Will GDP Growth Increase Happiness in Developing Countries?

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Summary

This paper asks what low-income countries can expect from growth in terms of happiness. It interprets the set of available international evidence pertaining to the relationship between income growth and subjective well-being. Conforming to the Easterlin paradox, higher income always correlates with higher happiness, except in one case: whether national income growth yields higher well-being is still hotly debated; essentially, the question is whether the correlation coefficient is "too small to matter".

The explanations for the small correlation between income growth and subjective well-being over time appeal to the nature of growth itself (e.g. negative side-effects such as pollution), and to the psychological importance of relative concerns and adaptation. The available evidence contains two important lessons: income comparisons do seem to affect subjective well-being even in very poor countries; however, adaptation may be more of a rich country phenomenon.

Our stand is that the idea that growth will increase happiness in low-income countries cannot be rejected on the basis of the available evidence. First, cross-country time-series analyses are based on aggregate measures, which are less reliable than individual ones. Second, development is a qualitative process that involves take-offs and thresholds. Such regime changes are eye-visible through the lens of subjective satisfaction measures. The case of Transition countries is particularly impressive in this respect: average life satisfaction scores closely mirror changes in GDP for about the first ten years of the transition process, until the regime becomes more stable. If subjective measures of well-being were made available in low-income countries, they would certainly help measuring and monitoring the different stages and dimensions of the development process.

I. INTRODUCTION

Is income growth the only aspect of development, and does it raise the level of well-being of the population? De facto, economic development is generally identified with growth in GDP per capita. International organizations, such as the United Nations Organization, the OECD, the World Bank and the International Monetary Fund, classify countries into categories of developed, intermediate and low-development, depending on whether they are below or above thresholds of GDP per capita. But of course, development is more than income growth. It is a multi-dimensional process, which involves not only a quantitative increase in capital accumulation, production and consumption, but also qualitative, social and political changes that enlarge the choice set of individuals. Institutional progress, human rights, democracy, gender equality and other capacities are an integral part of development. But can these qualitative objectives be attained by maximizing GDP? And doesn't income growth produce a series of negative side-effects, damaging to well-being, such as environmental externalities, the destruction of traditional social links, the concentration of the population in urban and suburban centres, the development of work-related stress, etc. ?

"Is growth obsolete?" The provocative title of the paper by William Nordhaus and James Tobin (1973) reflects the radical questioning of growth as an engine of well-being. Although the authors give a negative answer to this question, many economists and social scientists have come to the conclusion, that in developed countries, economic growth *per se* has little impact on well-being and should therefore not be the primary goal of economic policy (see Oswald, 1997). How much can this argument be extended to developing countries? Or should one follow the proposition of Inglehart et al. (2008) that material growth, as measured by GDP per capita, is welfare-improving in developing countries, as it takes people out of poverty and precariousness, but that it is useless in modern and "post-modern" societies where survival is taken for granted and human development becomes the only valuable goal?

This paper will address the relationship between GDP growth and well-being in developing countries through the lens of subjective well-being measures, i.e. self-declared satisfaction judgements collected by surveys of nationally representative samples of the population over

the world. Using these measures as a shortcut to people's well-being, one can try to verify whether GDP growth is really a proxy and a valuable route to happiness.

One of the most important but highly controversial issues in the literature based on subjective well-being is precisely the income-happiness gradient. In a famous article, Easterlin (1974) ironically asked whether "*raising the incomes of all will raise the happiness of all*?" This was based on the observation that happiness measures remained flat over the long-run in countries that had experienced high rates of GDP growth. The income-happiness nexus has been vividly debated for the last two decades by economist, psychologists and political scientists. However, most of the evidence to date on the relationship between income and subjective well-being is based on developed countries. Is the Easterlin paradox also valid for developing countries or is it a rich country phenomenon?

This paper presents an overview of the evidence accumulated during the past twenty years of research and illustrates some of the findings using a widely used international database (the World Values Survey, 1981-2005) containing individual subjective life satisfaction and happiness. In a first section, we present the relationship between income, income growth and subjective well-being and ask how much the patterns usually observed in developed countries are also relevant for developing countries. We discuss the potential existence of a threshold effect in the welfare returns of growth, the latter being higher in low-income countries as opposed to high-income countries. We then present the classical explanations of the Easterlin paradox and their importance in developing countries. Here, we distinguish the positive and negative side-effects of growth, as well as the limits to subjective well-being that stem from the human nature itself (comparison and adaptation effects). Finally, we provide some reasons why we believe that cross-section and panel analysis based on individual data is more reliable than aggregated times-series. Accordingly, we conclude that the positive income-well-being gradient, supported by individual and cross-sectional data, is difficult to dismiss.

I.1 Data used in the paper

This paper essentially hinges on the existing literature. However, we have added figures of our own, using the 5 waves of the well-known World Values Survey (WVS, 1981-2008) database that covers 105 countries, including high-income, low-income and Transition countries, which account for 90% of the world's population. Happiness measures were taken in priority from the WVS and the European Social Survey (ESS); this is the case of 250 out of

368 observations. When the data on happiness was missing, we used the answers to the ISSP (101 observations) and the 17 observations of the 2002 Latino Barometer. All these datasets are available at http://worldvaluessurvey.org. The measures of happiness and life satisfaction were administered in the same format in all these surveys, with equivalent translations to all countries. The wording of the Happiness question was: *"If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole?: 1. Not at all happy; 2. Not very happy; 3. Fairly happy; 4. Very happy".* In the WVS, the wording of the Life Satisfaction question was: *"All things considered, how satisfied are you with your life as a whole these days?: 1(dissatisfied) ... 10 (very satisfied)".* The surveys bear on representative samples of the population of participating countries, with an average sample size of 1400 respondents at each wave. We calculated the national average value of the answers to each of these questions (treating them as continuous variables). We also created a misery index defined as the percentage of people declaring to be very happy, or very satisfied, minus the percentage of people declaring to be not at all happy, or not at all satisfied. As the results were similar, we only present the Figures based on average measures.

In the paper, we also used a measure of trust, available in the WVS: *"Generally speaking, would you say that most people can be trusted or that you cant be too careful in dealing with people?*: 1. most people can be trusted; 0 . can't be too careful".* Measures of GDP per capita and annual GDP growth were taken from Heston, Summers and Aten − Penn World Table. We used other quantitative indicators available in the World databank, such as the Gini indicator of income inequality, women's fertility rates, adult literacy rates, life expectancy at birth (http://data.worldbank.org/). Qualitative indicators of governance were taken from Freedom house and Polity IV (http://www.qog.pol.gu.se/, http://www.freedomhouse.org, http://www.govindicators.org , http://www.systemicpeace.org/polity/polity4.htm). All these data are available from the World Data Bank: http://www.worldvaluessurvey.org.

I.2 Subjective well-being measures: why use them and are they reliable?

The critical quality of subjective well-being is that it is self-reported. Instead of a third person designing some set of criteria (income, health, education, housing etc.) which will define how well an individual is doing, individuals themselves are asked to provide a summary judgement of the quality of their life. While some have doubted the usefulness of subjective measures, we think that there are fairly compelling reasons to include them in the Economists' arsenal.

Think of an individual's level of well-being as being some appropriately-weighted sum of all of the aspects of life that matter to her. There are at least two significant obstacles for it to be measured objectively. The first is that we need to be sure that we cover all of the aspects of life that are important to the individual, and it seems a priori difficult to make up a definitive measurable list of these. The second problem is that we have to apply appropriate weights to construct the final well-being index. This might appear problematic right from the start: in the context of the aggregate data used in the Human Development Index, for example, how much is literacy worth in terms of life expectancy? Moreover, it would appear extremely likely that any such weighting will differ between individuals, in ways that it is not easy to observe. It is consequently very tempting to sidestep the difficulties involved by asking individuals to make these calculations themselves, in responding to evaluative questions about their own lives.

The well-being questions asked in this context are often very simple ones, such as "*How dissatisfied or satisfied are you with your life overall?*" (from the British Household Panel Survey), which is answered on a seven-point scale, with one referring to "Not satisfied at all", four to "Neither satisfied nor dissatisfied" and seven to "Completely satisfied". Alternatively individuals may be asked about their happiness, as in the following question from the American General Social Survey (GSS): "*Taken all together, how would you say things are these days, would you say that you are very happy, pretty happy, or not too happy?*" Other questions may refer to positive and negative affect or mental health.

These questions are increasingly widely included in surveys across the social sciences. One reason for their popularity is that they are simple to put into questionnaires, as probably the majority of those that appear are single-item (although there are very many multiple-item scales that are also available in the literature: see http://acqol.deakin.edu.au/instruments/instrument.php for a summary of some of these). A second point is that the vast majority of respondents seem to understand the question: non-response rates are very low. The third reason, which from our point of view is the most important, is that the answers to these questions do seem to pick up how well people are doing.

This last statement might seem to be rather uncontroversial: after all, we would expect a question on life satisfaction to measure exactly that. The potential problem lies exactly in the subjectivity of the reply. In particular, if individuals understand the question differently, or use the response scales differently, then there is a danger that someone who answers six on a

one to seven satisfaction scale is no better off than another person who has given an answer of five. Luckily there is by now a varied body of evidence suggesting that these subjective well-being measures do contain valid information.

A first point to make is that subjective well-being measures are well-behaved, in the sense that many of the correlations make sense. In cross-section data, variables reflecting marriage, divorce, unemployment, birth of first child and so on are typically correlated with individuals' subjective well-being in the expected direction.[1] If the answers to well-being questions were truly random, then no such relationship would be found.

We want to know whether asking *A* how happy she is will provide information about her unobserved real level of happiness. One simple check, called Cross-Rater Validity, is to ask *B* whether she thinks *A* is happy. This work has been carried out in a number of settings (see Sandvik *et al.*, 1993, and Diener and Lucas, 1999), including asking friends and family, or the person who administered the interview. Alternatively, we can use individuals who do not know the subject: *B* may be shown a video recording of *A*, or may read a transcription of an open-ended interview with *A*. In all cases, *B*'s evaluation of the respondent's well-being matches well with the respondent's own reply.

Another approach to validation consists in relating well-being scores to various physiological and neurological measures. It has been shown that answers to well-being questions are correlated with facial expressions, such as smiling and frowning, as well as heart rate and blood pressure. The medical literature has shown that well being scores are correlated with digestive disorders and headaches, coronary heart disease and strokes. Research has also looked at physical measures of brain activity. Particular interest has been shown in the differences in brain wave activity between the left and right prefrontal cortexes, where the former is associated with positive and the latter with negative feelings. These differences can be measured using electrodes on the scalp or scanners. Research has shown (for example, Urry *et al.*, 2004) that these differences in brain activity are correlated with individual well-being responses. These measures of brain asymmetry have been shown to be associated with cortisol and corticotropin releasing hormone (CRH), which regulate the response to stress, and

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[1] See, for example, the findings in Di Tella, MacCulloch and Oswald (2003), based on the analysis of the well-being reported by levels of a quarter of a million randomly sampled Europeans and Americans from the 1970s to the 1990s.

antibody production in response to influenza vaccine (Davidson, 2004). Consistent with subjective well-being and brain asymmetry measuring the same underlying construct, individuals reporting higher life satisfaction scores were less likely to catch a cold when exposed to a cold virus, and recovered faster if they did (Cohen *et al.*, 2003).

The last block of evidence that people "mean what they say" is that, in data following the same individual over a long period of time, those who say that they are dissatisfied with a certain situation are more likely to take observable action to leave it. This phenomenon is apparent in the labor market, where the job satisfaction that the individual reports at a certain point in time is a good predictor of her being observed in the future to have quit her job (examples are Freeman, 1978, Clark *et al.*, 1998, Clark, 2001, and Kristensen and Westergaard-Nielsen, 2006). One important subsidiary finding in this literature is the job satisfaction predicts quits even when we take into account the individual's wages and hours of work. This prediction of future behavior seems to work for the unemployed as well as for the employed. Clark (2003) shows that mental stress scores on entering unemployment in BHPS data predict the length of the unemployment spell, with those who suffered the sharpest drop in well-being upon entering unemployment having the shortest spell. This finding has been replicated in using the life satisfaction scores in GSOEP data by Clark *et al.*, 2010). Outside of the labor market, well-being scores have been shown to predict the length of life (Palmore, 1969, Danner et al., 2001). Satisfaction measures have also recently been shown to predict future marital break-up (Gardner and Oswald, 2006, Guven *et al.*, 2010).

One potential use of the analysis of subjective well-being is that it arguably provides us with information on trade-offs between different aspects of an individual's life. If one extra hour of work per week has the same effect on well-being as does 80 Euros in additional earnings per month, then the shadow wage (the wage that would compensate for one extra hour of work) is around 18 Euros and 50 cents per hour. Some of examples of these well-being trade-offs have appeared in the recent literature. For example, Blanchflower and Oswald (2004, p 1381), using American and British data, came to the conclusion that: "*To compensate men for unemployment, it would take a rise in income at the mean of approximately $60000 per annum. A lasting marriage is worth 100000$ per annum (when compared to widowhood or separated)*".

This capacity of subjective data to weight the different dimensions of development one against the other (to calculate marginal rates of substitution between two dimensions) is particularly adapted to the multidimensionality of economic development. The structure of the

well-being equation, as estimated in a country, can be seen as a synthetic measure that would have aggregated the different arguments of a social welfare function. The usual problem of the social planner (and of the social choice school of normative economics) is indeed to decide on the weights that should be attached to the different arguments of the social objective function. Subjective measures allow avoiding this obstacle by measuring directly the synthetic result of the weighting alchemy made by individuals themselves. An illustration of this is the paper by Di Tella and MacCulloch (2008, p31-33), where the authors use the American GSS and the Eurobarometer to estimate national welfare functions. They propose such marginal rates of substitution:

- Life expectancy / income: "*A person who expects to live one year longer due to the reduction in the risk of death is willing to pay $5052 in annual income in exchange (6.6% of GDP per capita)*".

- Life expectancy / unemployment: "*In terms of the unemployment rate, denying an individual one year of life expectancy has an equivalent cost to increasing the unemployment rate by 1.1 percentage point*".

- Pollution/GDP: "*a one standard deviation increase in SOx emissions, equal to a rise in 23kg per capita, has a decrease on well-being equivalent to a 415% drop in the level of GDP per capita.*"

- Inflation/unemployment: "*a 1 % point rise in the level of inflation reduces happiness by as much as a 0.3 percentage point increase in the unemployment rate*".

- Crime/GDP: "*a rise in violent crime from 242 to 388 assaults per 100000 people in the United States (i.e. a 60% rise) ... would be equivalent to a drop of approximately 3.5% in GDP per capita*".

- Working hours/GDP: "*a 1% rise in working hours would have to be compensated by a 2.4% rise in GDP per capita*" (to leave happiness unchanged)".

These examples illustrate the capacity of subjective well-being measures to serve as a useful tool for public policy that aims at maximizing well-being as countries develop.

Before we turn to the evidence about growth and subjective well-being, we need to warn the reader about two abusive approximations of this paper. First, we use indistinctly the terms

happiness, life satisfaction and well-being. Second, we treat these measures as though they were cardinal, although they are ordinal. In doing this, as the bulk of economists specialized in happiness studies, we follow the route opened by Ferrer-i-Carbonnell and Frijters (2004).

I. THE PARADOXICAL RELATIONSHIP BETWEEN GROWTH AND WELL-BEING

One of the main catalysts in the voluminous and rapidly expanding literature on income and happiness has been Easterlin's seminal article (1974; updated in 1995), setting out the 'paradox' of substantial real income growth in Western countries over the last fifty years, but without any corresponding rise in reported happiness levels. This finding is paradoxical for several reasons. First it hurts the popular prior that increased material wealth and larger freedom of choice should be accompanied by higher well-being. In a way, our societies are organized on this implicit principle. Second, it comes in contradiction with a large set of scientific empirical evidence based on cross-sections of countries, and on within-country individual panel data. This section presents and discusses the available evidence related to these contradictory findings and asks whether the Easterlin paradox is a rich-country phenomenon or should also be born in mind by policy-makers in developing countries. A summary of the wide-ranging data sources and results is presented in Appendix A.

I.1. Income raises happiness in the cross section

a. Within-country cross-section

"*As far as I am aware, in every representative national survey ever done, a significant bivariate relationship between happiness and income has been found*" (Easterlin 2005, p. 67).

In almost all of the empirical studies based on within-country surveys, statistical estimates of subjective well-being include, as a control or as a variable of interest, individual income or household income (or more precisely, the log of income). Log income invariably attracts a positive and statistically significant coefficient, of a considerable magnitude. It systematically appears amongst the most important correlates of self-declared happiness. "*When we plot average happiness versus average income for clusters of people in a given country at a given time…rich people are in fact a lot happier than poor people. It's actually an astonishingly large difference. There's no one single change you can imagine that would make your life improve on the happiness scale as much as to move from the bottom 5 percent on the income*

scale to the top 5 percent" (Frank, 2005, p. 67). This holds for both developed and developing countries, even if it has sometimes been found that the income-happiness slope is larger in developing or transition than in developed economies (see Clark et al. 2009 for a survey).

Layard et al. (2010) for instance, report that within a country, a unit rise in log income typically raises individual self-declared happiness by 0.6 units on average (on a 10 step scale). Stevenson and Wolfers (2008, p 13) have estimated the within-country well-being-income gradient over each of the countries available in several international datasets (the American General Social Survey, the World Values Survey, the Gallup World Poll, etc.). They conclude that: "*Overall, the average well-being-income gradient is 0.38, with the majority of the estimates between .25 and .45 and 90 percent are between 0.07 and 0.72. In turn, much of the heterogeneity likely reflects simple sampling variation: the average country-specific standard error is 0.07, and 90 percent of the country-specific regressions have standard errors between 0.04 and 0.11*".

