable.

3.1 Proposition 1: The Happiness Function

Figures 2 through 6 present cross-sections of real income and subjective well-being indices for the US, Germany and other European countries. As explained earlier, the SWB indexes come from country-specific ordered probit regressions of happiness on income-group-year membership variables. The index is the coefficient on a respondent's group.

The left hand side figures plot SWB and income on a normal scale and the right hand side figures present SWB and income on a logarithmic scale. Every year for which the data was collected is super-imposed, the x axis is in real figures. The dashed lines plot well-being predicted by a linear regression of the well-being indices on the logarithm of income (no controls). The shape of the well-being function is remarkably similar across countries. These figures should rule out any doubt about the concavity of the well-being function. In every country and for every well-being measure, the relationship between individual income and well-being is clearly concave. Also, in the US, correcting for taxes (Figure 3c and 3d) eliminates what appears to be a group of very happy poor outliers visible on the raw income

[6] http://www.nber.org/ taxsim/taxsim-calc8/index.html

figure (3a and 3b).

To formalize the insight that emerges from visual inspection of the figures, the degree of curvature of the well-being function is estimated through a Box-Cox transformation analysis. The procedure estimates

$$SWB_i = \alpha + \beta g(y_i) + \epsilon_i \qquad \text{where} \qquad g(y_i) = (y_i^\lambda - 1)/\lambda$$

y_i represent individual i income. The λ captures the degree of curvature of the function. A λ greater than 1 implies a convex function. At exactly 1, the function is linear and for values below 1 the function is increasingly concave. Finally, the function is of the logarithm form when λ equals 0. Figure 8 plots $g(y)$ for different λ on a linear and logarithmic scale. Notice that when the underlying function is less concave than the logarithm, it appears convex when plotted on a logarithm scale; the converse is also true.

The second column of Table 3 and Table 4 report country specific estimates of λ. The estimates confirm the concavity of the well-being function regardless of the country and subjective well-being measure. For the US the well-being function estimated with the GSS data is less concave ($\hat{\lambda} = 0.5$) than that estimated with the HRS data (around 0). This is not due to the fact that income in the GSS does not account for taxes and transfers since the degree of curvature estimated with net income actually suggests a less concave function ($\hat{\lambda} = 0.6$). When income is measured directly (HRS), as opposed to categorically, the degree of curvature of the happiness function estimated in the US is close to zero, the log-linear form.

In Europe, the degree of concavity of the well-being function appears to vary a great deal across countries (second and third column). However, as discussed earlier, this could be due to differences in tax systems. Estimates of the degree of curvature of the life satisfaction function range from 0.1 (Greece) to 1.3 (Ireland). In all but one country (Belgium), estimates of the degree of curvature of the happiness function are lower (weakly), implying a more concave function, and range from -0.2 (England) to 0.4 (Germany).

The relationship between income and life satisfaction is less concave than the relationship between income and happiness. Differently put, the marginal happiness of a dollar diminishes at a faster rate than the marginal life satisfaction of a dollar. One possible explanation is that the life satisfaction question more explicitly asks respondents to make comparisons when assessing their well-being. Indeed, when respondents focus on other peoples' circumstances;

extra income has an important effect on well-being even at high levels. For most functional forms, an increase in income improves an individual's relative position regardless of where he/she is along the income distribution (unless at the top). More generally, the channels linking income and life satisfaction might be different than the channels linking income and happiness. These different properties point to the fact that failing to make a distinction between the two measures may be a mistake. For example, one should be wary of comparisons between a within-country happiness gradient and a across-country life satisfaction gradient.

3.1.1 Satiation

Newspaper articles often suggest that the lack of growth in average happiness is due to the existence of a satiation point in the happiness function, i.e. a level of income above which additional income does not affect happiness [Begley()]. To explore this possibility the effect of income among the very rich is investigated. If the happiness function exhibits satiation, money should not buy happiness for this subpopulation.

The third, fourth and fifth columns of Table 3 and Table 5 report the smallest top income decile within which income has a statistically significant positive effect on well-being. The tables report the estimated coefficient from ordered probits and the corresponding full-sample estimate. For instance, in the GSS, when raw income is used, the smallest top income group for which income increases happiness is 10%. At 0.393, the income coefficient is actually higher within that group than among the whole population, 0.239. Using net income does not affect these results. The smallest top groups in the HRS are somewhat larger and the effect of income is smaller in those groups. Looking at the figures (2 and 3) reveals that a large number of middle income earners report being "highly happy" for three of the four HRS well-being measures . Additionally, out of all four, "Feeling depressed" is the well-being indicator that behaves most like the GSS happiness question. The results are very similar in Europe, where income raises well-being even among the top 10% richest These results are shown in Table 5.

The well-being function is clearly concave and there is no evidence of satiation as the well-being function is positively sloped even among top earners. **Proposition 1** is confirmed. Furthermore, using a log-linear function to capture the concavity of the relationship between individual well-being and income, as is the norm in the field, is a valid choice since it corresponds to the degree of parametrically estimated concavity. This specific form implies that proportional income gains bring the same well-being gain regardless of one's position

on the income distribution. Money buys happiness but, it gets more expensive as people get richer.

3.2 Proposition 2: Income Inequality

Panel (a) of Figure 9 shows the evolution of real income for each quintile of the US General Social Survey. Income inequality has grown among the GSS respondents over the last four decades. Real income for the bottom and second quintiles has decreased by an average of 0.58% and 0.55% a year respectively. Real income for the third, fourth and top quintiles has increased by an average of 0.15%, 0.79% and 0.90% a year respectively. The gap between the 1^{st} and 5^{th} quintile has thus grown by about 1.5% per year. While the average income of the top quintile was about 9 times larger than that of the bottom's in 1973 it was close to 10.5 times larger by the end of 2006 . The income patterns in the GSS support **Proposition 2**. Furthermore, because it is conducted with income measured with categorical questions, the analysis most likely underestimates the magnitude of the rise in income inequality.

3.3 Proposition 3: The Happiness Gap

Panel (b) of Figure 9 reports the happiness for each quintile of the GSS since 1973. Happiness has polarized over the years, decreasing for the bottom quintiles and stagnating for the top quintiles. Figure 10 presents the evolution of the percentage of respondents answering "Very Happy", "Pretty Happy" and "Not too Happy" for each income group. The figure shows that the proportion of the poorest respondents reporting to be "Very Happy" dropped for every income quintile over the last four decades. The proportion of richest respondent reporting to be "Unhappy" has also dropped over the same period. Interestingly, the frequency of "Very Happy" answers has dropped while the frequency of "Happy" has risen for every income group since the mid-seventies. The happiness gap between the rich and poor has widened because the *switch* from "Very Happy" to "Happy" has been more drastic for the poorer income groups.

To get a sense of the magnitude of the widening of the happiness gap, Table 6 reports estimates from four different specification of the following ordered probit:

$$\begin{aligned} SWB_{it} &= \beta_0 + \beta_P Poor_{it} + \beta_M Mid_{it} + \beta_X Controls_{it} \\ &\quad + \beta_{PT}(Poor \times Time) + \beta_{MT}(Mid \times Time) + \beta_{RT}(Rich \times Time) + \epsilon_{it} \end{aligned}$$

where $Poor_{it}$, Mid_{it} and $Rich_{it}$ are mutually exclusive group dummies representing the mem-

bership of respondent i to the bottom, middle three or top income quintiles in period t. β_P and β_M capture the difference in happiness between the corresponding group and the rich in 1973. The coefficients on the $(Group \times Time)$ variables, β_{PT}, β_{MT} and β_{RT} reflect the average annual change in happiness for each group. $Controls_{it}$ include the respondent's age, gender, ethnicity, marital status and education.

To help with the interpretation, column (4) is discussed in detail; this specification includes the sociodemographic controls. As captured by $\hat{\beta}_P$, the happiness gap between the rich and poor in 1973 was 60% of one standard deviation. This difference grew by 0.44% every year ($\hat{\beta}_{PT}$) to reach 74.5% by the end of 2006 ($\hat{\beta}_{PT} \times 33$ years). The happiness gap between the top and bottom income quintile has grown by 14.5% of one standard deviation over that period.[7] Said differently, the happiness difference between the bottom 20% poorest and the top 20% richest is 25% larger in 2003 than it was in 1975. During the same period, the income gap between these groups rose by 0.4 standard deviations.

The estimated happiness gap between the middle and rich income group($\hat{\beta}_M$) was 21.73% of one standard deviation in 1973. It grew by 0.39% ($\hat{\beta}_{MT}$) every year to reach 34.6% of a standard deviation in 2006 ($\hat{\beta}_{MT} \times 33$ years), a 12.9% increase. Notice that the gap between the middle and bottom quintiles remained roughly constant over that period since the well-being of both groups decreased at a similar rate.

The widening of the happiness gap is confirmed. It is not attributable to changes in the composition of the quintiles since the exclusion of controls does not affect the results. In the US, happiness has fallen for the poor and middle income groups and stagnated for the rich (**Proposition 3** is confirmed). Stevenson and Wolfers discuss the fall in overall variance in happiness since the mid-seventies and interpret this decline as a decline in happiness inequality [Stevenson and Wolfers(2008b)]. In light of the facts that the happiness of the poor has fallen and the gap between the rich and poor has widened this interpretation appears misleading. Indeed, both in relative and absolute terms, poor people are less happy today than they were in the seventies.

3.4 The Easterlin Paradox Revisited

The idea that the happiness income puzzle can be explained solely by the concavity of the happiness function and the evolution of incomes finds support in the data. 1) The happiness

[7]The ordered probit normalizes the standard deviation to one.

function is concave. 2) Income inequality has increased since the mid seventies and real income has fallen for the poorest two quintiles. 3) Happiness tracks income changes along a concave function, well-being has stagnated for the rich and dropped for the poor. The following subsection investigates the role of income inequality in the conversion of economic growth into aggregate well-being in other countries to further validate this reading of the happiness income puzzle.

3.5 The Happiness-Income Puzzle in Europe

Table 8 and 9 report estimates of the rich poor well-being gap and its evolution for each country. The bottom rows of the table report the evolution of the well-being gap over time. GDP per capita increased in all countries during the time of the survey. These regressions are country specific and include year dummies as well as a set of controls for age, ethnicity, gender, marital status and education. The interpretation of the coefficients is the same as that of Table 6.

In countries where income inequality has either fallen or remained constant, average life satisfaction has risen on par with GDP per capita. This is the case in France, Germany, Italy, Luxembourg, Denmark, and Spain. In Holland and Great Britain, average life satisfaction has risen despite rising income inequality. This is not inconsistent with the interpretation of the Easterlin paradox put forward in this paper.[8] Portugal displays patterns similar to the US. In both countries, aggregate well-being stagnated (failed) despite a growing economy. In that sense, the Easterlin paradox is not exclusively an American phenomenon.

In all but one country (Belgium), economic growth was accompanied by an (weak) increase in the rich-poor well-being gap. This should be regarded as a stylized characteristic of the relationship between subjective well-being and income over time.

Table 10 reports estimates of country-level life satisfaction regressions. Column (1) estimates the effect of the logarithm of GDP per capita on aggregate life satisfaction. The gradient is positive and significant at 0.183. The second specification (2) looks at the effect of the average logarithm of income which captures changes in the income distribution not captured by average income. The gradient for this estimation is roughly half of the ln(GDP) coefficient

[8] As long as the whole income distribution benefits from the economic growth (i.e. real incomes do not fall for the poor) average well-being will rise despite increasing income inequality. Furthermore, even if real incomes fall for the poor, average well-being will rise if the well-being gains of the rich is larger than the well-being loses of the poor.

at 0.096. However, when the estimation includes both variables (Column 3), only the average log-income remains significantly linked to aggregate well-being, confirming the role of income inequality in the conversion of economic growth into aggregate well-being. Overall, the patterns in Europe are consistent with the notion that aggregate well-being is driven by individual income.

4 Discussion

4.1 Taxes and Permanent Income

Another explanation of the happiness-income puzzle is that the lack of growth in average happiness as a function of income reflects the fact that income is improperly measured. The idea is that although measured income has risen substantially since the seventies, true income has not. This section looks at whether correcting for taxes and the transitory nature of income affects the relationship between income and subjective well-being.

Table 7 reports estimates from ordered probit regressions of subjective well-being on different income measures. The estimation uses data from the GSS and from the GSOEP. Note that while the GSS well-being measure asks about the respondent's happiness the GSOEP measure asks about life satisfaction. The log-linear form is assumed for these estimations.

Column (1) reports the estimated happiness-income gradient from an ordered probit of well-being on raw income in the US. Column (2) presents the same specification using net income computed with TAXSIM8. Both specifications include year dummies and controls for age, marital status, gender and race. Under the assumption that happiness, like utility, depends on disposable income, one would expect net income to have a larger effect on well-being. This is indeed the case; the coefficient is 0.15 for raw income and 0.16 for net income. Although the coefficients are statistically different the difference is minimal. Column (3) reports the same coefficient using data from Germany, with life satisfaction as the well-being variable. The income well-being gradient is higher in this case but since both the sample and well-being measure are different across the countries, discussion will be limited to within country comparisons. Column (4) presents the estimate obtained with a fixed-effect model. This model does not affect the gradient substantially.

Column (5) uses lagged income to proxy for permanent income to test the hypothesis that well-being, like utility, depends not on transitory income but permanent income. The argu-

ment as to why lagged income is a proper instrument for permanent income is detailed in the Appendix. Succinctly put, the only part of lagged income that is related to contemporaneous well-being is the permanent part, this is not the case for contemporaneous income. This correction actually lowers the well-being-income gradient (0.221). The fact that unlike utility, well-being depends on transitory income, could be interpreted as evidence that well-being does not measure utility. Overall, the Easterlin paradox does not appear to be a result of mismeasurement of income.

4.2 Income Adaptation and Social Comparison

The interpretation of the Easterlin paradox presented in this paper does not rule out the possibility that individual preferences exhibit income adaptation or social comparison. It does however call into question the stylized facts that have motivated most discussions of these phenomena in happiness research as well as the notion that aggregate happiness data is informative of individual preferences. There is evidence that individuals compare their circumstances with that of others and get accustomed to changes in their lives [Frey and Stutzer(2002)]. Whether these phenomena have an economically important effect at the macroeconomic level is unclear.

Research on hedonic adaptation suggests that people adapt to new circumstances very rapidly. Kimball, Ohtake, and Tsutsui find that the type of adaptation described by psychologists takes place over very short periods of time [Miles Kimball and Tsutsui(2006)]. Kimball and Silverman find, for example, that widows adapt to the loss of their partner in about nine months [Kimball and Silverman(2008)]. The type of adaptation described by psychologists and studied by the authors does not seem to be the mechanism at work in the behavior of long run happiness.