As an illustration, Figure 1.A represents the distribution household income-happiness gradient in the United-States. The relationship is well-fitted by a log linear function. The same findings have been verified in a series of surveys on the population of developing and countries. Figure 1.B represents the income decile-happiness gradient in China in year 2007 (based on the World Values Survey): the same positive relationship is obvious. In a general way, the fact that in a given society the rich are happier than the poor is a well-established and undisputed empirical finding of the literature.

b. Cross-sections of countries

Concerning the income-happiness gradient across countries, the empirical evidence is even more conclusive and consensual. Deaton (2008), for instance, reports an elasticity of 0.84 between log average income and average national satisfaction across a large set of nationally representative samples of people living in 129 developed and developing countries, collected by the 2006 Gallup World Poll. In the same spirit, Inglehart (1990, chapter 1) analyzed data from 24 countries of different level of development, and found a 0.67 correlation between GNP per capita and life satisfaction. In a more recent paper, Inglehart et al. (2008) found a correlation of 0.62 based on all available waves of the World Values Survey. Wolfers and

Stevenson (2008, p 12), using a very comprehensive set of data, report *"a between-country well-being-GDP gradient [..] typically centered around 0.4"*.[2] In the surveys analyzed by Inglehart et al. (2008), 52% of the Danes indicated that they were highly satisfied with their life (higher than 8 on a 10 steps scale) and 45% said they were very happy. In Armenia, 5% said they were very satisfied and 6% very happy.

Figure 2.A (taken from Inglehart et al., 2008) shows the concave relationship between income per capita and average happiness across developed, developing and Transition countries of the world, for the years 1995-2007. A similar graph was made by Deaton (2008) based on the World Values Survey (1996) and the Gallup World Poll (2006) (Figure 2.B). As illustrated by Figure 2.C, *"Each Doubling of GDP is Associated with a Constant Increase in Life Satisfaction"* across countries (Deaton, 2008). Figure 2.D illustrates the good fit of a log linear relationship between income per capita and average life satisfaction across countries of the world, in the late 2000's, using the most recent waves of the World Values Survey.

Many other studies into the "macroeconomics of happiness" have documented the fact that people are self-reportedly happier and more satisfied with their lives in higher-income countries in general (see for instance, Blanchflower, 2008), even if certain types of societies seem to be more conducive to happiness than others (Inglehart et al., 2008). Figure 2.A for instance shows that Latin American countries are systematically above the regression line, whereas Transition countries form a cluster of countries which lie well below the regression line typical of the survey[3].

Development and the inequality of subjective well-being

As a complement to the average income - average happiness relationship, we have looked at the relation between average life satisfaction scores and their standard deviation (treating this measure as a continuous variable). Cross-country comparisons lead to a striking observation: the higher the average national happiness scores, the lower the within-country standard deviation. Richer countries have both higher average scores and lower standard deviations of life satisfaction (Figure 6). Hence, the relation between average SWB and the inequality of

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[2] These estimate vary because of the composition of the sample and the controls included in the regressions.
[3] According to Guriev and Zhuravskaya (2009), the reasons for the lower happiness level in Transition countries are the deterioration in public goods provision, the increase in macroeconomic volatility and mismatch of human capital of residents educated before transition (unemployment).

happiness seems to depend strongly on GDP per capita. This points to a potentially important benefit of GDP growth for low-income countries. If people are risk averse, reducing the variance of SWB in a given society is a valuable objective of public policy.

c. A positive relation in panel individual data

Thanks to the increased availability of dynamic panel surveys of the population in several countries, a series of studies have been able to control for unobserved individual fixed effects, such as personality traits. All of them conclude to the positive correlation between change in real income and change in happiness (see, for example, Winkelmann and Winkelmann, 1998; Ravallion and Lokshin, 2002; Ferrer-i-Carbonell and Frijters, 2004; Senik, 2004, 2008; Ferrer-i-Carbonell, 2005; Clark et al., 2005). Further, a number of these studies have been able to hinge on exogenous variations in income to establish more firmly the *causal* effect of individual income on happiness (e.g. Gardner and Oswald, 2007; Frijters et al., 2004a, 2004b, 2006, Pischke, 2010). Of course, the slope of the income-happiness relationship is not necessarily the same between groups (Clark et al., 2005; Frijters et al., 2004a; Lelkes, 2006). The usual coefficient on intra-individual variations in log income is usually found to be in the vicinity of 0.3 (Layard, Mayraz and Nickell, 2010; Senik 2005).

Hence, national and international evidence shows that the rich are happier than the poor inside a given country, that inhabitants of richer countries are on average happier than those of poorer countries, and that an increase in individual income over time is associated with a positive rise in subjective happiness. At this stage, the evidence strongly advocates for a development policy based on GDP growth in low-income countries.

I.2. The diminishing returns to income growth

However, as illustrated by the panels of Figures 1 and 2, the positive relationship between income and happiness is marked by diminishing returns. This does not come as a surprise to economists, accustomed to the idea of concavity of preferences, i.e. decreasing marginal utility and risk-aversion. Concretely, this means that the effect of earning an additional ten thousand dollars on subjective well-being becomes progressively smaller as one's initial level of income increases. This is consistent with the good fit between the income-happiness relationship and the log functional form – a familiar fact of life for social scientists who specialize on happiness studies.

a. Is there a threshold in the utility of growth?

"Once a country has over $15,000 per head, its level of happiness appears to be independent of its income per head" (Layard, 2003, p 17)

Many specialists believe in the existence of a threshold in the welfare effect of income. They recognize that rich countries are happier than poor countries, but believe that among rich countries there is no more relation between GDP per capita and happiness. This threshold separates "*survival societies*" and "*modern societies*" (Inglehart et al. 2009). It is usually found in an interval from US$10,000 per annum to $15000 per annum (Di Tella et al., 2007).[4] Layard (2005, p 149) thus writes: "*if we compare countries, there is no evidence that richer countries are happier than poorer ones—so long as we confine ourselves to countries with incomes over $15,000 per head.... At income levels below $15,000 per head things are different*...." Frey and Stutzer (2002, p. 416) similarly 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*".

Even more explicitly, Inglehart (1997, pp 64-65) concludes that: "*the transition from a society of starvation to a society of security brings a dramatic increase in subjective well-being. But we find a <u>threshold</u> at which economic growth no longer seems to increase subjective well being significantly. This may be linked with the fact that, at this level, starvation is no longer a real concern for most people. Survival begins to be taken for granted [...] At low levels of economic development, even modest economic gains bring a high return in terms of caloric intake, clothing, shelter, medical care and ultimately in life expectancy itself. [...]. But once a society has reached a certain threshold of development ... one reaches a point at which further economic growth brings only minimal gains in both life expectancy and subjective well-being. There is still a good deal of cross national variation, but from this point on non-*

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[4] This notion of a satiation point also goes back to Adam Smith's concept of "*a full complement of riches*", beyond which there could be not be desire for more money. The large landholders of the 18th century had (according to him) reached this limit. However, there may be a limit to the quantity of wealth someone can enjoy in a given society at a certain point of time, but this does not mean that this limit cannot be stretched by the set of new choices brought about by economic growth (e.g. internet). In other words, the "full complement of riches" could be wider in richer countries than in less developed ones.

economic aspects of life become increasingly important influences on how long and how well people live"… The authors reach the same conclusion with updated data: "*Happiness and life satisfaction rise steeply as one moves from subsistence-level poverty to a modest level of economic security and then levels off. Among the richest societies, further increases in income are only weakly linked with higher levels of SWB*" (Inglehart et al., 2008, p 268).

If true, the implication of these findings for developing countries is that GDP growth should be seen as a temporary objective, to be considered only up to a certain level.

b. But the happiness-log GDP per capita gradient does not tend to zero.

In spite of these strong claims, the cross-country evidence in favour of such a subsistence level is far from consensual. Gathering several international survey datasets that cover about 90% of the world population including many developing countries (based on the World Values Survey and the Gallup World Poll), Stevenson and Wolfers (2008, p 11-12) have tried to verify the idea of a cutting edge at $15,000 per capita per annum (in constant dollars of 2000). They estimated the happiness-GDP per capita gradient, and found that: "*the well-being-GDP gradient is about twice as steep for poor countries as for rich countries. That is [...] a rise in income of $100 is associated with a rise in well-being for poor countries that is about twice as large as for rich countries*". However, the marginal utility of GDP growth is still positive in developed countries. "*The point estimates are, on average, about three times as large for those countries with incomes above $15,000 compared to those countries with incomes below $15,000*". […] *Taken at face value, the Gallup results suggest that a 1 percent rise in GDP per capita would have about three times as large an effect on measured well-being in rich as in poor nations. Of course, a 1 percent rise in U.S. GDP per capita is about ten times as large as a 1 percent rise in Jamaican GDP per capita*".

This is consistent with Deaton's analyze of the same Gallup World Poll data (Figure 2.B): "*the relationship between log per capita income and life satisfaction is close to linear. The coefficient is 0.838, with a small standard error. A quadratic term in the log of income has a positive coefficient: confirming that the slope is higher in the <u>richer</u> countries! [...] Using 12000$ of income per capita as a threshold between rich and poor countries shows that the slope in the higher income countries is higher! [...] If there is any evidence for a deviation, it is small and is probably in the direction of the slope being higher in the high-income countries*".

Deaton (2008) concludes that "*the slope is steepest among the poorest countries, where the income gains are associated with the largest increases in life satisfaction, but it remains positive and substantial even among the rich countries; it is not true that there is some critical level of GDP per capita above which income has no further effect on life satisfaction*". In other words, there are indeed diminishing marginal utility to GDP growth, as the level of GDP per capita increases, but the return to growth does not converge to zero[5].

In summary, it is an undisputed finding of the happiness literature based on cross-sections of countries that the relationship between income per capita and happiness is concave, i.e. has diminishing returns. But there is no consensus on the existence of a subsistence threshold beyond which the marginal utility of income would fall to zero.

1.3 "Rather than diminishing marginal utility of income, there is a zero marginal utility of income"

The most powerful criticism of pro-growth policy hinges on the empirical evidence of within-country long-run evolution of GDP and happiness. Visual evidence provided by Easterlin and his co-authors (1974, 1995, 2005, 2007, 2009, 2010) illustrates the flatness of the long run happiness curve plotted against time. One of the most famous and spectacular of these flat curves is show in Figure 3.A, taken from Easterlin and Angelescu (2007). In spite of a doubling of the U.S. GDP per capita over a period of 30 years (1972-2002), the average happiness of Americans has remained constant. Average happiness is calculated using the repeated cross-sections of the American General Social Survey. The same type of pattern has been uncovered by several studies, with long series data pertaining to different developed countries (see Diener and Oishi, 2000). The claim that is supported by these graphs is radical. In the words of Richard Easterlin: "*Rather than diminishing marginal utility of income, there is a zero marginal utility of income*" (Easterlin and Angelescu, 2007, p 8).

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[5] It is worth underlying that if the log function is indeed concave, it is not upward-bounded. If y=log(x), then y does not tend to 1 when x tends to infinity. Yet, this is the message that a vast majority of specialists in the field have drawn from the decreasing marginal utility of income and the good fit between the log linear functional form and the relationship between income and happiness.

The absence of long run correlation between growth and happiness could be explained by the decreasing marginal utility of income uncovered in the cross-section. But Easterlin strongly rejects this interpretation: "*The usual constancy of subjective well-being in the face of rising GDP per capita has typically been reconciled with the cross-sectional evidence on the grounds that the time series observations for developed nations correspond to the upper income range of the cross-sectional studies, where happiness changes little or not al all as real income rises.*" But "*the income change over time within the income range used in the point-of-time studies do not generate the change in happiness implied by the cross-sectional pattern*". (Easterlin and Angelescu, 2007, p 24). For example: "*in 1972, the cohort of 1941-1950 had a mean per capita income of about 12000$ (expressed in 1994 constant prices). By the year 2000, the cohort's average income had more than doubled, rising to almost 27000$. According to the cross-sectional relation, this increase should have raised the cohort's mean happiness from 2.17 to 2.27. In reality, the actual happiness of the cohort did not change*".

In several articles with different co-authors, (Easterlin, 2005a, Easterlin and Sawangfa 2005), Easterlin has forcefully pointed to the fact that cross-sectional evidence cannot be transposed to dynamic relationship. The dynamic evolution of average self-reported happiness in a country, over the long run, is not correctly predicted by the instantaneous cross-section relationship between income per head and happiness. Hence: "*knowing the actual change over time in a country's GDP per capita and the multi-country cross-sectional relation of SWB to GDP per capita adds nothing, on average, to one's ability to predict the actual time-series change in SWB in a country*" (Easterlin and Sawangfa, 2009, p 179). This is illustrated by Figure 3.B, taken from Easterlin (2005a, p 16), which contrasts the actual (flat) evolution of happiness in Japan, and the predicted evolution (log linear) over time.

Hence, the positive concave relationship between GDP per capita and SWB, that one observes in the cross section, cannot be used to predict the evolution of SWB in developing countries over time. This new "no bridge" theory points to the "fallacy" of transposing cross-sectional relations to time-series. The lesson for developing countries is that they should not expect to reach the higher level of well-being that is typical of developed countries by growing over time.

I.4 Is the dynamic correlation small enough to ignore?

In spite of the spectacular visual evidence offered by Easterlin, his rejection of any dynamic correlation between growth and happiness is still the object of a very vivid controversy. In particular, a disputed point is whether the magnitude of the correlation coefficient of SWB over GDP per capita is statistically significant, and of an important magnitude. It is small, but is it "*small enough to ignore*"? (Hagerty and Veenhoven, 2000, p 4).

For instance, the absence of correlation between growth and happiness in the fast developing countries of Japan (after WWII) and China (after 1980) is particularly disappointing. However, Stevenson and Wolfers (2008) have pointed to some discontinuities in the wording of the happiness question and in the sampling of the Japanese cross-sections used by Easterlin. Concerning China, the evidence is scarce (3 points of time) and Hagerty and Veenhoven (2000) have underlined the fact that the Chinese sample was not representative of the population, as it was initially biased towards more urban demographic groups.

Other studies in the long run macroeconomic time series of happiness, have concluded to a positive dynamic relation between GDP per capita and well-being. Exploiting the World Values Survey, Hagerty and Veenhoven (2003) found that GDP is positively related to the number of "happy life years" in 14 of the 21 countries available in the dataset. In a later paper, Hagerty and Veenhoven (2006) observed a statistically significant increase in happiness in 4 out of 8 high-income countries, and 3 out of 4 low-income countries. Inglehart et al. (2008) also exploited the most recent waves of the World Values Survey, spanning from 1981 to 2005. They found that, over the complete period, happiness rose in 45 out of the 52 countries for which substantial time series data is available. Kenny (2005) used data on 21 Transition and Developed Countries and ran regressions of change in happiness over GDP variation, for each country. He found that 88% of correlation coefficients were positive. The general regression coefficient was positive and significant at 5%.

Inglehart et al. (2008) present a series of graphs plotting average happiness against time in different countries, based on the 4 first waves of the World values Survey. As they point out: "*in many cases, the results contradict the assumption that, despite economic growth, and other changes, the publics of given societies have not gotten any happier. They show that the American and British series show a downward trend in happiness from 1946 to 1980, but an upward trend thereafter*" [this was confirmed by Easterlin]. "*In general, among the countries*

for which we have a long-term data, 19 out of the 26 countries show rising happiness levels. In several of these countries- India, Ireland, Mexico, Puerto Rico and South Korea- there are steeply rising trends. The other countries with rising trends are Argentina, Canada, China, Denmark, Finland, France, Italy Japan, Luxembourg, the Netherlands, Poland, South Africa, Spain and Sweden. Three countries (the U.S., Switzerland and Norway) show flat trends from the earliest to the latest survey. Only four countries (Austria, Belgium, the U.K and West Germany) show downward trends" (Appendix to Inglehart et al., 2008). Figures 4.A to 4.E taken from their paper illustrate the positive slope of the happiness curve in India, Mexico, Puerto Rica, South Africa, and the downward slope in China.

Several studies have thus uncovered a positive and statistically significant correlation between growth and well-being over time, using within-country time-series data. This includes Hagerty and Veenhoven (2003), Stevenson and Wolfers (2008), Inglehart, et al. (2008). In turn, many of these results have been criticized by Easterlin (2005) on the basis of the choice of countries, on the confusion between long run dynamics and the business cycle, and on the absence of controls in some of the estimates. Easterlin, with several co-authors, has documented and developed his initial conjecture. Authors such as Ed Diener, Rafael Di Tella, Bruno Frey, Robert MacCulloch, Andrew Oswald and Alois Stutzer have provided additional empirical evidence in the direction of Easterlin.

A note on statistical power

The dispute over the long run income-happiness gradient revolves around the magnitude of the correlation coefficient and its statistical significance. Some authors have noticed that there is less statistical power in the long run series of well-being than in the cross-section, because of the smaller standard deviation. With less variation to explain, it is difficult to obtain statistically significant correlations.

Hagerty and Veenhoven (2000, p 5) for instance, notice that: "*the standard deviation in GDP per capita in the cross section from Diener and Oishi was about 8000\$, whereas the standard deviation in Hagerty time-series (for the same countries) was only about ¼ of that (2000\$) [...] within a country in 25 years*". Hence, the statistical power to detect the effect is lower in time-series studies. Identically, Kenny (2005), using data on 21 Transition and developed countries, found a standard deviation in happiness over time within countries of 0.28 in average, as compared to a standard deviation of average scores across countries of 0.65

(p212). Layard et al. (2010, p 161), using Eurobarometer time series for 20 Western European countries, also report an average standard deviation of national happiness scores over time of 0.2, to compare with an average of 0.5-0.6 for individual cross-sections.

We calculated the standard deviation in happiness and life satisfaction in the World Values Surveys cross-sections from 1981 to 2007. The average standard deviation inside a <u>cross-section</u> (250 observations) is 0.67 for happiness (4 modalities) and 2.14 for life satisfaction (10 step scale). But the standard deviation of average national happiness <u>across countries</u> is 0.28 for happiness and 1.04 for life satisfaction. Finally, the standard deviation of national happiness <u>over time</u> fluctuates around 0.1 for happiness and from 0.13 to 0.41 for life satisfaction. In other words, the variability of subjective well-being measures is much lower in dynamic time-series than in the cross-sections within countries and across-countries. The implication is that the difference between cross-sectional versus time-series correlation coefficients is difficult to interpret, as aggregated measures necessarily vary less than individual data.

In summary, the long-run relationship between GDP growth and subjective well-being is still controversial. As pointed by Stevenson and Wolfers (2008), one cannot reject the null that the correlation coefficient is equal to zero, but this does not mean that one can reject the null that it is greater than zero. The nature of the long-run relationship between GDP and well-being is far from being firmly established.

I.5 Subjective well-being and the business cycle

One of the reasons why it is difficult to admit the absence of correlation between income and well-being is that it comes in sharp contradiction with the indubitable welfare effect of the business cycle.