Research on social comparison suggests that people compare themselves to people who are geographically close to them [Barrington-Leigh and Helliwell(2008)]. One implication is that the well-being income gradient should be smaller for cross-country than for within-country regressions. When individuals derive utility from comparisons with people living in their own country, regressions are driven not by between-country variations but by within-country variations. In fact, if agents only care about where they rank in their country, there should be no positive association between a nation's GDP per capita and the average level of subjective well-being. Stevenson and Wolfers could not reject the hypothesis that the within and between-country gradients are equal [Stevenson and Wolfers(2008a)]. This paper

investigated the possibility that this is due to errors in the measurement of income and found that it is not the case.

5 Conclusion

This paper presents the Easterlin paradox under a new light. It argues that the assumption of equivalence between happiness and utility does not necessarily lead to the conclusion that peoples' preferences are different than what standard notions of utility suggest. Like the utility function described in introductory economics courses, the relationship between income and subjective well-being is concave. Whether this should be interpreted as evidence that subjective well-being captures utility is an open question.

The lack of growth in aggregate happiness despite massive economic growth reflects the fact that, over the last few decades, income gains have accrued to the top income earners to such a disproportionate extent that income has fallen for the poor. Over the last thirty-five years the happiness gap between the rich and the poor has widened in pair with income inequality. Regardless of the reason given, happiness is nowadays more a commodity of rich people than it was thirty-five years ago. Analysis of patterns in European countries confirm the crucial role of income inequality in the conversion of economic growth into aggregate well-being. The increased well-being gap between the rich and poor has widened in other developed countries. It appears that this fact should receive additional attention and be consider as a stylized fact of the relationship between income and happiness. Correcting for taxes has little effect on the estimated slope of the happiness function and using permanent rather than transitory income surprisingly lowers the gradient.

The conclusions reached in this paper extend naturally to those reached in other fields of economics: income equality matters. Whether it is because people compare themselves to each other or because the happiness function is concave, the income distribution affects how resources are converted into well-being. Raising national happiness with policies aimed at accelerating the economic development of a country is not ineffective if the expansion benefits the entire income distribution.

On a theoretical level, economists understand how utility relates to income. Bridging the gap between theory and practice can be a difficult task as utility per se is not measurable. Economists have partly resolved this issue by studying peoples' choices but choices are only informative of preferences; they do not allow for comparisons across individuals. For many,

this is precisely the appeal of happiness data. This paper attempts to inform the debate about the relationship between happiness and utility by exploring an alternative interpretation of the stylized facts of happiness research.

More work is needed before economists can clearly understand the relationship between subjective well-being and utility. Few studies have investigated the production of happiness. An agent's time allocation is paramount to his welfare. Furthermore, knowing that time is an important input for happiness opens the door to a promising area of research.

APPENDIX

Permanent Income

Lagged income (Y_{t-1}) can be used as a proxy for permanent income (Y_t^P). Under the permanent income hypothesis, observed income (Y_t) has a permanent (Y_t^P) and transitory (Y_t^T) component. A consumers' utility depends on permanent income.

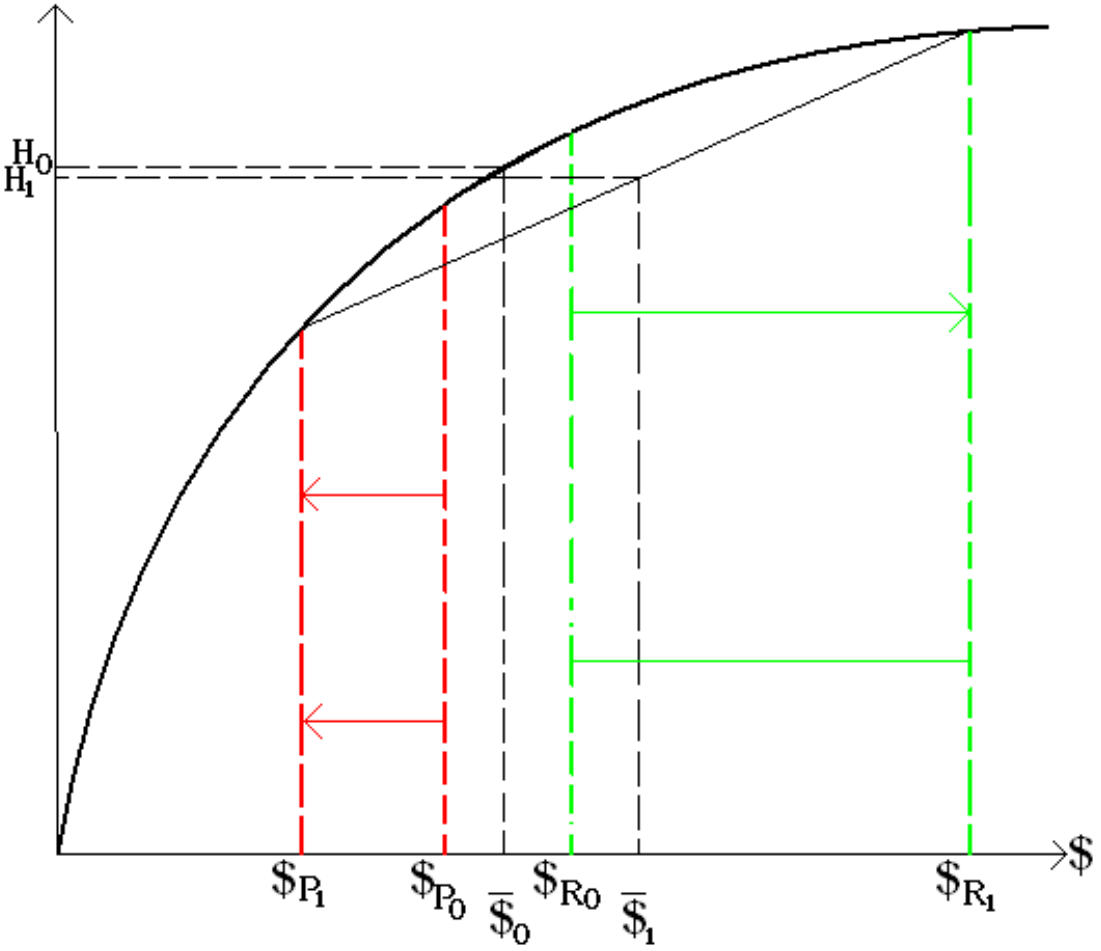
$$\begin{aligned} Y_t &= Y_t^T + Y_t^P \\ Y_{t-1} &= Y_{t-1}^T + Y_{t-1}^P \end{aligned}$$

The correlation between Y_t and H_t does not isolate the effect of permanent income on happiness. However, if income follows a random walk, the only part of lagged income related to contemporaneous well-being is the permanent part, it can thus serve as a proxy for Y_t^P.

$$Cov(Y_{t-1}^P, Y_t^P) > 0, \quad Cov(Y_t^T, Y_t^P) = 0, \quad Cov(Y_{t-1}^T, Y_{t-1}^P) = 0 \quad \text{and} \quad Cov(Y_t^T, Y_{t-1}^T) = 0$$

$$\frac{Cov(Y_{t-1}, H_t)}{Cov(Y_{t-1}, Y_t)} \simeq \frac{Cov(Y_{t-1}^P, H_t)}{Cov(Y_{t-1}^P, Y_t^P)}$$

Figure 1: Economic Growth and Falling Average Happiness.



Note: The Figure illustrates the happiness of two individuals, with the same concave utility function, who's happiness changes across two periods as a result of changes in their income. The result is an overall increase in average income and a drop in average happiness.

Figure 2: The Well-Being Function in the US General Social Survey.

(a) Happiness and Income

(b) Happiness and log(Income)

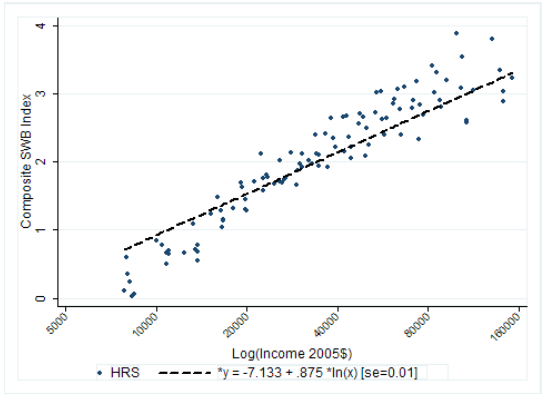
(c) Happiness and Net Income

(d) Happiness and log(Net Income)

Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

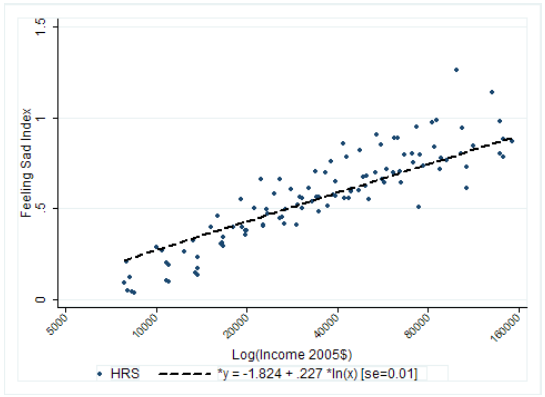
Figure 3: The Well-Being Function in the US Health and Retirement Study (A).

(a) Composite Well-Being



(b) Composite Well-Being/log

(c) Feeling Happy

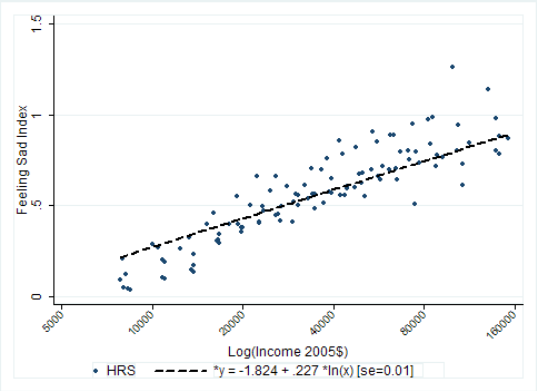


(d) Feeling Happy/log

Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

Figure 4: The Well-Being Function US Health and Retirement Study (B).

(a) Feeling Sad

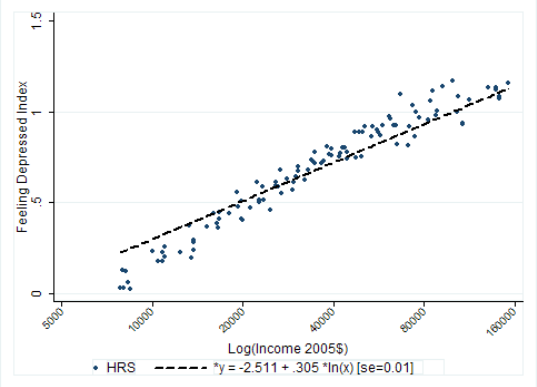


(b) Feeling Sad/log

(c) Enjoy Life

(d) Enjoy Life/log

(e) Feeling Depressed



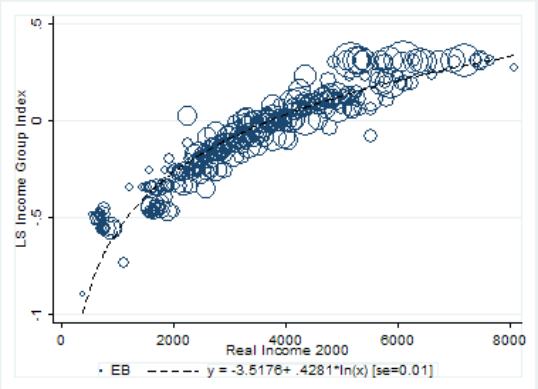
(f) Feeling Depressed/log

Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

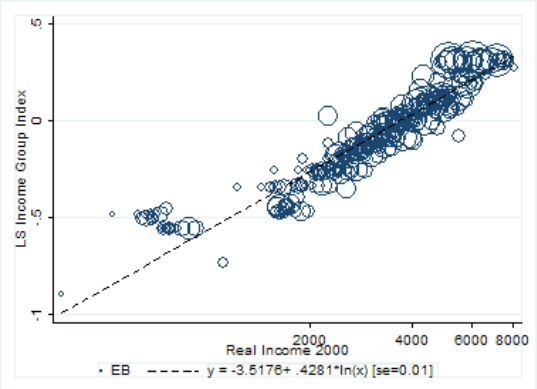
Figure 5: The Well-Being Function in West Germany.

(a) Life Satisfaction (GSOEP)

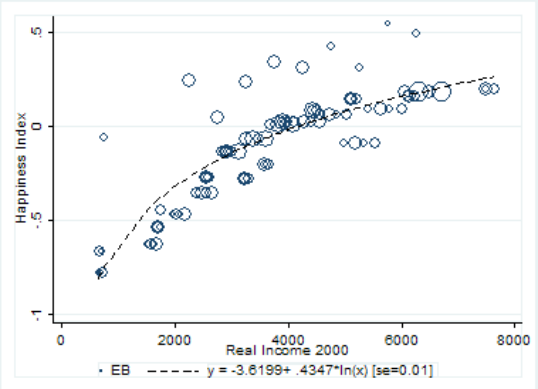
(b) Life Satisfaction/log (GSOEP)



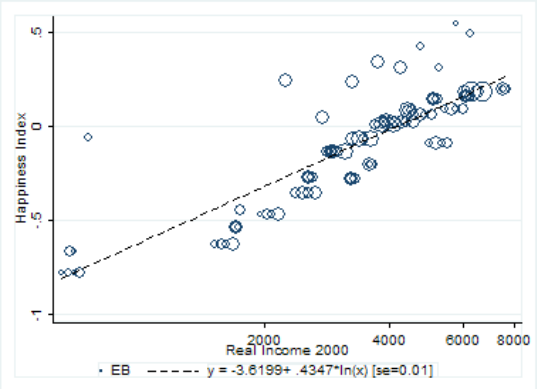
(c) Life Satisfaction (EB)



(d) Life Satisfaction/log (EB)



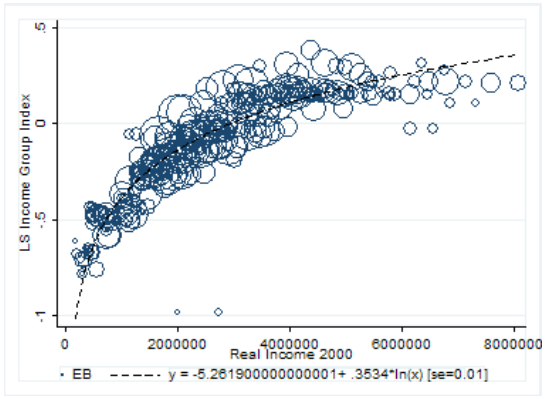
(e) Happiness (EB)