First of all, there is a large consensus among specialists, about the fact that recession makes people unhappy. Di Tella et al. (2003) showed that macroeconomic movements, in particular unemployment, inflation and the volatility of output exert strong effects on the happiness of nations. The negative impact of volatility on subjective well-being was also established by Wolfers (2003). A powerful illustration of the business cycle-happiness correlation is given by Figure 5.A, taken from Stevenson and Wolfers (2008), which shows the spectacular parallel dynamics of the output gap and the average happiness in the United States from 1972 to 2008. This does not mean that the influence of the business cycle can be equated with the

influence of long run growth. Indeed, it is easy to imagine happiness and the business cycle fluctuating around a flat long-run trend.

A special episode, which is usually considered as illustrating the correlation between income fluctuation and well-being, rather than between long-term growth and well-being, is the process of Transition of Central and Eastern European countries from socialism to capitalism. All studies unanimously recognize the statistically significant correlation between the dynamics of GDP and that of subjective well-being. Figures 5.B to 5.D, taken from Guriev and Zhuravskaya (2008) and Easterlin (2009), illustrate such concomitant evolutions in income and happiness in several transition countries. Similar evidence can be found in Sanfey and Teksoz (2008).

However, these trends are qualified as short term by Easterlin (2009), who warns that one should avoid *"confusing a short-term positive happiness-income association, due to fluctuations in macroeconomic conditions, with the long-term relationship. We suggest, speculatively, that this disparity between the short and long-term association is due to the social psychological phenomenon of "loss aversion".*

However valuable the interpretation in terms of loss-aversion, it is surprising to us that Transition is assimilated to a short-term phenomenon. In a way, Transition is the best example of regime change that one can think about. It is a deep and irreversible structural transformation, not a short lived phenomenon. It shares the essential features of development, including the take-off period and the profound qualitative and institutional changes. Hence, whether Transition should be treated as a short term or a long term evolution should be seen as an open question. It is only with the passage of time, that one will be able to observe whether the increase in subjective well-being continues with GDP growth, stagnates at a certain point, or goes down to the initial (1990) level.

II. EXPLANATIONS RELATED TO GROWTH ITSELF: CHANNELS AND NEGATIVE SIDE-EFFECTS

The flatness of happiness curves does not only suggest that GDP growth does not bear the promise of a rise in well-being over time. More generally, it suggests that whatever the aggregate trend a society can experience, it will not raise people's average happiness in the long run. If this is true, the prospect is very dark for developing countries, which are locked at

their current low level of happiness. The message is also very discouraging for public policy in general: if happiness cannot be raised in the long run, not only should growth be abandoned as an objective, but this is true of any public policy measure.

Before jumping to these radical conclusions, the two next sections discuss possible explanations of the flatness of the happiness curve. A first series of explanations pertain to the nature of growth itself, i.e. the channels of growth and the fact that growth is accompanied by negative externalities (pollution, inequalities) that compensate its subjective benefits. Another series of explanations include the social and psychological processes, such as comparisons and adaptation that reduce the subjective benefits of growth.

II.1 Quality of Life: channels from GDP growth to happiness

Statistical estimates of subjective well-being most often include time and/or country fixed effects, as well as other controls that are introduced in order to neutralize changes in the demographic composition of the population (in terms of age, occupation, health, number of children, etc.). Some estimates also control for political variables such as democracy, gender equality, trust, etc. However, in terms of empirical strategy for estimating a relation between two magnitudes, there is always a trade-off between controlling for variables that channel the phenomenon under study, at the risk of not capturing its effect, and not controlling for such variables, at the risk of obtaining a biased measure. In the case of growth and well-being, controlling for the positive side-effects or channels of growth includes the risk of missing the impact of growth itself. Indeed, if growth is expected to bring higher well-being, it is not only through the greater amount of purchasing power (income), i.e. with the increase in the amounts of consumed goods, but also through the entire transformation that accompanies the process of growth.

An increase in income per capita always comes with increased productivity of labour, which means a greater choice in their time-use for those who are concerned. As argued by Sen (2001), it is because it enhances the greater freedom of choice (by enlarging their set of capacities) that growth is expected to raise people's well-being. Identically, GDP growth is known for coming with demographic transition in low developing countries. This is certainly "*a revolutionary enlargement of freedom for women*", as put by Titmuss (1966, quoted by Easterlin and Angelescu 2007, p9), and a gain in the amount of education and resources for self-development that children can count on. Growth also comes with increased life

expectancy, reduced child mortality and child underweight (see for instance Becker, Philipson and Soares, 2005 or Easterlin and Angelescu, 2007). Finally it is well-known that democracy and development go hand in hand, even if the direction of causality is not as clear as it was believed in the 18th century (e.g. by Montesquieu, Steuart and Hume). Lipset (1959, page 80) for example, claims that: "*industrialization, urbanization, high educational standards and a steady increase in the overall wealth of society [are] basic conditions sustaining democracy*". Without inferring any causality, one can observe the statistical association between GDP growth and progress in political freedom and human rights. Hence, in terms of empirical strategy, in order to capture the global effect of GDP growth on subjective well-being, one should not control for any variable that neutralizes the effect of the channels that vehicle these effects. It is regrettable that many of the studies in the GDP growth-happiness gradient do include such controls.

The next sections review the available evidence of the correlation between GDP growth and quality of life indicators. Those are measures of the non-income quantitative and qualitative dimensions that constitute the channels from income growth to well-being.

a. Cross-section correlation between GDP growth and Quality of Life indicators

Easterlin and Angelescu (2007) have illustrated the high and positive correlation in the cross section between a series of quality of life indicators and GDP per capita across countries of different levels of development. Clearly upward-pent slopes relate subjective well-being and quantifiable factors, that are measured on a continuous scale, such as: food, shelter, clothing and footwear, energy intake, protein intake, fruits and vegetable, radios, cars, TV sets, cellular subscribers, internet users, urban population, life expectancy at birth, gross enrolment rate, total fertility rate. Many other authors have documented these evolutions and their relation with subjective well-being, e.g. Inglehart and Welzel (2005), Inglehart et al. (2008), Layard et al., 2010, Di Tella and MacCulloch (2008), Becker et al. (2005).

Some authors have insisted on the relationship between procedures, governance and institutions, democratic and human rights, tolerance of out-groups, gender equality, on the one hand, and subjective well-being on the other hand (e.g. Barro 1997, Frey and Stutzer 2000, Inglehart and Welzel 2005, Schyns 1998, Inglehart et al. 2008).

b. Time-series correlation between GDP growth and Quality of Life indicators

Figure 7 illustrates the spectacular take-off of life expectancy in England and Wales in the 19th century. More generally, Easterlin and Angelescu (2007) provide a detailed account of the progress in the different dimensions of quality of life over time, in a large set of developed and emerging countries. They document the different dimensions of the Quality if Life evolution during "*modern economic growth*". The latter is defined as a "*rapid and sustained rise in real output per head and attendant shifts in production technology, factor input requirements, and the resource allocation of a nation*", where "rapid and sustained" is defined as at least equal to 1.5% per year (Easterlin and Angelescu, 2007, p 2).

They document the turning points in GDP growth and in other indicators of Quality of Life. Although both variables move together in the same direction, they insist on the fact that the dates of their respective take-offs do not systematically coincide. Qualitative indicators sometimes lag behind and sometimes are in advance as compared to the date of GDP take-off. "*If social and political indicators of QoL are, at present, positively associated with GDP per capita, it is often because the countries that first implemented the new production technology underlying modern economic growth were also the first to introduce, often via public policy, new advances in knowledge in the social and political realms*" (Easterlin and Angelescu, 2007, p 21). Whether the co-movements between growth and quality of life indicators are causal is indeed controversial and difficult to establish (see also Easterly (1999). However, it is undeniable that there is no progress in quality of life without GDP growth.

In their provocative paper "Is growth obsolete?" William Nordhaus and James Tobin (1973), advocated for an alternative indicator, integrating leisure, household work, costs of urbanization. They constructed a "Measure of Economic Welfare". However, it turned out that this index grew like GDP over the period under study, albeit more slowly. This, to our knowledge is a universal observation. Pritchett and Summers (1996) for instance, observe that "wealthier is healthier" in the long run. Using multi-countries time-series data, they identify that "*The long-run income elasticity of infant and child mortality in developing countries lies between 0.2 and 0.4*". This implies that "*over a half a million child deaths in the developing world in 1990 alone can be attributed to the poor economic performance in the 1980s*".

In summary, GDP growth comes with a series of quantitative and qualitative non-monetary improvements. These constitute the channels from growth to well-being that should not be controlled for in estimates of the former relationship.

II. 2. *Negative side-effects of growth*

The flatness of the GDP-happiness graphs may be due to the negative influence of some side-effects of growth, such as pollution, income inequality, work stress, etc. The influence of these "omitted variables" could hide the positive influence of GDP growth on subjective well-being in econometric estimates (see Di Tella and MacCulloch, 2008).

The most widely established negative side-effects of growth are: inequality, crime, corruption, extended working hours, unemployment, pollution and other environmental degradation (as measured by SOx emissions for example) (Di Tella and MacCulloch, 2003, 2008). Kenny (2005) also point to the social cost of economic transformation, and the shift from local to global relative income concerns. The impact of urban concentration and sub-urbanization is not as clear-cut. Easterlin and Angelescu (2007) also underline the effect of carbon dioxide emissions and fat intake (obesity and blood pressure). See Clark and Fischer (2009) for a useful summary of the macro-economic correlates of life satisfaction in OECD countries.

Among the list of usual suspects, income inequality occupies a special place. First, the relation between income inequality and subjective well-being has been the object of a large series of studies, of which most concluded to a negative correlation (see Senik, 2009 for a survey, or Clark et al. 2008, or Alesina and la Ferrara, 2008 for a survey of the self-declared demand for income redistribution). Income inequality can reduce well-being if people dislike it as such (although it may improve well-being if it is interpreted as reflecting the scope of opportunities: see Alesina et al., 2004). However, it can also exert a mechanically depressing effect on the measure of average SWB, because of the log functional form of the relationship between income and SWB (see Stevenson and Wolfers, 2008). However, this technical effect does not seem to be sufficient to explain the flatness of curve. As illustrated by the different panels of Figure 8 (taken from Layard et al., 2010, p 142), income inequality has increased sharply from 1970 to, average happiness has remained flat, the income of the upper quintile has increased, but not its happiness. Hence, even for highest income quintile, the happiness curve has remained flat in the USA.

An important note is that many of the negative externalities of growth actually follow an inverted U-shape, i.e. they increase in the initial stages of development and decrease in later stages. Income inequality, pollution, long hours of work, poor working conditions, etc. are phenomena that have initially gained importance, but have started to be been attenuated at some point, in high-income countries. This was not the result of purely mechanical forces, but of public policy- an important point in view of developing countries. Should these negative factors be taken into account in the evaluation of GDP growth in terms of well-being? This an open question. If they constitute inevitable companions to growth, then the answer is yes: they have to be counted as negatives in the welfare evaluation of growth. However, if they can be attenuated or suppressed by public policy, then they can be discounted from the welfare effect of growth.

III. EXPLANATIONS RELATED TO THE HAPPINESS FUNCTION ITSELF (HUMAN BEINGS ARE SOCIAL ANIMALS)

III.1. Income comparisons

One simple explanation of the lack of any long-run relationship between income and well-being is that this does not reflect that there is something wrong with growth *per se*, but rather that this reflects the very structure of individual well-being functions. The broad idea is that income does not bring well-being in a vacuum, but is rather intensely social, in that it is evaluated relative to some benchmark, reference or comparison level of income. There are many synonyms for the latter: this can be thought of as what is normal in the society, or what is fair. Forgetting about the other determinants, we can then write the relationship between utility and income as:

$$U_{it} = U(y_{it}, y_{it}*) \tag{1}$$

The well-being of individual *i* at time *t* rises with their own income, y_{it}, but falls with the level of comparison income, $y_{it}*$. Comparison income acts as a deflator with respect to own income here, in the sense that the higher it is the less good the individual's own income looks. Much of the empirical literature exploring this relationship has explicitly parameterized the well-being function as a function of both y_{it}, and $y_{it}/y_{it}*$. If the income effect of income on well-being is mostly absolute, so that absent the externalities mentioned above greater GDP will increase individual well-being, then the second term will play only a minor role. On the other

hand, if income comparisons are very important, so that most of the effect of income works through how well I am doing compared to some reference group, then it is the second term that will be preponderant. If it is mostly relative income (y_{it}/y_{it}*, which is homogeneous of degree zero) that matters, then, answering Dick Easterlin's 1995 question, Raising the Incomes of All will not Increase the Happiness of All.

Distinguishing between these two scenarios has been the goal of a considerable amount of empirical work over the past fifteen or so years. A variety of different empirical approaches across various disciplines have been mobilized to answer the question of how much income comparisons matter in the determination of well-being. All of this work has had to set out a priori exactly to whom or to what individuals are thought to compare themselves: this has included the individual's spouse, to people with the same characteristics as the individual, those in the same region, other participants in experiments, hypothetical individuals, or even a measure of the individual's expected income. Some of the key findings in developed countries are described below.

a. Evidence in Developed Countries

One direct approach to the question of income comparisons has been to estimate well-being regressions in which both the individual's own income and the comparison income level appear: these are the empirical counterpart to equation (1) above. This literature has appealed to different datasets (in terms of countries and years), different measures of well-being (job and life satisfaction being the most predominant), and various measures of comparison income, y_{it}*. The typical finding is that own income is positively correlated with well-being, but the correlation with others' income is negative.

Clark and Oswald (1996) use the BHPS to calculate the income of 'people like me' from a wage equation, and show that this is negatively correlated with individual job satisfaction. Own income attracts a positive coefficient, and the sum of the two estimated income coefficients is zero: pay rises for everyone have no effect on satisfaction. More recent work along the same lines using, respectively, German and American data is Ferrer-i-Carbonell (2005) and McBride (2001). Vendrik and Woltjer (2006) extend the analysis of the German GSOEP data in this respect, by considering asymmetric reactions to gains and losses (relative to the reference group).

An alternative measure of $y_{it}*$ is at the local level: what do my neighbours earn? Both Blanchflower and Oswald (2004) and Luttmer (2005) calculate regional average income in US data, and show that this is negatively correlated with respondents' well-being: an individual earning $40 000 per year is happier in a poorer than a richer region. However, at the very local level of a few hundred metres, Clark *et al.* (2009) find that in Danish panel data, conditional on my own income and local median income, my satisfaction is strongly positively correlated with my rank in the local income distribution. Other work her has considered comparisons to the income of the individual's work colleagues (Brown *et al.*, 2006), partner (Clark, 1996) and parents (McBride, 2001).

Running well-being regressions is only one way of addressing the question of income comparisons. One early method (the first published contribution being Van Praag, 1971) is that of the Welfare Function of Income. Here individuals assign income levels (per period) to verbal labels (such as excellent, good, sufficient and bad): these stated values form the basis of individual-level regressions estimating a lognormal Welfare Function of Income. The resulting individual estimated means (μ) show which individuals require greater income in order to be satisfied. Comparison income is introduced into the analysis, typically as average income over age, education and other characteristics. The regression results (for example, Van de Stadt *et al.*, 1985) show that, given own income, the higher is reference group income, the more money individuals say they need to reach a given verbal well-being level, which is consistent with income comparisons.

Separate evidence on comparisons is found in experimental economics. In Zizzo and Oswald (2001), experimental participants paid out of their own winnings in order to burn the money earned by other participants. An alternative approach is to ask individuals to choose between hypothetical outcomes, as in Alpizar *et al.* (2005), Johannsson-Stenman *et al.* (2002) and Solnick and Hemenway (1998). A typical income choice is as follows:

A: Your current yearly income is $50,000; others earn $25,000.

B: Your current yearly income is $100,000; others earn $200,000.

The key here is that one choice has a greater absolute return while the other is more advantageous in relative terms. In line with experimental work, there are strong positional concerns over income, in that individuals choose *A* over *B*. While the above example is couched in terms of income, the same method can be used to compare the degree of

comparisons across domains. For example, relative concerns in Alpizar *et al.* are stronger for cars and housing, and weaker for vacations and insurance.

A recent randomized experiment was set up by Card et al. (2010), showing evidence of relative concerns among employees of the University of California when they had access to internet information about the wage of their colleagues.

Last, we can appeal to recent neurological work. Fließbach *et al.* (2007) use MRI techniques to measure the brain activity of pairs of individuals engaged in identical guessing-game tasks. Each individual's monetary reward for a correct guess was announced to both subjects, and these rewards were varied. In some conditions a correct guess by a participant earned 60 points; in other conditions the subject's guess earned 60 and the other's correct guess earned 30, or 60 and 120. As such, the individual's relative payoff for a correct guess changed, while keeping the absolute reward fixed. Blood oxygenation analysis showed that brain activity in the ventral striatum was increased with relative income. Related work in this area appears in Takahashi *et al.* (2009).

b. Evidence in LDCs

The majority of the work on income comparisons and individual well-being has covered OECD countries. However, the increasing availability of data including subjective questions undoubtedly allied with the increasing interest that researchers have in these issues, have produced a small but growing number of pieces of evidence regarding the correlates of individual well-being in poorer countries. The key question that we want to answer here is whether positional concerns are less important in poorer countries: are comparisons luxuries?

Regarding the direct estimation of individual well-being, Graham and Felton (2006) have replicated the finding of a negative effect of regional income on individual well-being across 18 Latin American countries. Kuegler (2009) analyzes self-collected data on 400 Venezuelans in 2005, and shows that those who say that they are better off than their own siblings report higher life satisfaction. This is consistent with relative income effects in a relatively poor country. The strength of this correlation depends on the individual's own characteristics, being stronger for respondents with above-median incomes and those who work in higher-rank professions. Stark and Taylor (1991) present indirect evidence of the role of income comparisons by looking at the decision to migrate. Using Mexican data, they show that relative deprivation is a significant predictor of Mexico-US migration.

Castilla (2010) also considers Mexican data, including information on subjective poverty (whether the respondent's income is sufficient for their needs) and income satisfaction. Relative concerns are introduced by considering these two welfare measures as a function of both own expenditure and the respondent's evaluation of their own income relative to people with whom they live, to how much they aspired to have at this stage of their lives, and relative to the income they earned three years ago (all three of which are measured on a seven-point scale). The empirical results show that welfare rises with own expenditure, but falls with income relative to others and income relative to aspirations. The results with respect to past income are significant only in the life satisfaction equation and when the individual reports being worse off than three years ago (consistent with loss-aversion).