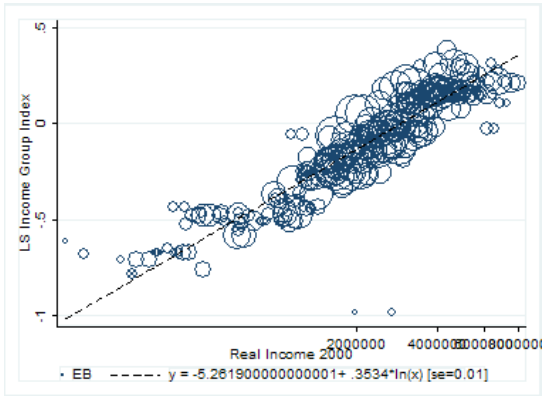
(f) Happiness/log (EB)

Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

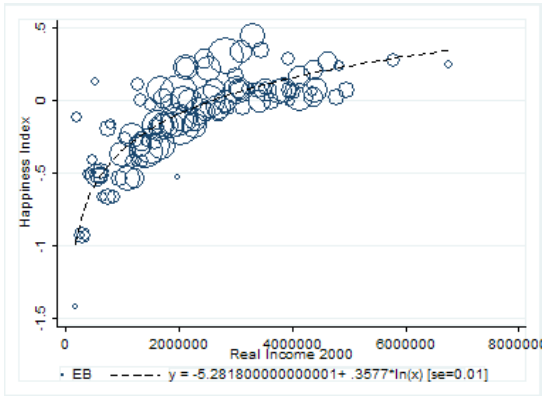
Figure 6: The Well-Being Function in Europe (A).



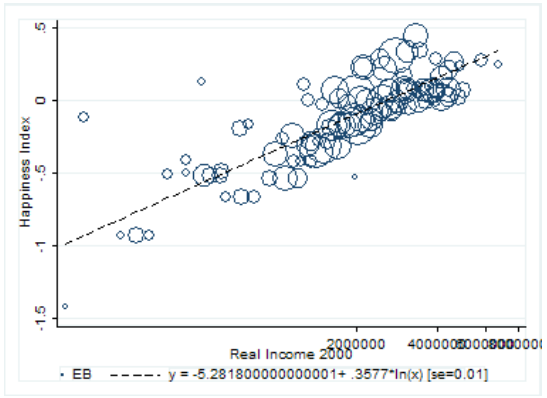
(a) Italy (LS)



(b) Italy (LS)/log



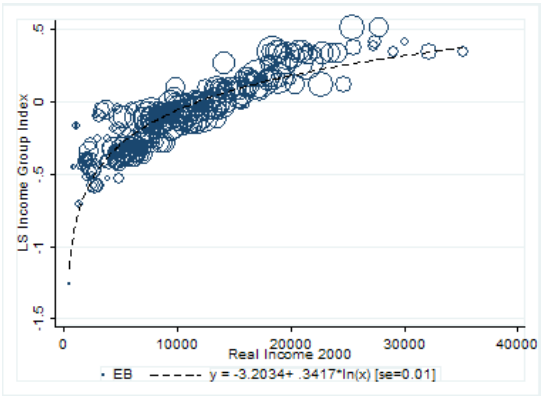
(c) Italy (H)



(d) Italy (H)/log

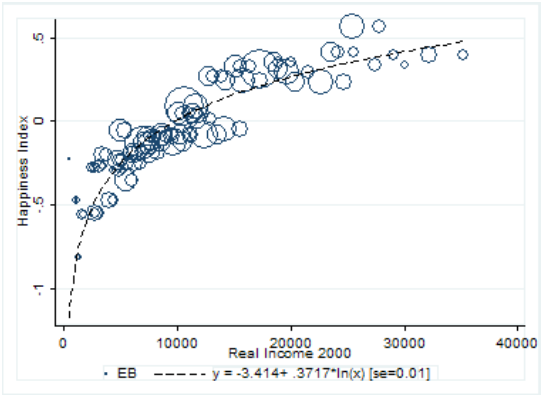
Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

Figure 7: The Well-Being Function in Europe (B).

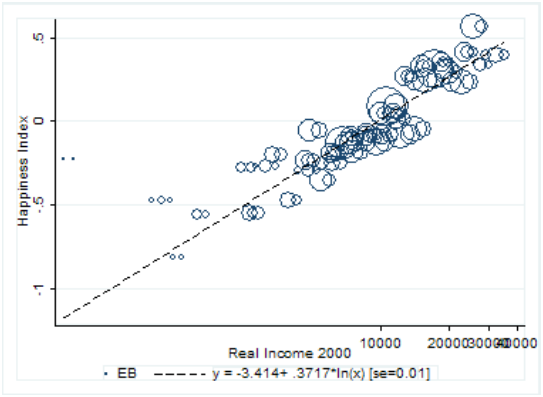


(a) France (LS)

(b) France (LS)/log



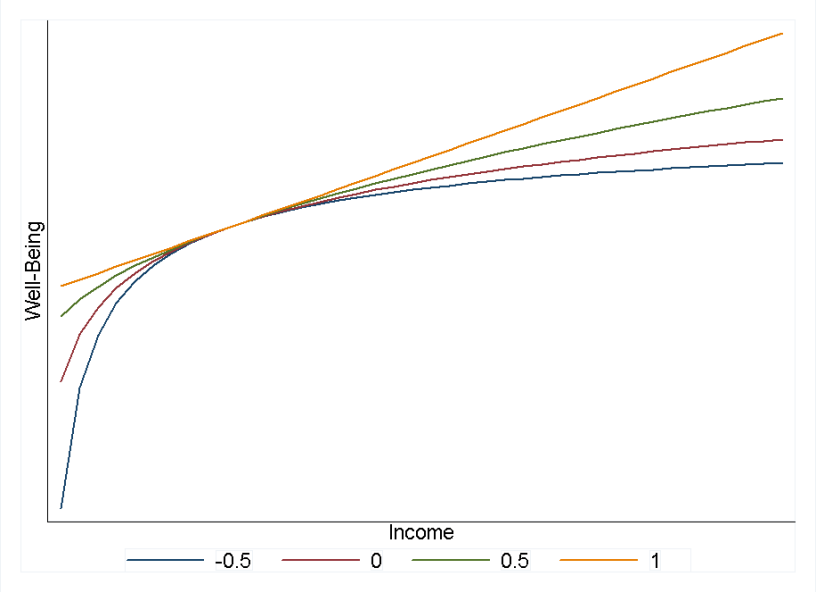
(c) France (H)