Rojas and Jiménez (2007) also appeal to Mexican data to show respondents' subjective poverty evaluations are partly determined by the gaps between own income on the one hand and comparison and aspired income levels on the other. Comparison income is measured directly by asking about the income gap 'with respect to those you usually compare yourself to'. Guillen-Royo (2010) analyzes small sample data from seven communities in Peru, and shows that satisfaction with a number of different life domains is positively correlated with own expenditure but negatively correlated with average community expenditure. Last, Rojas (2010) uses data from 20 Latin American countries found in the 2007 Gallup survey. Two measures of individual well-being, the ladder question of worst to best possible life and satisfaction with standard of living, are related to both own income and the average income in the reference group (defined by age, sex and country). The empirical results show that well-being rises with the log of own income but falls with the log of comparison income. In the case of satisfaction with standard of living, the coefficients on the two variables are equal and opposite, suggesting that a rise in everyone's income would leave no-one in Latin America better off.

Moving from Latin America to Asia, there has been a spate of recent work on the determinants of well-being in China, some of which has appealed to the notion of reference income. Appleton and Song (2008) conclude that the life satisfaction reported by urban Chinese is affected by status considerations, and Smyth and Qian (2008) analyze data from 31 Chinese cities in September 2002, finding that the log of average monthly income in the city in which the respondent lives is negatively correlated with happiness, controlling for own income. Gao and Smyth (2010) appeal to two different datasets to present some evidence that job satisfaction is negatively related to reference group income, where this latter is either

average income in the firm in which the respondent works, or the predicted income of "people like me" (as in Clark and Oswald, 1996).

Recent work by Cojocaru (2010) appeals to cross-section 2007 data from the LSMS in Tajikstan. He finds a mostly insignificant effect of regional income on individual life satisfaction, but suggests that this might reflect the fact that the wrong reference group is being used. When however a qualitative variable is used which measures the individual's evaluation of their household's welfare relative to that of their neighbours, strong effects are found in the expected sense: those who rank their household relatively lowly compared to their neighbours report lower levels of life satisfaction, controlling for the household's own expenditure.

Fafchamps and Shilpi (2008) consider a direct measure of relative utility in a developing country by analysing the answers to a question on consumption adequacy in Nepalese data. Consumption adequacy rises with own income (but falls with the distance to the nearest market). Critically, conditional on these and other control variables, consumption adequacy also falls with reference group consumption, as in a relative utility model. Here reference group consumption is defined in a geographical way as the mean or median consumption of other households living in the same ward as the respondent.

Carlsson *et al*. (2009) look at hypothetical preferences over different absolute and relative income situations (as used by Alpizar *et al*., 2005) in India. They find that around half of the effect of income on well-being comes from some kind of status or relative income concern. Crucially, they note that this figure is around the same as that found in rich countries. They moreover note that low caste and low income respondents seem to be more sensitive to relative income.

John Knight has authored a series of papers using Chinese data from the 2002 CHIP national household survey. Unusually, this survey included not only questions on subjective well-being but also asked direct questions about who individuals considered as their reference group. Knight et al. (2009) appeal to cross-sectional information on 9,200 households in China. The authors first show that comparisons in China are local, in that 70% of individuals see their village as their reference group. Further, conditional on both own and village income, those who report that their own income was much above the village have higher happiness scores. Knight and Gunatilaka (2010*a* and 2010*b*) also emphasize the importance of

relative income rather than absolute income, and the role of changing reference groups, in Chinese data. Mishra et al. (2010) show that reporting an income below that of a self-reported reference group is associated with lower well-being for the Korean minority in China.

Well-being work using Chinese data has thus uncovered a number of pieces of evidence consistent with the presence of income comparisons in a developing countries. This is consistent with the results in Brown et al. (2010), who do not measure well-being directly, but instead appeal to the literature that has analyzed conspicuous consumption in developing countries. They use data from a Chinese household panel, and show that spending on funerals and gifts is consistent with status-seeking behaviour. Last, Fließbach and co-authors followed up their 2007 work by running the same relative income Neuro experiments in China (although the results have not yet been written up).

Turning to Africa, Kingdon and Knight (2007) consider the role of relative income in South Africa. The authors find evidence of negative relative income effects within race groups (whereby life satisfaction is lower the more others earn), but positive relative income effects within neighborhoods.[6]

Bookwalter and Dalenberg (2010) analyze South African SALDRU data from the early 1990s. They find no significant effect of local (cluster-level) income for Whites, but a positive and significant effect of others' income for non-Whites. However, similar to Cojocaru (2010), dummy variables for one's own income compared to that of one's parents attract significant estimated coefficients consistent with income comparisons (with feeling less well-off than one's parents having a far larger absolute effect on satisfaction than feeling better-off than one's parents).

Ravallion and Lokshin (2010) appeal to large-scale 2004 household data from Malawi, which includes measures of satisfaction with life and consumption expenditure. More unusually, the data also includes measures of own subjective economic welfare, from respondents' answers to the question "Imagine six steps, where on the bottom, the first step, stand the poorest people, and on the highest step, the sixth, stand the rich (show a picture of the steps). On which step are you today?", as well as their assessment of the economic welfare of their

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[6] So that higher neighbourhood income is associated with greater satisfaction. This mirrors the finding in Danish small neighbourhood data in Clark et al. (2009).

neighbors and their friends. Ravallion and Lokshin model individual life satisfaction as a function of both own and local neighbourhood consumption, and as a function of both own and others' economic welfare. Although they argue that the results show that comparisons are not important for the majority of Malawians, others' consumption reduces individual life satisfaction in the urban sample, and there is some evidence of a negative effect of friends' economic welfare on those who report a relatively high level of own economic welfare.

On a smaller scale, Kenny (2005) uses data from a survey of 566 Tanzanian households, in which respondents report the amount of income necessary to be wealthy. Similar to the European results in Van Praag's work, it is shown that the average income in the area is one key determinant of what people consider to be a whealthy income.

Akay and Martinsson (2008) use a cell-mean approach similar to that in Ferrer-i-Carbonell (2005) applied to 2004-2005 household survey data in Northern Ethiopia. They find no significant effect of reference group income on life satisfaction. A companion paper (Akay *et al.*, 2009) again looks at Ethiopia, but this time considers hypothetical preferences over absolute and relative income scenarios. The results here are that the choices of most Ethiopian subsistence farmers are based on absolute income alone. However, there are still an arguably considerable number of some of the poorest people in the world who take status considerations into account. Corazzini *et al.* (2010) use the same approach to compare the degree of relative income concerns across eight different countries. While they argue that there is a broad pattern of individuals in richer countries being more sensitive to relative income, it is striking that one of the most comparison-conscious countries in this respect is Kenya.

c. Absolute versus relative poverty

One of the reasons why we are interested in income comparisons, especially in the context of less well-off countries, is that they impinge on the concept of poverty. The distinction between poverty as an absolute lack and a relative lack goes back at least to Adam Smith: in the mid-18th century the Scots were not seriously deprived if they did not have shoes, whereas in England, only the truly destitute had no shoes. The stigma from being shoeless was therefore greater in England than in Scotland, because of the social norm that was attached to it. As such, the impact of a given lack on individual well-being may depend on the degree to

which this lack is stigmatised in society, which itself is likely related to the incidence of the lack under consideration.

Moving back to income and appealing to equation (1) above, the critical distinction is then whether poverty is defined by an individual's income falling below a certain critical level, or whether other people's outcomes play a role. Absolute measures of poverty include the cost of minimum calorie intake line, the minimum consumption basket defining the poverty line in the US, and the World Bank's 1$ a day poverty line. Relative measures of poverty take context into account, such as the commonly-used relative poverty line set at 60% of median income. The evidence of relative income concerns in low-income countries seems to constitute an argument in favor of measures of relative poverty.

Another important question that we are unable to answer to date, is whether relative concerns are less important, i.e. have smaller welfare effect in low-income countries than in high-income countries. Income interactions can be thought about as some kind of luxury good, that come into attention only once survival is taken for granted. We have reviewed the evidence that relative concerns do exist in developing countries. But whether their importance is smaller than in developed countries remains an open question that would need specific data – maybe experimental data- to be answered. Analyzing the data from the third wave of the European Social Survey, Clark and Senik (2010) focused on the answers to the question "*How important is it to you to compare your income with other people's incomes*?" across European countries. They found that this importance is greater in poorer countries than in richer countries, and that, within countries, this comparison is more often said to be important by poorer people. Comparisons are most often upward directed and people suffer more from upward-directed comparisons. This is consistent with the literature's general findings (see for example Ferrer-i-Carbonnell 2004, or Card et al. 2010). If this finding could be extended to poor countries, this would rule out the idea that income comparisons are a rich country phenomenon.

Knowing that local income comparisons matter for low-income countries' citizens, one should consider the possibility that global income concerns may also be important, especially in view of the development of information and communication technologies. If the latter allow the inhabitants of low-income countries to be aware of the life-style and consumption possibilities of high-income country citizens, this is likely to generate feelings of relative deprivation. This might explain the steeper curve of the relation between GDP per capita and

subjective well-being in developing countries (see section I.1). We are not aware of any direct evidence of global income concerns. One exception is Clark and Senik (2010), who noted that in the above cited recent survey of Europeans, respondents who did not have internet access were less subject to income comparisons.

The most radical view about the importance of income comparisons would lead to the conclusion that it is only be because they compare to each other that the richer inhabitants of the globe are more happy and the poorer less happy. Does this mean that low-income countries should give up pro-growth policy? This would be a surprising policy advice. Indeed, if relative concerns are important, many may well find it strange to recommend that low-income countries should remain at their current low rank in the concert of nations. Even if income comparisons lead to a vain zero-sum rat race between countries, it is not clear that not competing is an avenue for happiness.

III.2. Adaptation

Adaptation and the associated "hedonic treadmill" is one of the classical explanations of the Easterlin paradox. Habituation effects destroy the welfare benefit of growth. This is because of the deleterious role of aspirations: "*Material aspirations increase commensurately with income, and as a result, one gets no nearer to or farther away from the attainment of one's material goals, and well-being is unchanged*" (Easterlin, 2003).

Adaptation is a central issue in the social sciences: to what extent do we get used to any specific life situation? The psychological basis of adaptation is that judgements of current situations depend on the experience of similar situations in the past, so that higher levels of past experience may offset higher current levels of these phenomena due to changing expectations (see Kahneman and Tversky, 1979). Some psychologists draw a parallel between the homeostasis that leads us to hold body temperature steady and homeostasis in subjective wellbeing (Cummins, 2003), which latter is argued to hold well-being at some constant individual-specific set-point (argued to be between 60 and 80 on a standardised 0-100 scale, with an average figure of 75). This may be partly biologically determined, underlying a potential role of genetic factors. In any case, the key element is that, although positive and negative events will have short-run effects on well-being, in the longer-run most individuals will return to their set-point level.

Although initially partisans of the adaptation hypothesis, Fujita and Diener (2005) note that in 17 years of GSOEP data, around one quarter of people changed well-being significantly from the first five to the last five years. Diener *et al*. (2006) propose 5 significant revisions to hedonic-treadmill theory: 1) individuals' set-points are not hedonically neutral; 2) individuals have different set-points; 3) a single person can have multiple set-points depending on the components of happiness (emotions, life satisfaction); 4) well-being set-points can change under some conditions, 5) individuals differ in their adaptation to events.

In the context of the Easterlin paradox, we are particularly interested in adaptation to income. With respect to equation (1) above, we again introduce an additional income term into the utility function; however, this time the newcomer is not the income of others or expectations, but rather the income that the individual themselves had earned in the past. Individual well-being is thus still subject to income comparisons, but here the comparisons are within subject, to use the psychological term. Those who have earned more in the past are less satisfied with any given level of income today.

While in theory any past income level could negatively affect well-being today, in practice empirical work has appealed to the income that the individual received one year ago (in panel terms, this is the income that the individual reported in the previous wave, as most panels are carried out on a yearly basis).

$$U_{it} = U(y_{it}, y_{it-1}) \qquad\qquad (2)$$

This kind of utility function implies that any attempt to raise happiness via higher income is potentially subject to debate. If the effect (negative) of past income, via habituation, is strong enough then income will have no long-lasting well-being effect, at both the individual and the societal level.

a. Evidence in Developed Countries

Perhaps the best-cited piece of work in the domain of adaptation to income is that of Brickman *et al*. (1978), who show that a very small sample (22) of American lottery winners report no higher life satisfaction than a control group. The authors' interpretation of this finding is in terms of adaptation to higher income. Much as this paper has been cited, it does not necessarily tell a clean story. Two points of note in this respect are that the winners were actually more satisfied than non-winners, but the small sample size did not yield a significant

difference. Further, the analysis is cross-section, rather than panel. As such, it could well be the case that the lottery winners were less happy to start with, before they won. As such, they would have experienced an increase in well-being on winning the lottery, but this would not have been visible in the cross-section analysis.

An early piece of evidence that does appeal to explicit information on income changes is Inglehart and Rabier (1986), who use pooled Eurobarometer data from ten Western European countries between 1973 and 1983 to show that well-being scores are essentially unrelated to current income, but are positively correlated with the change in financial position over the past twelve months. They conclude that aspirations adapt to circumstances, such that, in the long run, stable characteristics do not affect well-being.

More recently, Clark (1999) used two waves of BHPS data to look at the relationship between job satisfaction and current and past labour income. Considering those who stay in the same firm in the same position, past income reduces job satisfaction while current income increases it. This is consistent with a utility function that depends on changes in these variables. The data suggest a completely relative function, with job satisfaction depending only on the annual change in the hourly wage. More recent results in German and British panel data are reported by Di Tella *et al.* (2005) and Burchardt (2005), respectively. Layard et al. appeal to GSOEP data to show that the long-run effect of a rise in income is smaller than the initial effect.

Instead of using own and past individual income, we can also consider aggregate income. Di Tella *et al*. (2003) examine individual happiness in data covering 18 years across 12 European countries, and argue that some of their results on current and lagged GDP per capita show that '*bursts of GDP produce temporarily higher happiness'* (p.817).

The Welfare Function of Income, described above, also produces evidence consistent with adaptation to income. In this context, a common finding is that a $1 increase in household income leads to a 60 cents increase (within about 2 years) in the income that individuals consider to be 'excellent', 'good', 'sufficient', 'bad' etc.. Hence, 60% of the welfare effect of income is dissipated by adaptation.

b. Evidence in LDCs

Much of the work on adaptation to income changes has appealed to panel data to follow individual well-being over time as their income moves around. While there is now a thriving literature looking at adaptation in this way in rich countries, there is at the same time an almost total lack of evidence in poorer countries, undoubtedly due to the lack of panel data in the latter.

Knight and Gunatilaka (2009) is an exception. The work here appeals to data from a household survey for rural China. The survey includes information on life and income satisfaction, but also the minimum income that respondents consider necessary to sustain the household for a year. This latter measure, sometimes known as the Minimum Income Question, was introduced in Goedhart et al. (1977). Knight and Gunatilaka consider the answer as a measure of income aspirations. These aspirations are found to be positively correlated with actual income, so that the more individuals earn, the greater the income level they consider as the minimum necessary. Subjective well-being is positively correlated with own income, but negatively correlated with aspiration income. As such, the results are consistent with at least partial adaptation to income in China.[7]

Barr and Clark (2010) analyze South African data, and consider the levels of income that individuals say are necessary to get by, and to live well. In a regression analysis, these are shown to be positively correlated with own income and with reference group income (geographically defined). This is again consistent with a certain amount of adaptation. Along the same lines, Herrera et al. (2006) provide a comparative analysis of survey data in Peru and Madagascar. A three-level satisfaction with standard of living variable is shown to be positively correlated with own income, but negatively correlated with average neighbourhood income and the minimum amount the individual thinks is necessary to get by. In turn, this latter minimum amount is positively correlated with own income, suggesting the existence of a ratchet effect whereby higher income increases aspirations and reduces satisfaction.

An impressive piece of evidence by Di Tella and MacCulloch (2007, 2010, chapter 8) is based on repeated cross-sections. The authors uncover a positive happiness gradient over time in

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[7] Castillo's (2010) work mentioned above also shows that income satisfaction in Mexico is positively correlated with the respondent's evaluation of their own current income relative to aspirations. If aspirations rise with own income, then this is also consistent with adaptation.

low income countries, but not in high income countries. In the latter, the level of GDP per capita attained in 1960 is sufficient to explain the level of happiness as of 2005. By contrast, in low-income countries, both the 1960 level and the later growth in GDP per capita exert a statistically significant impact on 2005 subjective well-being. The authors conclude to the smaller importance of adaptation in low-income countries: "*The past 45 years of economic growth (from 1960 to 2005) in the rich nations of the world have not brought happiness gains above those that were already in place once the 1960s standard of living had been achieved. However, in the poorest nations, we cannot reject the null hypothesis that the happiness gains they experienced from the past half century of economic growth have been the same as the gains from growth prior to the 1960s. In other words, for these nations, it is still the absolute level of (the logarithm of) income that matters for happiness.*" (2010, p 219). Hence, the process of adaptation brings back the idea of a threshold effect in the GDP-happiness gradient.

III.3 Bounded scales: what exactly is relative ?

Is the welfare effect of income purely relative (to other people's income or to one's past level of income)? Or could it be that happiness measures themselves are relative (to some implicit context)?

We believe that it is likely that satisfaction judgements expressed on an ordinal bounded-scale express relative judgements, i.e. the relation between individuals' attainments and the existing of possibilities (represented by the scale). Van Praag (1991) for instance, has illustrated this phenomenon in experimental settings involving bounded scales: subjects always divided the total length of the scale into quantiles, equating the higher step with the maximum amount of the proposed magnitude. If this is so, it is not surprising that only a small minority of the population chooses the upper 10th rung on the happiness scale, which is interpreted as "having it all".

Of course, the fact that the happiness scale is interpreted as a context-dependent measure is difficult to disentangle from the fact that happiness itself is context-dependent. However, in order to illustrate the specificity of bounded scales, we distinguished among the quality of life indicators (which are positive correlates of growth), the cardinal measures that can be measured on a continuous scale (although often not infinite), such as life expectancy, the percentage of literate population, women's fertility, or the gross enrolment rate in school,

from ordinal variables that are measured on an ordinal bounded scale, such as Happiness, the index of Democracy (Polity IV), the Human Rights index or the Trust variable (see section I.1). Keeping only countries which were observed for at least ten years in the World Values Survey and which had experienced an episode of positive growth, we plotted the values of the concerned measures against time. The panels of Figure 8 represent these time evolutions in countries of Asia and in Western OECD countries separately.

Two observations are in order. First, objective but ordinal and bounded measures (democracy, human rights) tend to converge to their maximum value as development unfolds with GDP growth, whereas subjective ordinal variables (happiness and trust) remain below the maximum value. Second, the graphs representing average happiness, trust, human rights and democracy tend to be much more flat than graphs of cardinal indicators, such as fertility, school enrollment rates, life expectancy, or infant mortality, which show much clearer dynamic trends.

In conclusion, one should not expect to see ordinal bounded-scale measures behave on the long run like quantitative cardinal measures. Instead of looking at the long run evolution of the average level of subjective well-being (which is bound not to increase much), it is more interesting to observe the distribution of the answers on the proposed scale. The fact that the variance of SWB tends to fall as GDP grows is quite promising for low-income countries.

IV. CONCLUSIONS AND TAKE-HOME MESSAGES: HOW CAN WE USE SUBJECTIVE VARIABLES IN ORDER TO UNDERSTAND THE GDP-HAPPINESS RELATIONSHIP?

• The evidence presented in this paper indicates how subjective satisfaction variables can be used in order to measure well-being in developing countries. First of all, subjective well-being measures are particularly well-fitted to capture the multi-dimensional aspect of growth, and can be used to estimate the marginal rates of substitution between different aspects of development that may well need to be traded off against each other, such as greater consumption, extended life expectancy, a worsened quality of air, urban congestion, etc. This creates a useful tool for public policy that aims at maximizing well-being as countries develop.

• Subjective data contain a number of lessons regarding the well-being benefits that growth may confer on developing countries. Cross-sectional data clearly show that income growth yields sizable benefits in terms of self-declared happiness and life satisfaction, although with decreasing marginal returns (i.e. the functional form is concave). Within a given country, the richer report higher happiness levels than do the poorer; equally those who live in richer countries are happier than those in poorer countries.

• However, the evidence is much less clear-cut regarding long-run changes in well-being, in growing economies. Whether GDP growth yields rising well-being is still hotly debated: essentially, the question is whether the correlation coefficient is "too small to matter". This of course has very important consequences for developing countries, which need to know what potential gains are associated with growth-oriented policies.

• The explanations for the small correlation between income growth and subjective well-being over time appeal to the nature of growth itself, and the way in which humans function psychologically. First, growth may go hand-in-hand with non-monetary qualitative changes that improve the "quality of life", but may well also be accompanied by unwanted side effects such as pollution, income inequality or stress on the job. Second, greater purchasing power increases individual happiness, but man is a social animal and relative concerns (income comparisons) may well diminish the absolute effect of greater wealth. This is consistent with the positive income-happiness gradient that is regularly observed within countries; it is also consistent with the same gradient across countries, if income comparisons are global instead of local. A very pessimistic view of growth is then that it may be a zero-sum game, whereby the richer are happier and the poorer less happy, both across populations within a country and across country, but rising income for all may not change the relative income positions. This explains why happiness does not seem to increase with GDP in time-series data. However, even if this is true, many may well find it strange to recommend that low-income countries should remain at their current low rank in the concert of nations. Any single country will always have an incentive to climb up the ranking. The problem is that any gain by one country may well involve losses for other countries, when income is evaluated by comparisons across the globe. Similarly, within a country income growth for one part of the population will benefit them, but may reduce the well-being of others.

• An analogous phenomenon is that of adaptation to the standard of living, whereby individuals tend to return to some set-point level of well-being. Growth changes both the

environment and aspirations. If both expectations and outcomes increase at the same rate, then individuals will not feel any happier. If they do not realise that their expectations and outcomes tend to move together, individuals will aspire to grow richer, but doing so will not increase their happiness as soon as their expectations catch up with their outcomes. This might be an illusion, as suggested by Easterlin, but can also be seen as some kind of hard-wired mechanism, built into human beings by evolution, to ensure that they keep trying to improve their lot (Rayo and Becker, 2007).

• One crucial question in this literature is the relative importance of absolute versus relative income concerns. Is the welfare effect of income entirely relative? And is the relative/absolute proportion the same in developing and developed countries? Empirical evidence on the extent of income comparisons is much scarcer in developing countries. The evidence that we do have so far contains two important lessons: income comparisons do seem to affect subjective well-being even in very poor countries; however, adaptation may be more of a rich country phenomenon.

• Finally, growth and development do not just concern quantitative increases in consumption, production and the accumulation of capital. They also involve the qualitative transformation of political governance and market development. These qualitative and quantitative processes likely involve take-offs and thresholds. Regime change is an important dimension of these non-linear changes. It is striking that such regime changes are visible in subjective satisfaction measures. The case of Transition countries is particularly impressive in this respect: average life satisfaction scores closely mirror changes in GDP for about the first ten years of the transition process, until the regime becomes more stable. By way of contrast, in given stable regimes, such as France, we no longer find a relationship between GDP growth and life satisfaction changes. Our interpretation is that once it becomes stable, the regime become the population's frame of reference.

• While it is not easy to find large welfare benefits of growth using subjective well-being, there is nonetheless an interesting finding concerning the level and distribution of subjective well-being depending on the country's level of development. The stylized facts are as follows: (i) average SWB rises with GDP per capita, but (ii) the standard deviation of SWB falls with GDP per capita. As such , (iii) there is a strong negative relationship between the average and standard deviation of SWB within a country. Consequently, GDP growth reduces the inequality in subjective well-being. This is certainly a desirable outcome. If individuals

are risk averse, then behind the veil of ignorance they would prefer a society in which well-being is more equally distributed, *ceteris paribus*.

• The recourse to subjective measures of well-being is particularly welcome for assessing social phenomena that are not measurable using the standard approach of revealed preference. Whenever social interactions, social preferences or externalities are involved, it becomes more difficult to trace out the link from individual preferences to individual actions. There is no price one can pay to buy less inflation, unemployment or income inequality.

• However, subjective variables should be used as a complement to action-revealed preferences, rather than as a replacement. When people clearly vote with their feet, it is difficult to dismiss their actions on the ground that the message is not confirmed in subjective data. With respect to growth and well-being, as long as international migrations remain clearly unidirectional, from low- to high-income countries, it would appear extremely difficult to argue that GDP growth, in the mind of less-developed countries, does not bring higher well-being. The revealed preferences here are consistent with the cross-sectional evidence of a positive income- well-being gradient.

• Our stand is that the dynamic evidence based on subjective well-being is much less solid than the cross-sectional and panel evidence, based on individual data. This is because cross-country time-series comparisons are based on aggregate measures, which, by definition, have lower variance and are less powerful in terms of statistical inference. Moreover, it is possible that the satisfaction judgements expressed on a bounded-scale yield relative judgements by their very nature, due to the relation between outcomes and the set of possibilities (represented by the bounded scale). In this case, it is to be expected that only a small minority of individuals choose the 10th rung on the scale, which is interpreted as "having it all". De facto, quantitative variables, such as fertility, life expectancy or literacy, have much more obvious dynamic trends than do these bounded-scale qualitative variables, such as governance indicators.

• The relationship between income growth and well-being is still the object of ongoing debates that would be illuminated by the development of panel surveys of the population of low-income countries.

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TABLES

Figure 1.A. Income and happiness in the American General Social Survey (1972-2006).

Taken from Stevenson and Wolfers, 2008.
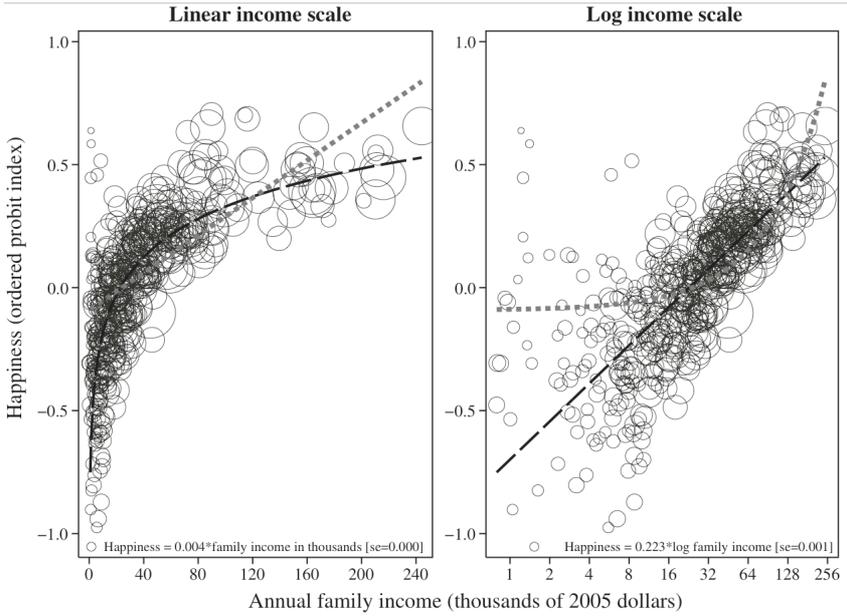
Source: General Social Survey (USA), 1972–2006; authors' regressions.
a. Each circle aggregates income and happiness for one GSS income category in one year, and its diameter is proportional to the population of that income category in that year. The vertical axis in each panel plots the coefficients from an ordered probit regression of happiness on family income category × year fixed effects; the horizontal axis plots real family income, deflated by the CPI-U-RS. In each panel the short- and long-dashed lines are fitted from regressions of happiness on family income and the log of family income, respectively, weighting by the number of respondents in each income category × year. Survey question asks, "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?"

Figure 1.B. Income and Happiness in a Chinese cross-section.
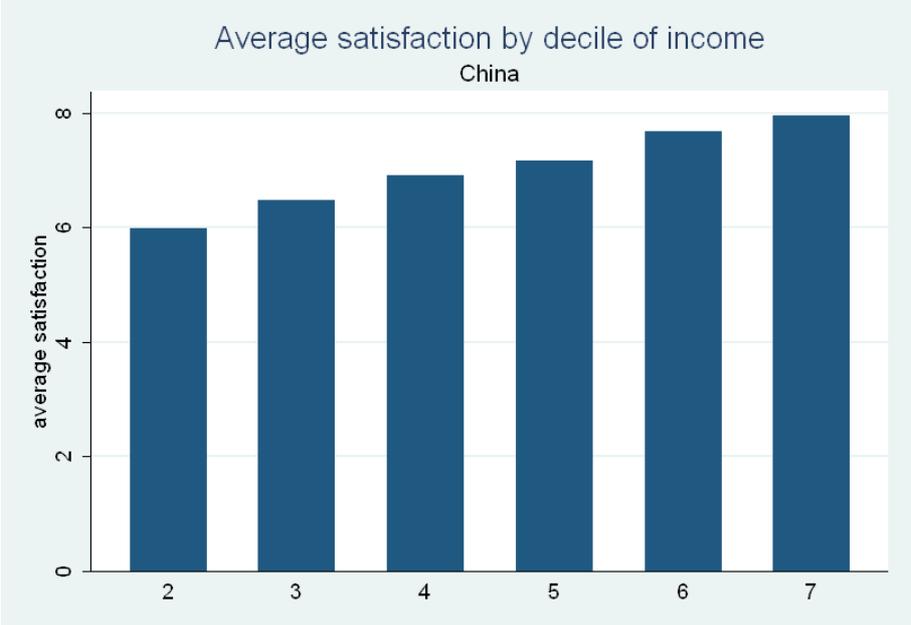
Source : WVS. China 2007.
We have aggregated the 3 upper deciles (7, 8, 9) that were very poorly represented, in the Chinese sample.

Figure 2.A GDP per capita and SWB in the world.
Taken from Inglehart, Foa, Peterson, Welzel (2008), p 269.
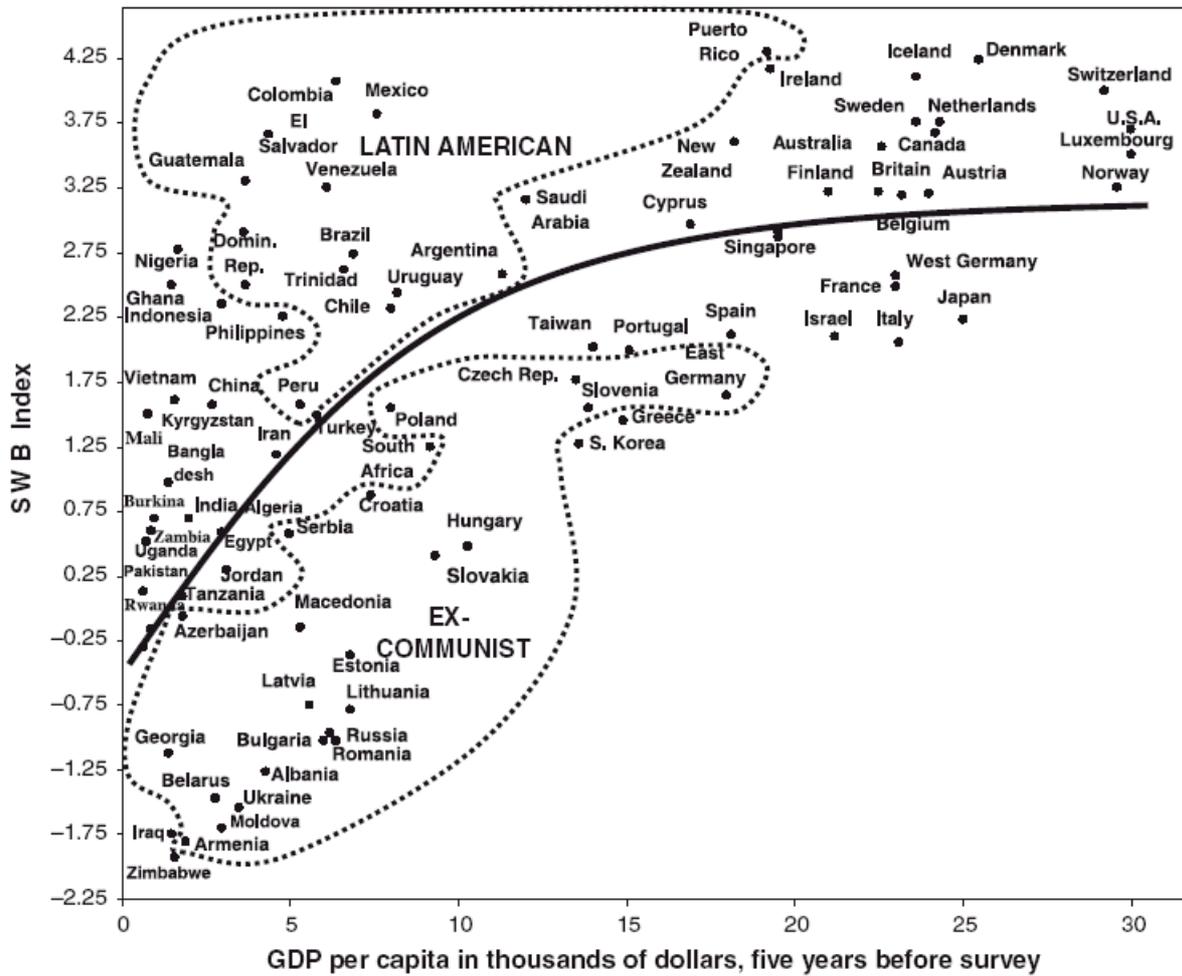
Fig. 2. Subjective well-being (SWB), per capita gross domestic product (GDP), and different types of societies. Well-being index is based on reported life satisfaction and happiness, using mean results from all available surveys conducted 1995–2007 (cubic curve plotted; $r = .62$). PPP = purchasing power parity estimates.

Figure 2.B. GDP per capita and Life satisfaction.
Taken from Deaton (2008), p 57.

Life Satisfaction in the World Poll and the World Values Surveys
(World Poll data shown as hollow circles, World Values Surveys data as shaded circles)
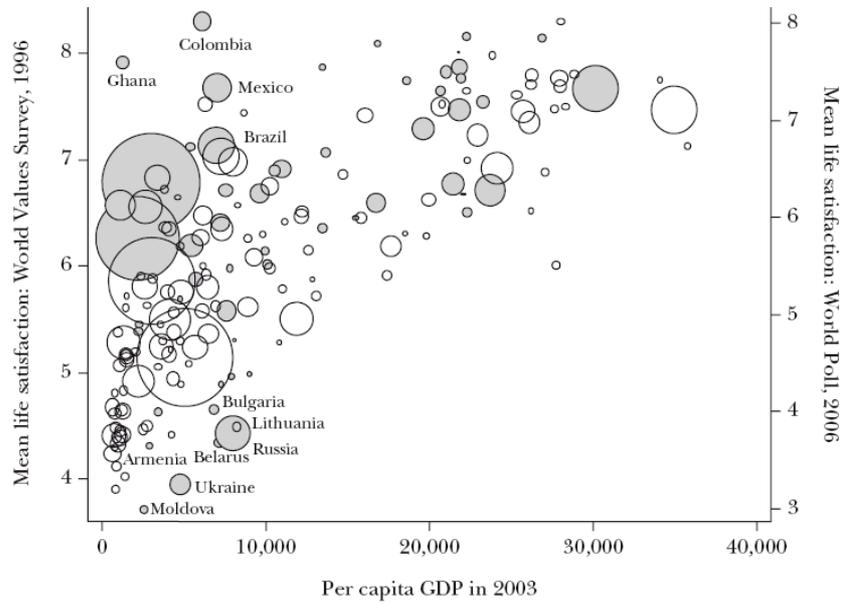
Source: Penn World Table 6.2.
Note: Each circle is a country, with diameter proportional to population. GDP per capita in 2003 is measured in purchasing power parity chained dollars at 2000 prices.

Figure 2.C. GDP per capita and Life satisfaction
Taken from Deaton (2008), p 57.