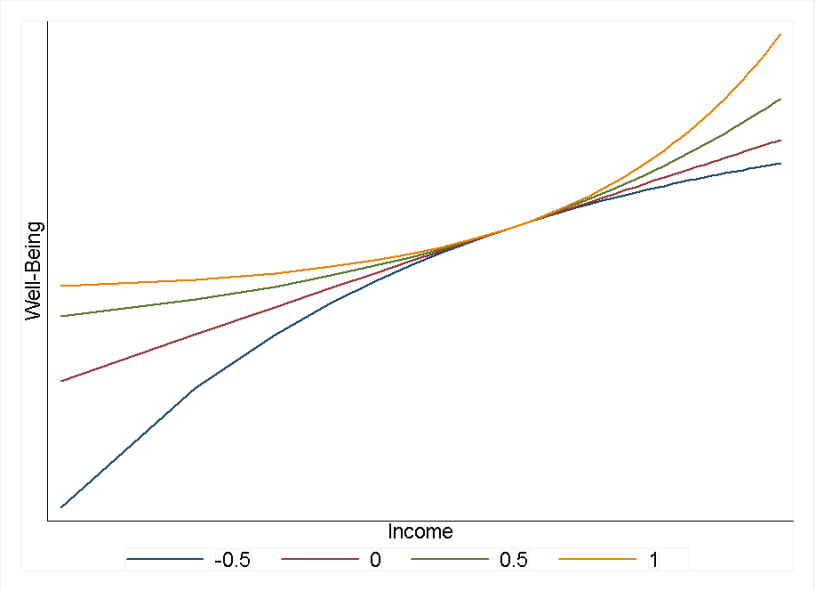
(d) France (H)/log

Note: Figure displays the coefficients of an ordered probit regression of well-being on income-group-year dummies.

Figure 8: Curvature Profile for Different λ.



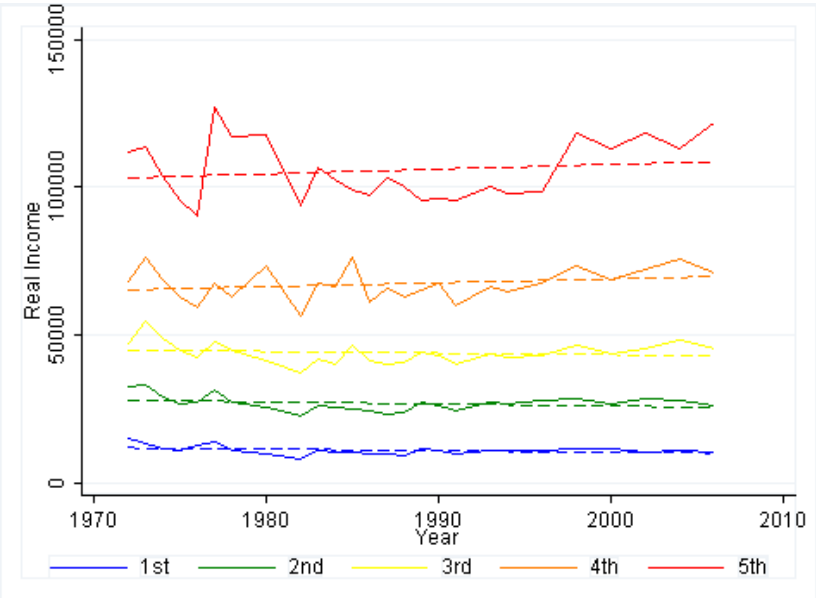
(a) Linear Scale



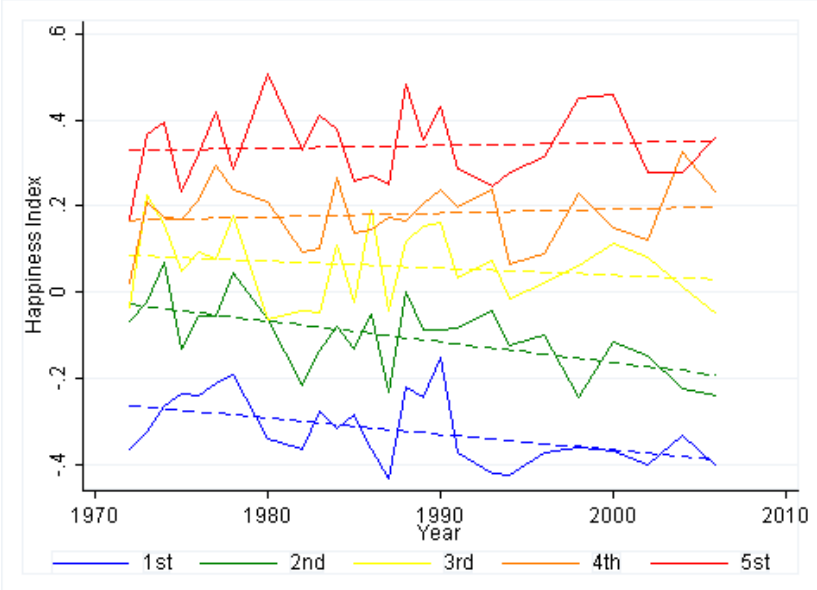
(b) log Scale

Note: Figure shows the effect of λ on $y = (x^{\lambda} - 1)/\lambda$ on a linear and a log scale.

Figure 9: Incomes of the Quintiles in the **US**.



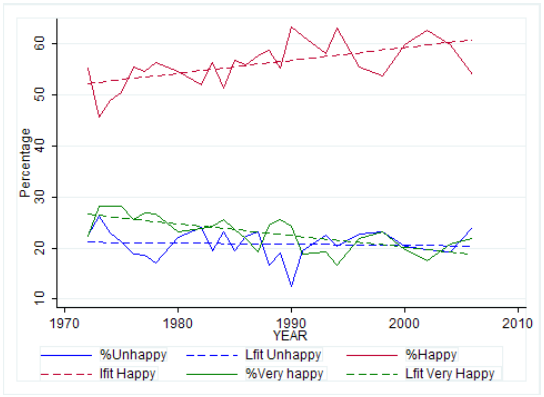
(a) Real Income



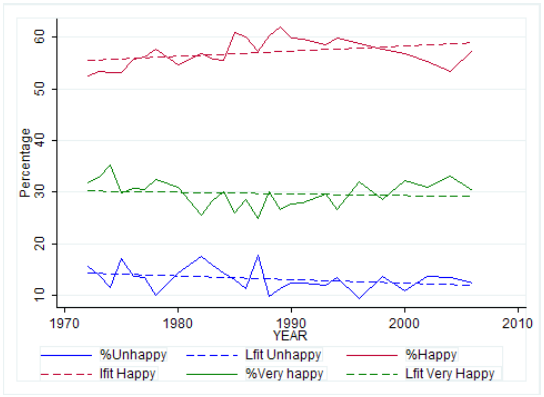
(b) Happiness

Note: Figure shows the trajectories of Real income and Happiness for each quitiles.