Each Doubling of GDP is Associated with a Constant Increase in Life Satisfaction
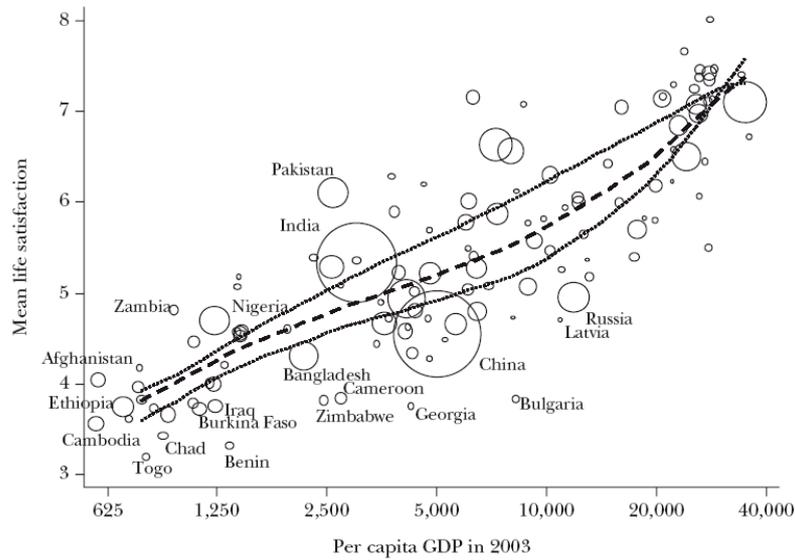
Source: Penn World Table 6.2.
Note: Each circle is a country, with diameter proportional to population. The scale on the x-axis is logarithmic. The middle line shows average life satisfaction for each level of per capita GDP while the outer two lines show the same thing, but for two age groups, ages 15 to 25—the upper line for most of the figure—and ages 60 and over—which is usually the lower line. GDP per capita in 2003 is measured in purchasing power parity chained dollars at 2000 prices.

Figure 2.D. GDP per capita in the 2000's and Life Satisfaction
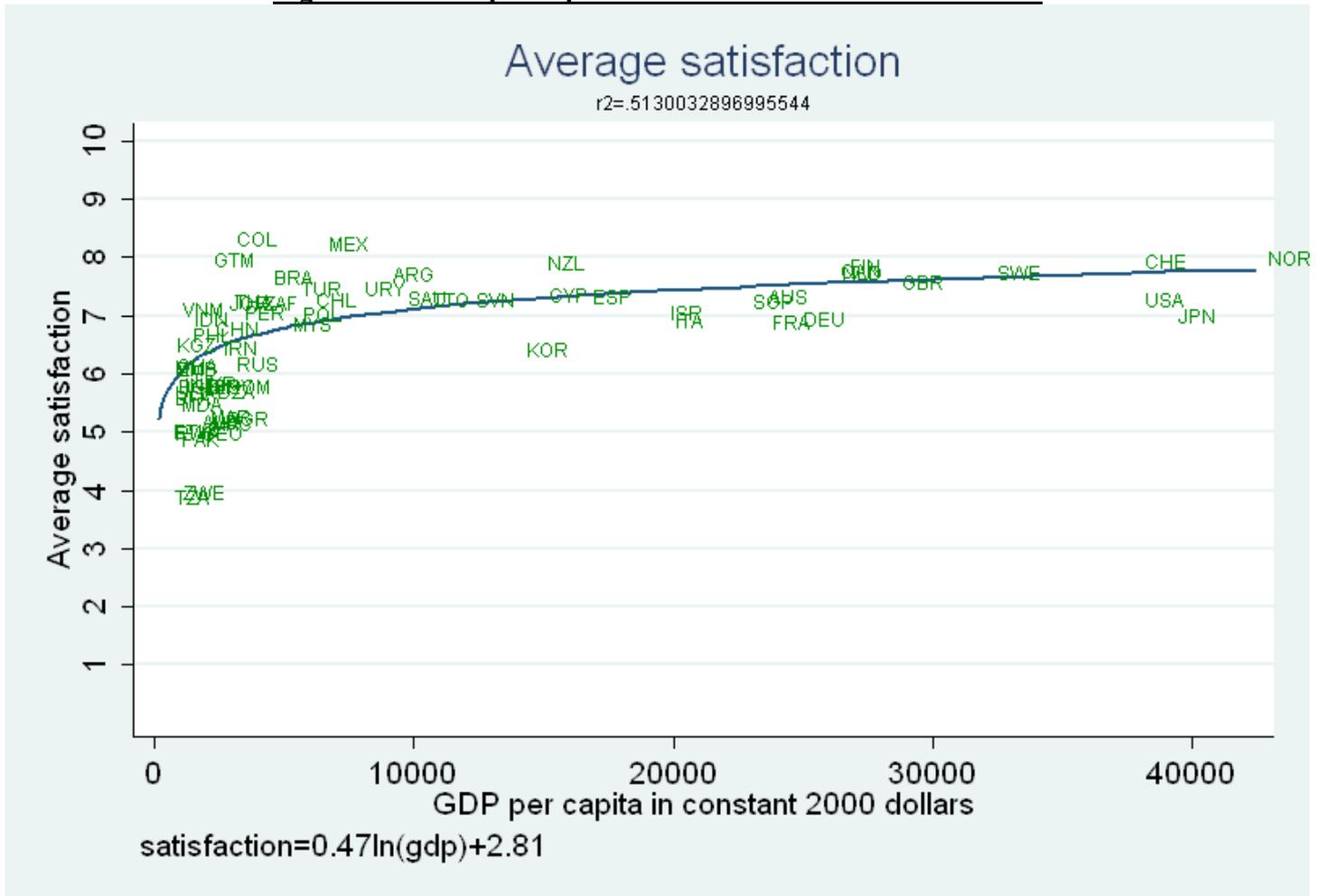
Source: WVS.
GDP and average satisfaction are calculated for the last available year of each country's survey (spanning from 2001 to 2008).

Figure 3.A The American paradox. Happiness and Real GDP per Capita, United States, 1972-2002
Taken from Easterlin and Angelescu (2007).
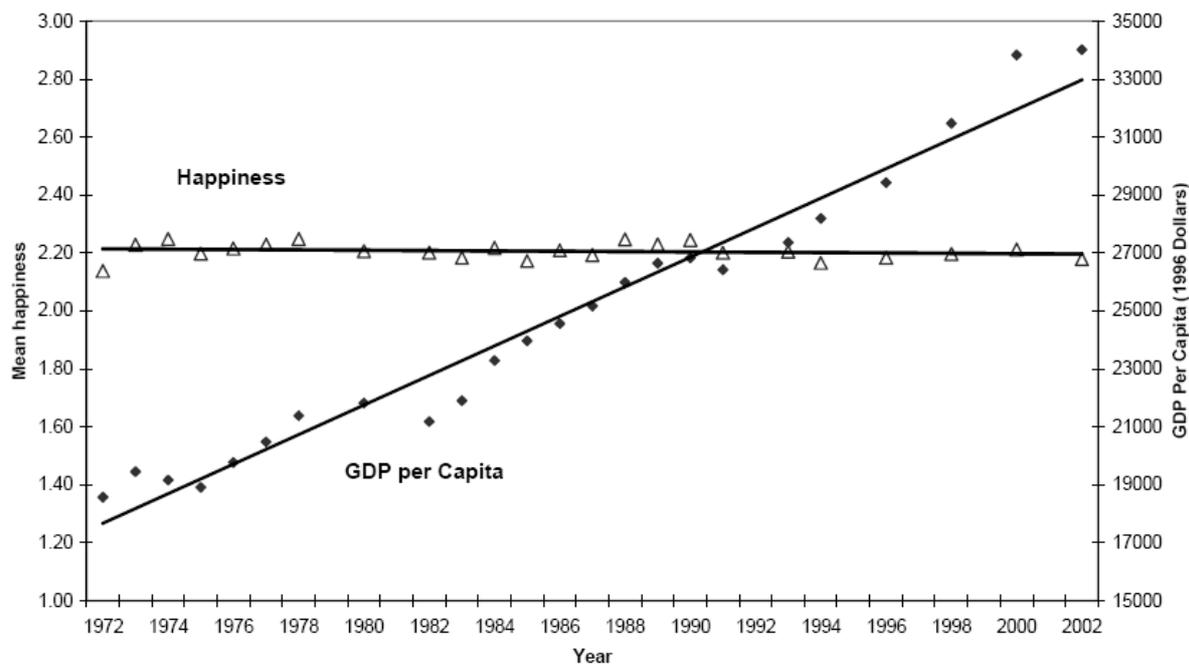
Figure 3.B Misleading cross-sections. Actual versus predicted happiness in Japan. 1958-1987.
Taken from Easterlin (2005).
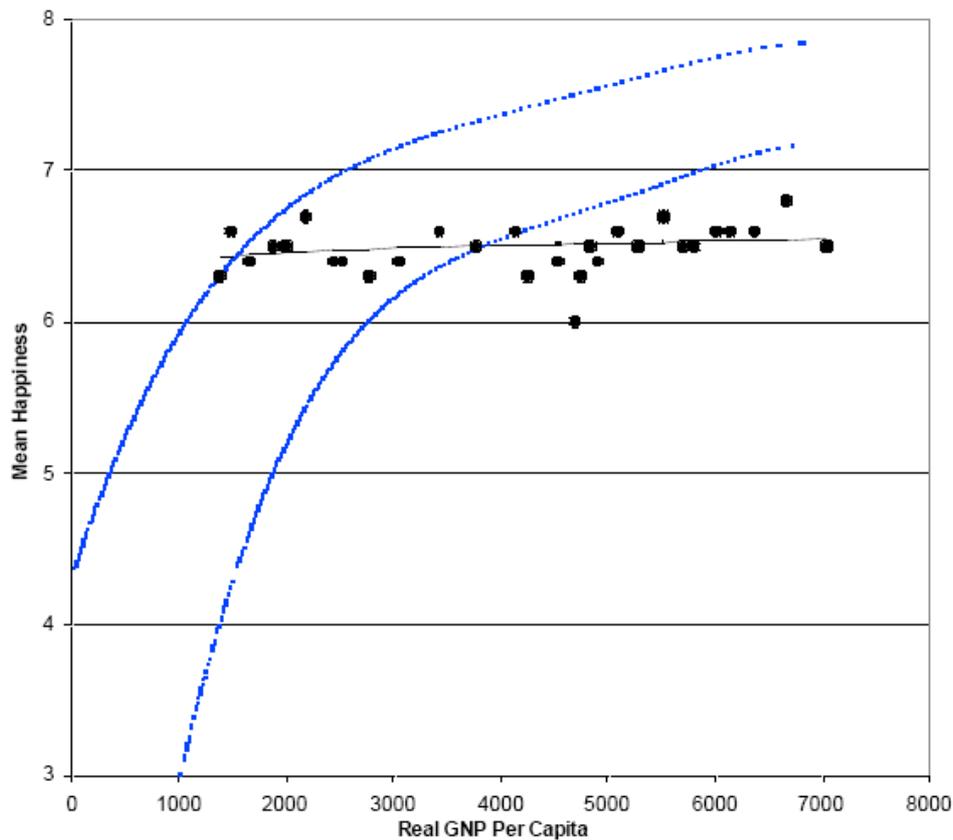
Figures 4.A to 4.E are taken from Inglehart et al. (2008, statistical appendix).

Figure 4.A. The Happiness Trend in India

mean happiness in India, 1975-2006
(1= not at all happy, 4=very happy)
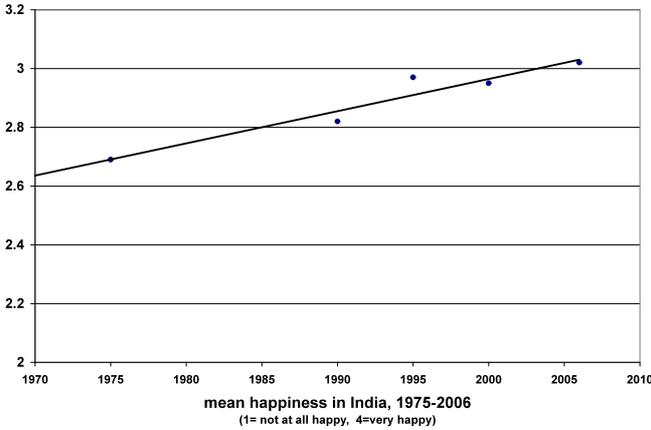
Figure 4.D. The Happiness Trend in South Africa

mean happiness in South Africa, 1981-2006
(1= not at all happy, 4=very happy)
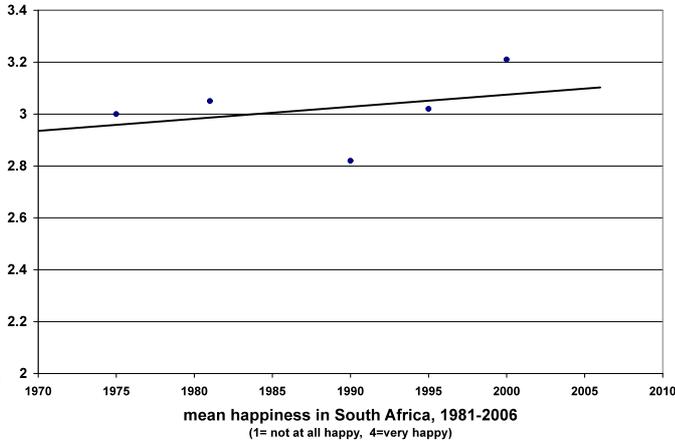
Figure 4.B. The Happiness Trend in Mexico

mean happiness in Mexico, 1975-2006
(1= not at all happy, 4=very happy)
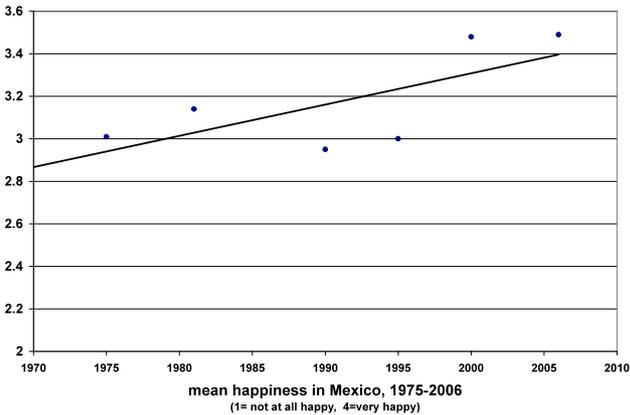
Figure 4.E. The Happiness Trend in China

mean happiness in China, 1990 - 2006
(1= not at all happy, 4=very happy)
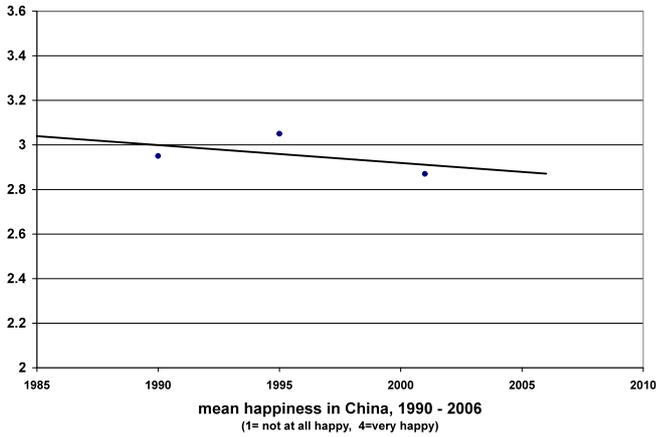
Figure 4.C. The Happiness Trend in Puerto Rico

mean happiness in Puerto Rico, 1963-2000
(1= not at all happy, 4=very happy)
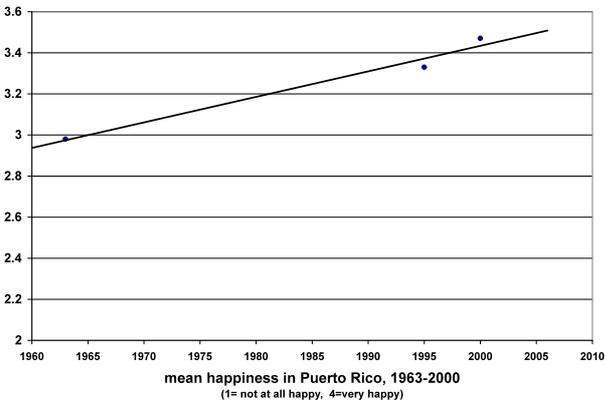
Figure 5.A Happiness and the Business Cycle.
Taken from Stenvenson and Wolfers (2008)

$$Happiness = 0.01 + 0.016*Output\ gap\ (se=0.005)$$
$$Correlation = 0.56$$
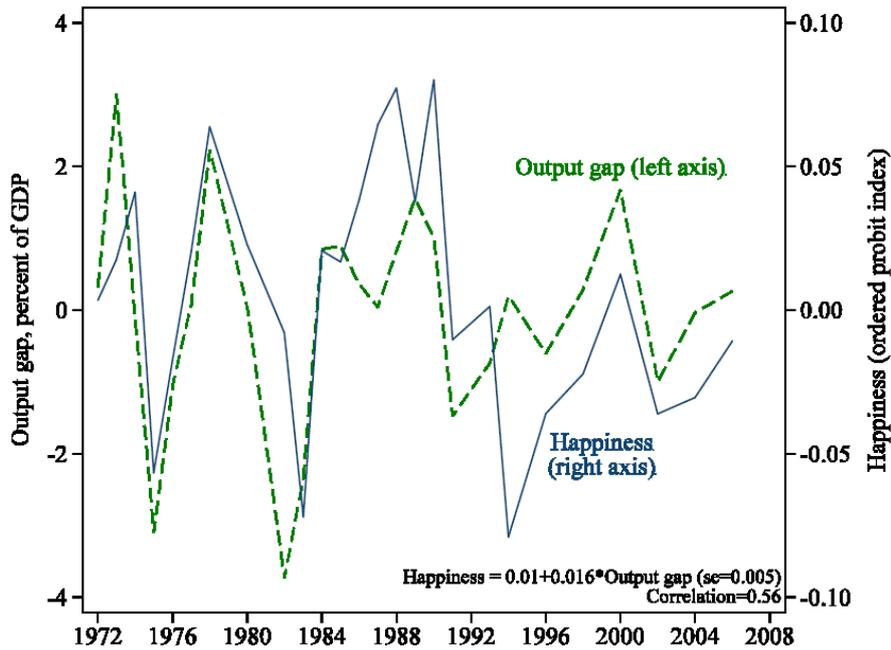
Sources: General Social Survey, 1972-2006; Bureau of Economic Analysis.
Notes: "Output gap" is the difference between real GDP per capita and its trend, estimated using a Hodrick-Prescott filter on annual data on the logarithm of real GDP per capita, with the smoothing parameter set to 6.25. Happiness data are aggregated into a happiness index by running an ordered probit regression of happiness on year fixed effects. See figure 8 for wording of the question. See text for details of the sample.

Figure 5.B Happiness and Transition in Russia.
Taken from Guriev and Zhuravskaya
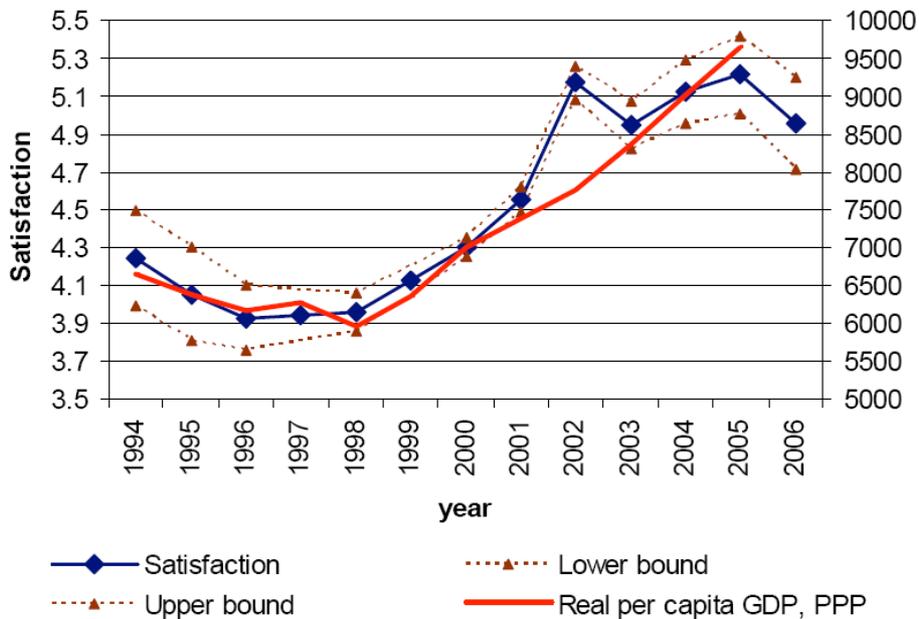
Left scale: Life satisfaction for an average individual from the panel regressions with person fixed effects and other usual controls (95% CI). Right scale: Real per capita GDP in PPP-adjusted 2000 US dollars. Source: For satisfaction, the Russian Longitudinal Monitoring Survey. For GDP per capita, the World Development Indicators data base.

Figure 5.C Happiness and Transition in several countries. Taken from Easterlin (2009)

Figure 1
Life Satisfaction c. 1990, 1995, and 1999, and Index of Real GDP, Annually 1986-1999[a]
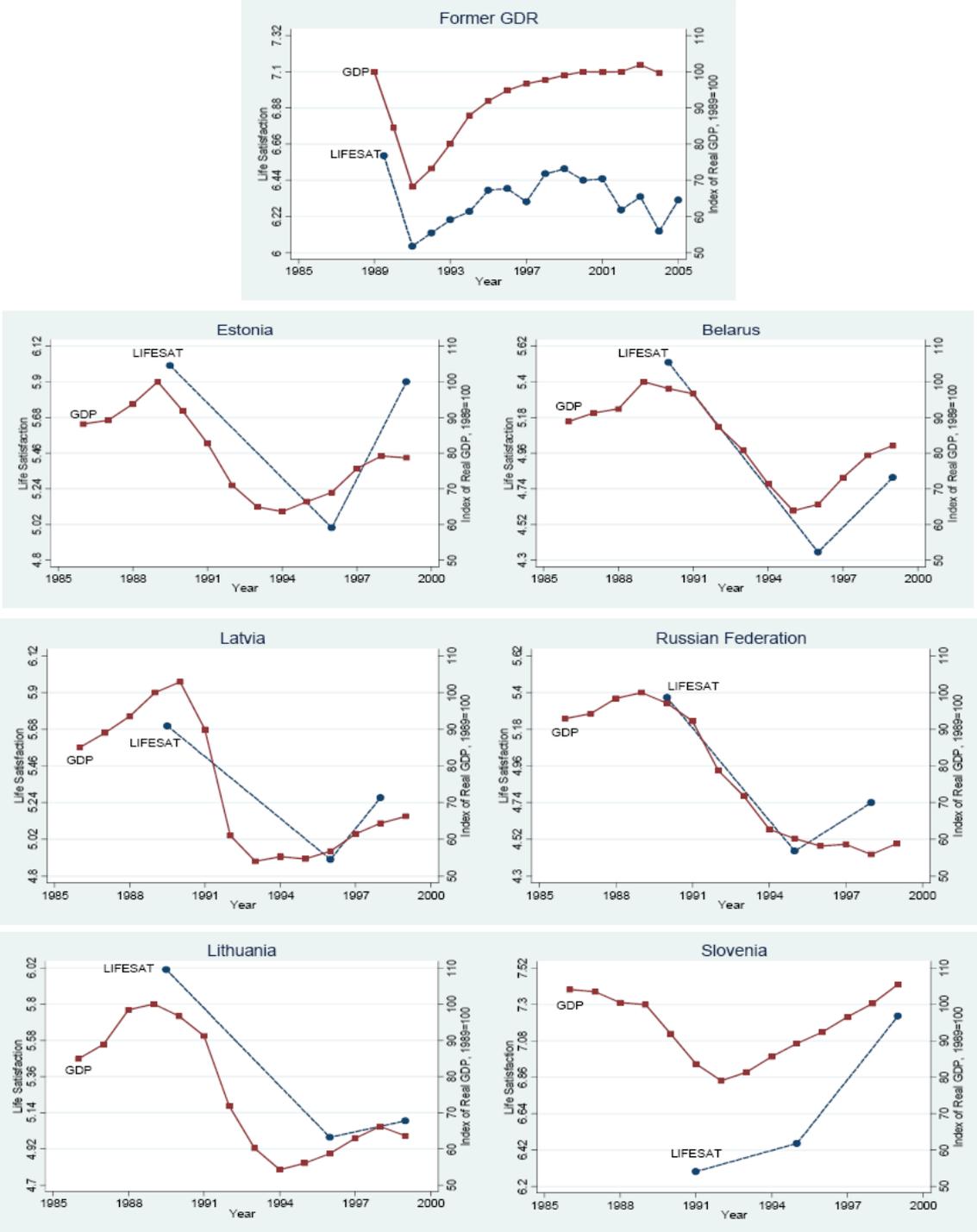
Source: Real GDP, Economic Commission for Europe, 2003, Appendix Table B-1. For Former GDR, GDP 2003 on is extrapolated from 2002 via real household income from GSOEP. Life satisfaction, Appendix Tables A-1, A-2.

[a] Former GDR, 1989-2005

Figure 7
Life Satisfaction, c. 1990 - 2005, and Index of Real GDP: Three Transition Countries
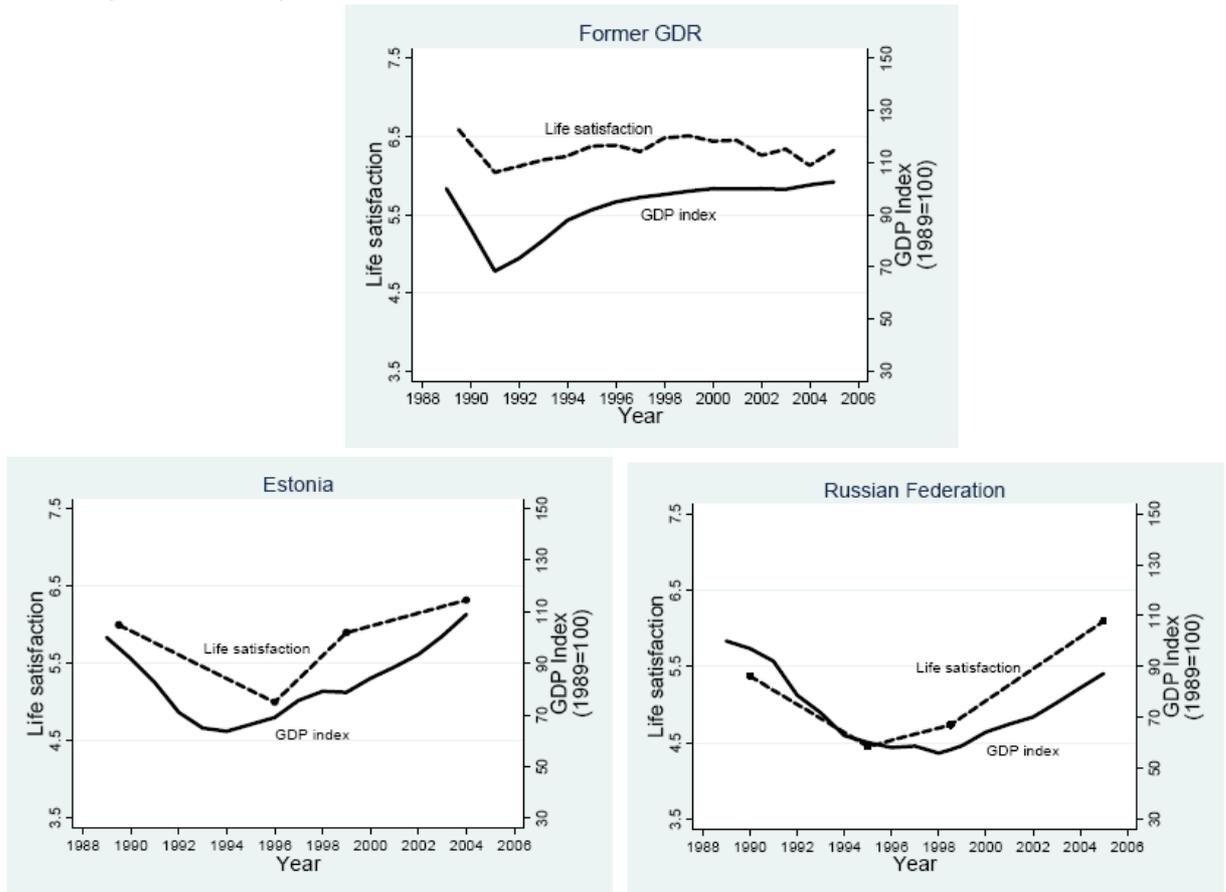
Source: Easterlin (2009 forthcoming).

Figure 6. GDP, Average and Standard Deviation of Happiness
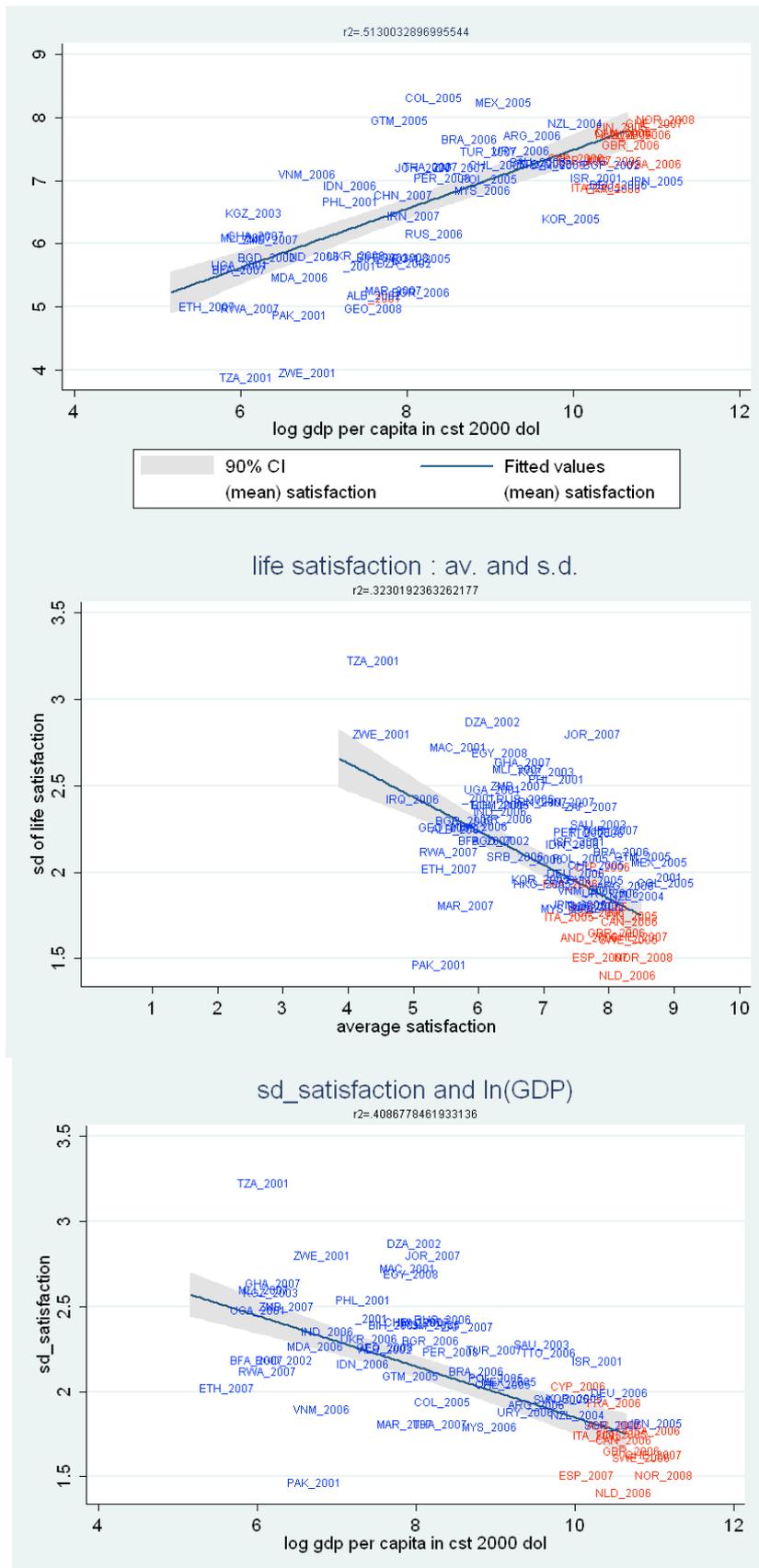
Source: World values Survey, 1981-2007.

Figure 7. The take-off in life expectancy
Taken from Easterlin and Angelescu (2007).

Figure II B-3. Life expectancy in England and Wales since the sixteenth century
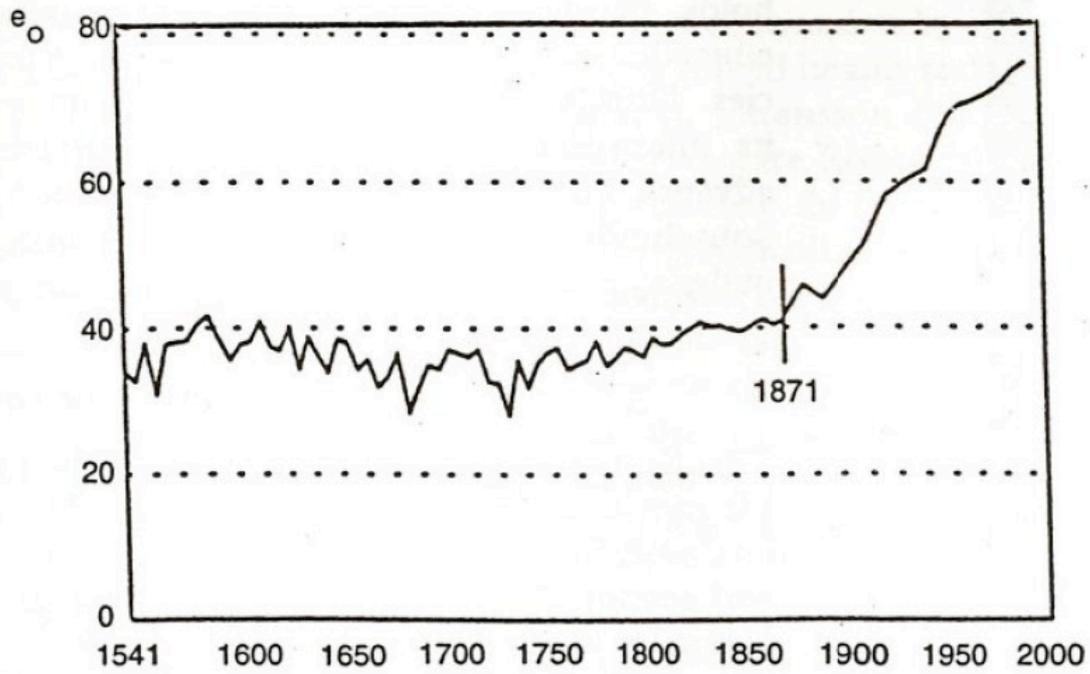
Source: 1541-1871, Wrigley and Schofield (1981, p. 230); 1871 to 1945-47, Keyfitz and Flieger (1968, pp.36-9); 1950-55 to 1990-95, United Nations (1995).