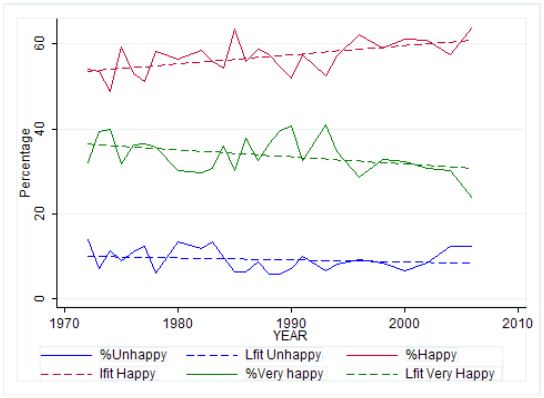
Figure 10: Evolution of the Distribution of Answers for Each Income Quintile of the GSS (**US**)



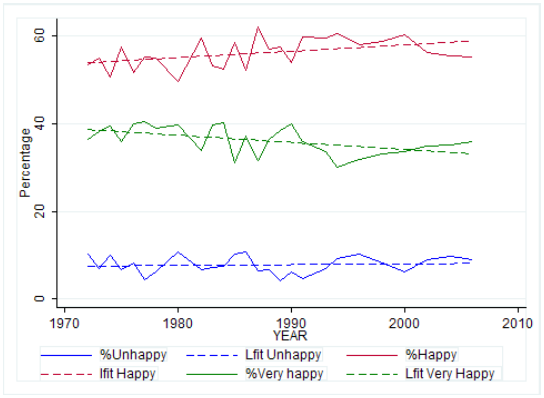
(a) Bottom Quintile



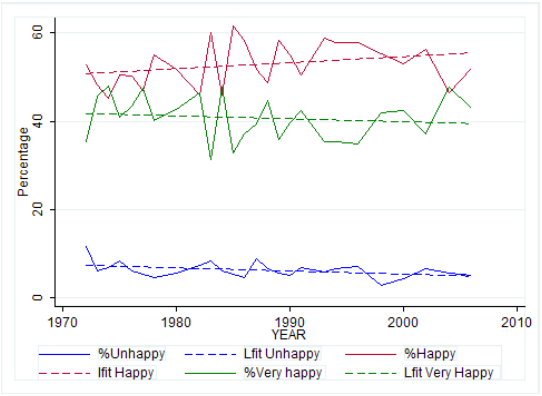
(b) 2nd Quintile



(c) 3rd Quintile



(d) 4th Quintile



(e) Top Quintile

Note: Figure shows the % of respondent choosing each answer over time for each quitiles.

Table 1: Well-being Questions from Different Data Sources.

General Social Survey

"Taken all together, how would you say things are these days would you say that you are:"
1. Very Happy 2. Pretty Happy 3. Not too Happy

Health and Retirement Study

"Now think about the past week and the feelings you have experienced. Please tell me if each of the following was true for you much of the time this past week."
Felt depressed / Was happy / Felt sad / Enjoyed life.

Eurobarometer

Happiness
"Taking all things together, how would you say things are these days - would you say you're: "
1. Very Happy 2. Pretty Happy 3. Not too Happy

Life Satisfaction
"Please tell me whether you are _____ with your life in general?"
1. Very satisfied 2. Fairly satisfied 3. Not very satisfied 4. Not at all satisfied

German Socio Economic Panel

"In conclusion, we would like to ask you about your satisfaction with your life in general."
0. Completely dissatisfied (...) 10. Completely satisfied

Table 2: Income Questions from Different Data Sources.

German Socio Economic Panel

"If you take a look at the total income from all members of the household: how high is the monthly household income today?" Please state the ***net monthly income****, which means after deductions for taxes and social security. Please include regular income such as pensions, housing allowance, child allowance, grants for higher education support payments, etc."*

Health and Retirement Study

The income variable, HwITOT, is the sum of all income in household, that is, the sum of the respondent and his spouse earned income, capital gains income, pension and annuities, Social Security payments, unemployment and worker's compensation, income from Veteran's benefits, welfare, and food stamps, alimony, other income, lump sums from insurance, pension and inheritance."

The information from each item is obtain from unfolding bracket questions.

Eurobarometer

"Please count the total wages and salaries per month of all members of this households, all pensions and social benefits; child allowance and any other income like rents, etc... Please indicate the letter of the income group your household falls into ***before tax and*** *. other deductions."*

A. Under $10,000 per year ... F. $70,000 and over per year

General Social Survey

"In which of these groups did your total family income, from all sources, fall last year ***before taxes****, that is? Just tell me the letter."*

A. Under $1,000 ... Y. $150,000 or over

Table 3: The Well-Being Function in the US.

SWB measure	λ^1	Smallest top %[2]	$\hat{\beta}_{Top}$	$\hat{\beta}_{Full}$	Income	Source
Happiness	0.5143	90^{th}	0.393	0.238	Pre-Tax	GSS
	(0.049)		(0.083)	(0.007)		
Happiness	0.6112	90^{th}	0.430	0.262	Net	GSS
	(0.055)		(0.078)	(0.007)		
Feeling Happy	-0.0117	60^{th}	0.040	0.171	Net	HRS
	(0.0012)		(0.015)	(0.005)		
Enjoy Life	-0.0070	60^{th}	0.059	0.170	Net	HRS
	(0.0012)		(0.018)	(0.005)		
Feeling Sad	0.0116	70^{th}	0.050	0.204	Net	HRS
	(0.0012)		(0.014)	(0.004)		
Feeling Depressed	0.0594	95^{th}	0.106	0.280	Net	HRS
	(0.0009)		(0.037)	(0.005)		
CUmulative Score	0.0181	95^{th}	0.106	0.280	Net	HRS
	(0.0010)		(0.037)	(0.005)		

[1] λ provides the best fit for $SWB_{it} = (y_{it}^{\lambda} - 1)/\lambda$, where y is income.

[2] The table reports the smallest group at the top of the income distribution within which $ln(income)$ is significantly associated with well-being. The coefficients estimated within the group and with the full sample including demographic controls.

Table 4: Curvature Estimates of the Happiness Function for Europe.

	$\hat{\lambda}_{LS}$		$\hat{\lambda}_{H}$	Income	$\bar{N}$	Time Span	Source
France	0.4772	=	0.4480	Pre-Tax	291	1975-02/86	EB
	(0.1012)		(0.1334)				
Belgium	0.1221	<	0.2667	Pre-Tax	278	1975-02/86	EB
	(0.1318)		(0.2062)				
Netherlands	0.9894	>	0.2366	Pre-Tax	310	1975-02/86	EB
	(0.1338)		(0.2520)				
Germany-West	0.4941	>	0.3603	Pre-Tax	291	1975-02/86	EB
	(0.1195)		(0.1644)				
Italy	0.2209	>	-0.0391	Pre-Tax	291	1975-02/86	EB
	(0.0851)		(0.1418)				
Denmark	0.9157	>	0.1013	Pre-Tax	246	1975-02/86	EB
	(0.1462)		(0.2135)				
Ireland	1.3234	>	0.2555	Pre-Tax	272	1975-02/86	EB
	(0.2201)		(0.2352)				
Great Britain	0.4980	>	-0.1916	Pre-Tax	300	1975-02/86	EB
	(0.1039)		(0.2169)				
Greece	0.1014	=	0.0886	Pre-Tax	255	1975-02/86	EB
	(0.0765)		(0.2094)				
Germany-West	-0.1531			Net	2,788	1984-05	GSOEP
	(0.4362)						

[1] The estimation finds λ that provides the best fit for $SWB_{it} = (y_{it}^{\lambda} - 1)/\lambda$,
where y is income.
The =, > and < signs indicate how the coefficient statistically relate to each other.

Table 5: Satiation test of the Well-Being Function for Europe.

Country	Smallest top %[1]	$\hat{\beta}$ top	$\hat{\beta}$ Full Sample	Smallest top %[1]	$\hat{\beta}$ top	$\hat{\beta}$ Full Sample
		Happiness			Life Satisfaction	
France	80^{th}	0.387	0.371	80^{th}	0.561	0.338
		(0.087)	(0.017)		(0.068)	(0.010)
Belgium	90^{th}	0.495	0.347	90^{th}	0.221	0.154
		(0.181)	(0.019)		(0.083)	(0.011)
Netherlands	70^{th}	0.297	0.316	90^{th}	0.693	0.349
		(0.097)	(0.020)		(0.161)	(0.011)
Italy	70^{th}	0.210	0.397	90^{th}	0.556	0.420
		(0.079)	(0.020)		(0.070)	(0.011)
Luxembourg	70^{th}	0.287	0.328	80^{th}	0.351	0.388
		(0.139)	(0.039)		(0.122)	(0.020)
Denmark	50^{th}	0.125	0.097	90^{th}	0.478	0.201
		(0.048)	(0.013)		(0.124)	(0.008)
Ireland	60^{th}	0.166	0.190	90^{th}	0.179	0.223
		(0.072)	(0.020)		(0.081)	(0.012)
Great-Britain	60^{th}	0.231	0.154	90^{th}	0.206	0.259
		(0.053)	(0.015)		(0.106)	(0.008)
Greece	70^{th}	0.152	0.176	90^{th}	0.187	0.3053
		(0.069)	(0.022)		(0.062)	(0.010)
Germany	70^{th}	0.338	0.457	80^{th}	0.444	0.440
		(0.130)	(0.025)		(0.099)	(0.012)
Germany		GSOEP		95^{th}	0.206	0.254
					(0.068)	(0.028)

[1] The table reports the smallest group at the top of the income distribution within which $ln(income)$ is significantly associated with well-being. The coefficients estimated within the group and with the full sample are reported.

Table 6: Trends in the Rich-Poor Gap in the US (GSS).

	(1)	(2)	(3)	(4)
Poor	-0.5780***	-0.4648***	-0.1834***	-0.6018***
	(0.0374)	(0.0385)	(0.0469)	(0.0388)
Mid	-0.2377***	-0.2310***	-0.0873***	-0.2173***
	(0.0319)	(0.0321)	(0.0336)	(0.0322)
Poor Time Trend	-0.0038***	0.0008	-0.0025**	-0.0044***
	(0.0012)	(0.0012)	(0.0012)	(0.0012)
Middle Time Trend	-0.0021***	0.0025***	-0.0022***	-0.0039***
	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Rich Time Trend	0.0016	0.0029**	0.0011	-0.0001
	(0.0014)	(0.0014)	(0.0014)	(0.0015)
$ln(RealIncome)$			0.1745***	
			(0.0124)	
Controls[1]	No	Yes	No	Yes
Education[2]	No	No	No	Yes
Pseudo R^2	0.0174	0.0418	0.0203	0.0219
N	41795	41727	41795	41631

[1] Controls include the respondent's age, its square, its ethnicity (black, white or other) and his marital status.
[2] Education is accounted for by the highest degree achieved (Less then High-School, High-School, Bachelor or Graduate).

Table 7: Individual Income and Happiness in the US and Germany.

	(1)	(2)	(3)	(4)	(5)
ln(Income)	0.1465***				
	(0.0079)				
ln(Net Income)		0.1565***	0.2427***	0.2569***	
		(0.0089)	(0.0090)	(0.0258)	
ln(Net Income$_{t-1}$)					0.1949***
					(0.0091)
Year dummies	Yes	Yes	Yes	Yes	Yes
Controls [1]	Yes	Yes	Yes	No	Yes
(Pseudo)R^2	0.0450	0.0450	0.0107	0.0155	0.0083
Fixed Effects	No	No	No	Yes[2]	No
N	41727	41635	60714	61169	57934
Source	GSS	GSS	GSOEP	GSOEP	GSOEP

[1] Controls include age, age^2, marital status, gender, race and education.
[2] Linear regression, SWB score converted with a linear scheme (Very Satisfied=10 , ..., Very Unsatisfied=0)

Table 8: Life Satisfaction and Income Inequality trends in Europe (EB-A).

	France	Belgium	Holland	Germany	Italy	Luxembourg	Denmark	Ireland
Poor	-0.6704***	-0.5655***	-0.5208***	-0.4415***	-0.5668***	-0.5056***	-0.5596***	-0.5755***
	(0.0355)	(0.0377)	(0.0359)	(0.0344)	(0.0334)	(0.0797)	(0.0449)	(0.0442)
Mid	-0.4118***	-0.1943***	-0.3104***	-0.1195***	-0.1699***	-0.0712	-0.2896***	-0.2818***
	(0.0321)	(0.0328)	(0.0316)	(0.0310)	(0.0298)	(0.0701)	(0.0391)	(0.0389)
$Poor \times Time$	0.0003	-0.0103***	-0.0028*	-0.0016	0.0224***	0.0107***	0.0106***	0.0014
	(0.0014)	(0.0016)	(0.0015)	(0.0014)	(0.0014)	(0.0027)	(0.0016)	(0.0018)
$Mid \times Time$	0.0070***	-0.0121***	0.0082***	0.0029***	0.0181***	0.0076***	0.0150***	0.0010
	(0.0009)	(0.0010)	(0.0009)	(0.0009)	(0.0009)	(0.0015)	(0.0010)	(0.0011)
$Rich \times Time$	0.0038**	-0.0144***	0.0083***	0.0166***	0.0196***	0.0119*	0.0183***	0.0019
	(0.0019)	(0.0019)	(0.0019)	(0.0023)	(0.0019)	(0.0063)	(0.0024)	(0.0026)
Controls[1]	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo R^2	0.0240	0.0209	0.0250	0.0193	0.0239	0.0176	0.0213	0.0153
N	40991	33838	41788	39996	38639	13230	38746	23413
LS Gap	↑	↓	↑	↑	↓	↑	↑	↔
Inc. Inequality	↓	↔	↑	↔	↔	↓	↓	↓

[1] Controls include age, age^2, marital status, gender, race and education.

Table 9: Life Satisfaction and Income Inequality trends in Europe (EB-B).

	UK	Greece	Spain	Portugal
$Poor$	-0.6579***	-0.4970***	-0.6809***	0.1101
	(0.0457)	(0.0566)	(0.1737)	(0.0853)
Mid	-0.2736***	-0.2150***	-0.5988***	0.1009
	(0.0391)	(0.0487)	(0.1641)	(0.0788)
$Poor \times Time$	0.0012	-0.0049**	-0.0010	-0.0138***
	(0.0016)	(0.0020)	(0.0034)	(0.0025)
$Middle \times Time$	0.0061***	-0.0024*	0.0118***	0.0023
	(0.0010)	(0.0013)	(0.0019)	(0.0020)
$Rich \times Time$	0.0091***	-0.0004	-0.0157	0.0197***
	(0.0030)	(0.0025)	(0.0100)	(0.0039)
Controls[1]	Yes	Yes	Yes	Yes
PseudoR^2	0.0231	0.0157	0.0127	0.0257
N	35046	30515	18733	25544
LS Gap	$\uparrow$	$\downarrow$	$\leftrightarrow$	$\uparrow$
Inc Inequality	$\uparrow$	$\downarrow$	$\downarrow$	$\uparrow$

[1] Controls include age, age^2, marital status, gender, race and education.

Table 10: Determinants of Aggregate Well-Being in Europe (EB).

	(1)	(2)	(3)
ln(GDP)	0.1833***		0.0504
	(0.0399)		(0.0590)
Avg ln(Income)		0.0956***	0.0789***
		(0.0174)	(0.0261)
β_0	-2.1920***	-1.5655***	-1.8560***
	(0.3928)	(0.2142)	(0.4024)
Year dummies	Yes	Yes	Yes
F	21.0578	30.1479	15.4218
N	270	270	270

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