Figure 8. The Evolution of Cardinal versus Ordinal Quality of Life Indices over a Period of Growth

1) Asia:
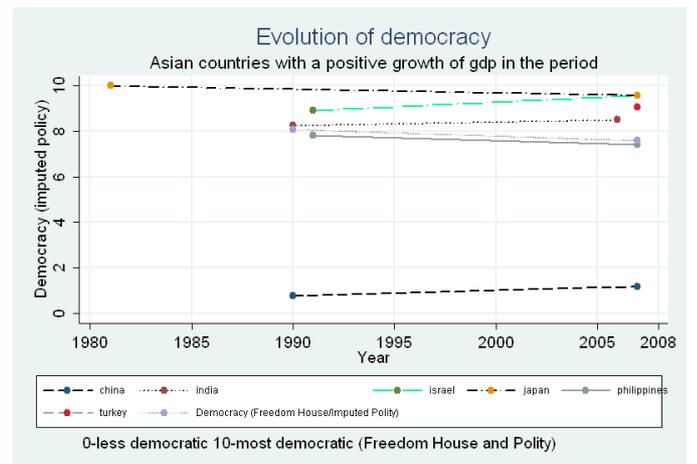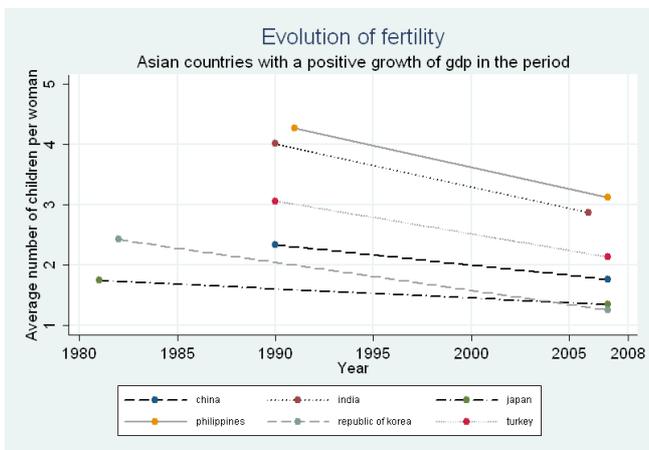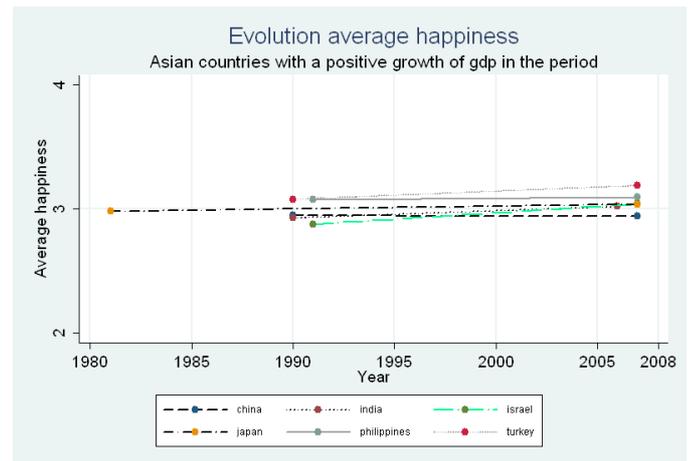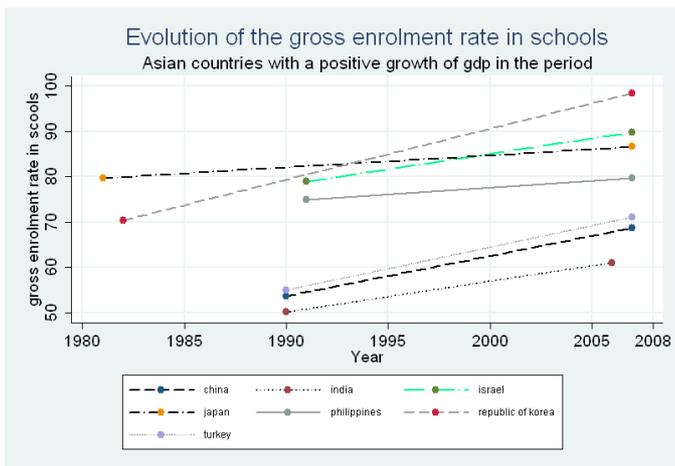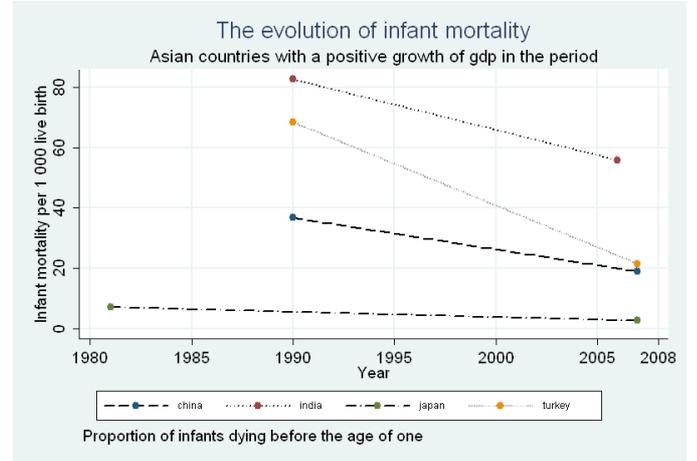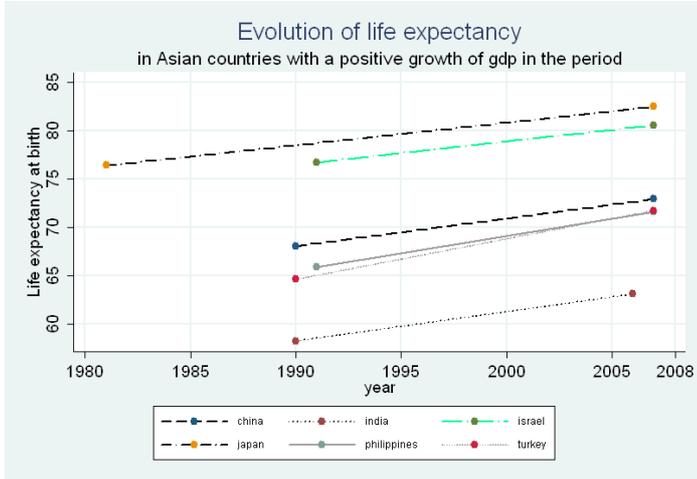
Source: WVS (1981-2008)

2) Western countries:

Evolution of life expectancy
in Western countries with a positive growth of gdp in the period

Evolution average happiness
Western countries with a positive growth of gdp in the period

The evolution of infant mortality
Western countries with a positive growth of gdp in the period

Proportion of infants dying before the age of one

Evolution of political rights
Western countries with a positive growth of gdp in the period

7-less political rights 1-more political rights (Freedom House)

Evolution of the gross enrolment rate in schools
Western countries with a positive growth of gdp in the period

Evolution of democracy
Western countries with a positive growth of gdp in the period

0-less democratic 10-most democratic (Freedom House and Polity)

Evolution of trust
Western countries with a positive growth of gdp in the period

Source: WVS (1981-2008)

Figure 8. GDP Growth, Inequality and Happiness.
Taken from Layard, Mayraz and Nickell (2010, p142)
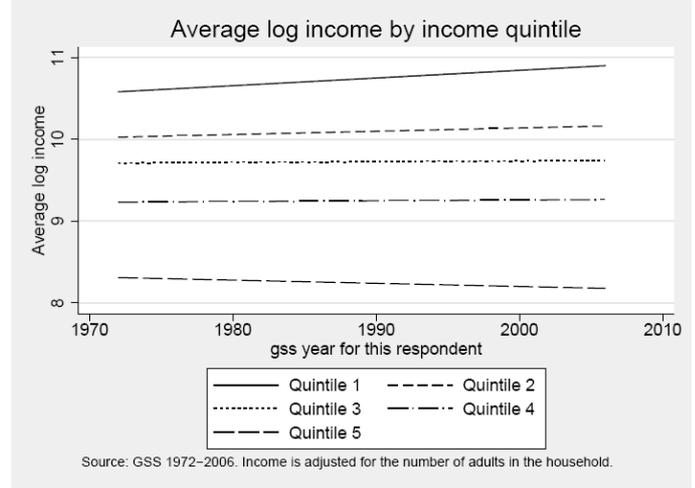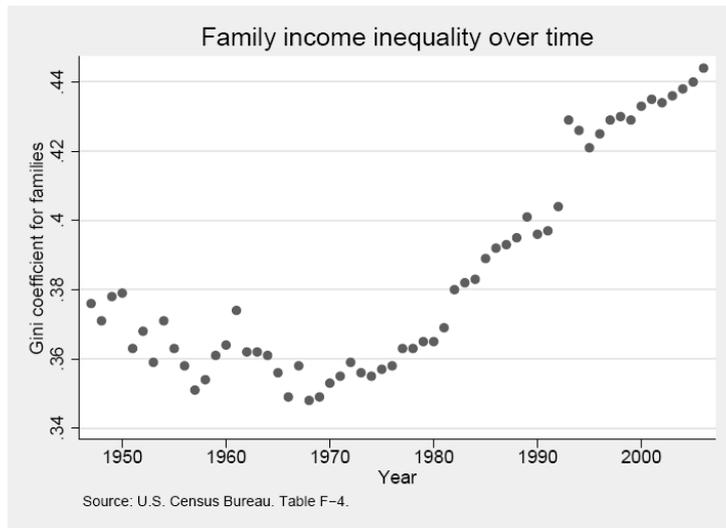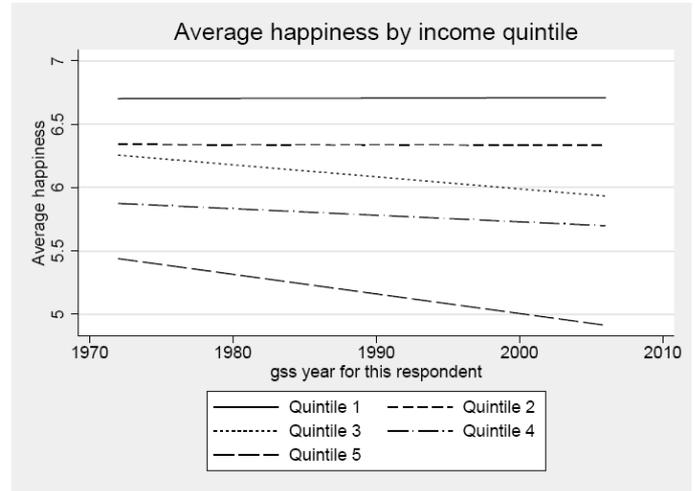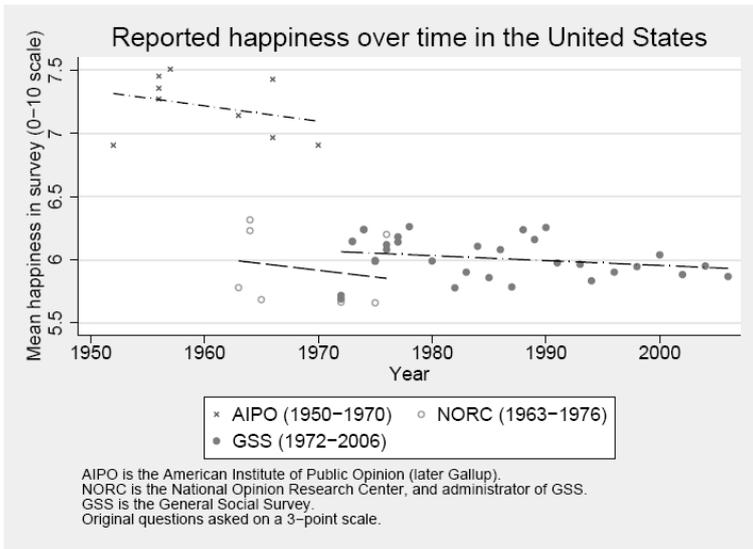
Figure 4: Average happiness and average log real income in the United States by income quintile (from high to low). Source: General Social Survey, 1972-2006. Income is adjusted for the number of adults in the household.

APPENDIX

Table A1. Descriptive statistics of the variables taken from the WVS database

Variable	Nb countries	Nb years	Mean value	Std. Dev.	Min	Max	Source	First year	Last year
Average happiness	105	368	3.020239	.2697393	2.064234	3.577646	WVS	1981	2008
Average satisfaction	98	251	6.700283	1.06626	3.725051	8.493724	WVS	1981	2008
Nb of children per woman	96	342	2.116977	1.024418	1.08	6.791	WDI	1981	2008
Democracy (Freedom House/ Polity)	96	337	8.242583	2.337498	0	10	Freedom house	1981	2008
Political Rights	96	337	2.151335	1.653623	1	7	Freedom house	1981	2008
GDP growth per year	97	348	3.118207	4.819254	-14.5738	46.5	WDI	1981	2008
GDP per capita in constant 2000 $	97	348	11536.26	11138.87	175.0063	43420.52	WDI	1981	2008
Growth of GDP per capita	97	348	2.322539	4.640043	-14.5738	42.85782	WDI	1981	2008
GDP per capita in PPP	96	347	16508.83	11547.53	236.9362	57034.16	WDI	1981	2008
Gross enrolment rate	95	331	78.87084	12.89512	32.76789	100	HDI	1981	2007
Gini index	49	91	39.81776	11.80366	19.4	60.24	WDI	1989	2007
Life expectancy at birth	96	344	72.8859	6.796048	42.187	82.50707	WDI	1981	2008
Infant mortality rate per 1000	74	254	14.22527	19.52275	2.5	120	WDI	1981	2008
Average trust	98	251	.295465	.1513425	.0281442	.742126	WVS	1981	2008

Variable description

All variables are available in the World Data Bank: http://www.worldvaluessurvey.org/

Happiness: "If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole ?" (the question and different degrees of answers are the same in the three studies) : 1. Not at all happy; 2. Not very happy; 3. Fairly happy; 4. Very happy.

Life satisfaction: "*All things considered, how satisfied are you with your life as a whole these days?"*. Proposed answers from 1(dissatisfied) to 10 (very satisfied).

Trust: "*Generally speaking, would yon say that most people can be trusted or that you cant be too careful in dealing with people?"*, Proposed answers: 1. *most people can be trusted;* 0 . *Can't be too careful.*

Fertility rate : represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children in accordance with current age-specific fertility rates.

GDP growth: Annual percentage growth rate of GDP at market prices based on constant local currency. Aggregates are based on constant 2000 U.S. dollars.

GDP per capita in 2000 dollars: GDP per capita is gross domestic product divided by midyear population. Data are in constant U.S. dollars.

Gini index : Gini index measures the extent to which the distribution of income (or, in some cases, consumption expenditure) among individuals or households within an economy deviates from a perfectly equal distribution. A Lorenz curve plots the cumulative percentages of total income received against the cumulative number of recipients, starting with the poorest individual or household. The Gini index measures the area between the Lorenz curve and a hypothetical line of absolute equality, expressed as a percentage of the maximum area under the line. Thus a Gini index of 0 represents perfect equality, while an index of 100 implies perfect inequality.

Life expectancy at birth: Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.

Infant mortality rate (per 1000 under one): the number of infants dying before reaching one year of age, per 1,000 live births in a given year.

Gross Enrolment Rate in %: enrolment in primary, second and tertiary education.

Adult Literacy rate in %.

Freedom house (http://www.freedomhouse.org): Political rights that enable people to participate freely in the political process, including the right to vote freely for distinct alternatives in legitimate elections, compete for public office, join political parties and organizations, and elect representatives who have a decisive impact on public policies and are

accountable to the electorate. The specific list of rights considered varies over the years. Countries are graded between 1 (most free) and 7 (least free).

Democracy: Average of Freedom House and Polity, transformed to a scale 0-10, where 0 is least democratic and 10 most democratic. **(**http://www.govindicators.org).

A.2 THE INCOME – HAPPINESS NEXUS: SOURCES AND ESTIMATES, SUMMARY.

SUBJECTIVE WELL-BEING MEASURES

- **Happiness** : *If you were to consider your life in general these days, how happy or unhappy would you say you are, on the whole. Not at all happy; not very happy; Fairly happy, Very happy.*

- **Life satisfaction** : *All things considered, how satisfied are you with your life as a whole these days ? 1 (dissatisfied) – 10 (very satisfied).*

1) THE STATIC RELATIONSHIP BETWEEN INDIVIDUAL INCOME AND INDIVIDUAL HAPPINESS

Consensus: higher income → higher happiness. In a country, richer individuals are happier than poorer ones.

Nationally representative household surveys. Individual level analysis. Within-country cross-section estimates.

Western developed countries

German Socio-Economic Panel (GSOEP), British Household Panel Survey (BHPS), Swiss household panel, Australian household survey (HILDA), General Social Survey (America), Japanese household survey, Netherlands, Denmark, etc.

European Values Survey (EVS), European Social Survey (ESS), Eurobarometer.

Transition countries

Albania, Bulgaria, Latvia, Romania Russia, Estonia, Lithuania, Hungary, Belarus, Poland, Ukraine, etc.

Life in Transition Survey (LITS, 2006), European Social Survey, European values Survey.

Asian household surveys

China, India, Shanghai

African and Middle-East national household surveys

Argentina, Brazil, Chile, Ethiopia, Mexico, Mexico, Nigeria, Peru, South Korea, South-Africa (SALDRU), Tanzania, Turkey, Venezuela

International surveys

World Values Survey (WVS, 1981- 2008, 5 waves, 105 countries).

International Social Survey Program (ISSP, 101 countries)

Gallup World Poll (2006, 105 countries).

Latino Barometer (18 countries)

European Social Survey (25 countries)

European values Survey

2) THE DYNAMIC RELATIONSHIP BETWEEN INDIVIDUAL INCOME AND INDIVIDUAL HAPPINESS

Within country estimates. Individual level panel data analysis.

Consensus: higher income → higher happiness. Individuals become happier as they grow richer.

Individual Panel Data in Developed Countries

GSOEP, BHPS, HILDA, Netherlands, Denmark

Individual Panel data in LDC

RLMS (Russia), ULMS (Ukraine), Peru, LSMS (Tadjikistan)

3) THE STATIC RELATIONSHIP BETWEEN NATIONAL INCOME AND AVERAGE HAPPINESS

Aggregate measures, cross-country estimates.

Consensus: higher income → higher happiness. Individuals living in richer countries are happier than citizens of poorer countries.

4) THE DYNAMIC RELATIONSHIP BETWEEN NATIONAL INCOME AND AVERAGE HAPPINESS

Aggregate measures, cross-country estimates.

No consensus. Divergent findings.

→ Income growth does not increase happiness over time

- o Easterlin (2005a), Easterlin and Sawangfa (2005, 2009), Easterlin and Angelescu (2007), Easterlin (2009)
- o Layard; Brockmann, Delhey, Welzel, Yuan (2009)

→ Income growth does increase happiness over time

- o Stevenson and Wolfers (2008)
- o Deaton (2008) Gallup (2006)
- o Helliwell (2002)
- o Blanchflower (2008)

→ Income growth does increase happiness over time but not always and weakly

- o Hagerty and Veenhoven (2000, 2003, 2006), WVS (positive and statistically significant coefficient, but not in all countries).
- o Inglehart, Peterson and Welzel (2008): WVS, BHPS, GSS (positive and statistically significant coefficient, but not in all countries), Kenny (2005), idem.
- o Layard, Mayraz and Nickell (2010) (positive coefficient but not always statistically significant).
- o Oswald (1997) (O+) in GSS and Eurobarometer survey series, positive coefficient but not always statistically significant.
- o Di Tella and MacCulloch (2008): positive coefficient but low statistical significance.