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HAPPINESS ADAPTATION TO INCOME BEYOND "BASIC NEEDS"

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ABSTRACT

We test for whether, once "basic needs" are satisfied, there is happiness adaptation to further gains in income using three data sets. Individual German Panel Data from 1985-2000, and data on the well-being of over 600,000 people in a panel of European countries from 1975-2002, shows different patterns of adaptation to income across the rich and poor. We find evidence that for wealthy Germans, and for the rich half of European nations, higher levels of per capita income don't buy greater happiness. The reason appears to be adaptation. However even for the rich half of European nations such habituation may take over 5 years so the happiness gains that they experience, whilst not permanent, can still be relatively long-lasting. Finally we study a cross section of nations in 2005 from the World Gallup Poll and find that the past 45 years of economic growth (from 1960-2005) in the rich half of nations has not brought happiness gains above those that were already in place once the 1960s standard of living had been achieved. However in the poorest half of nations we cannot reject the null hypothesis that the happiness gains they have experienced from the past 45 years of growth have been the same as the gains that they experienced from growth prior to the 1960s.

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I. Introduction

In a 1974 paper, Richard Easterlin found that for the United States, a measure of subjective well-being (like happiness) did not increase appreciably in the post-World War II period, in spite of large increases in per capita income. This finding was observed for other periods and other nations in Europe and even Japan, and has become a "stylized fact" of happiness research. And those researchers who do detect positive trends in some of the happiness time-series have to face up to the fact that these tend to be small.[1] This stylized finding is consistent with happiness adaptation to income in the long-run in these nations. A problem with this general conclusion however, is that we do not have a long time-series of happiness in a poor country. But if a flat time-series was present in poor nations it should also lead to no positive relationship between happiness and income across nations, given that most international income differences are long established.

But the evidence is not supportive of this conjecture. People in poor countries, like Nigeria, report lower levels of happiness than in rich countries, like the US (e.g., Veenhoven, 1991, Diener *et al* 1995, Inglehart, 1997, and Deaton, 2008). Figure 1 shows the pattern reported in Inglehart and Klingemann (2000). Such work suggests that a positive cross-country relationship should be a second "stylized fact" of happiness research.[2] The explanation presented in Veenhoven (1991) is that more income improves happiness only until basic needs are met. Beyond the point where there is enough income so that people are no longer hungry and absolute poverty has been eliminated, income does not matter for happiness. That is, once wealthy countries have satisfied basic needs, they are on the *"'flat of the curve', with additional income buying little if any extra happiness"* (see Clark, Frijters, and Shields, 2008).

Fitting these two "facts" (flat time-series and positive slope in the cross-section of countries) has become an important challenge for happiness researchers.[3] Note that, within the "second stylized fact" (the cross sectional finding) there is at least some evidence that the relationship is not linear

[1] See, for example, the evidence in Hagerty and Veenhoven (2003) and the references cited therein, Stevenson and Wolfers (2008) as well as the (small) trends in European nations reported by Di Tella, MacCulloch and Oswald (2003).
[2] Easterlin (2005) has also concluded that *"a positive happiness-income relationship typically turns up in international comparisons"*. Note the large role played by countries with low levels of political freedom in Figure 1 of Inglehart and Klingemann (2000). Blanchflower and Oswald (2008) show that happiness and hypertension are correlated across countries.
[3] Another interesting finding is the positive association between happiness and income in a cross-section of people within a country.

(although the extent of this is not agreed upon). More recent evidence in favor of the proposition that income depends on (the logarithm of) the level of income across countries is due to Deaton (2008) using the latest Gallup World Poll.

The purpose of this paper is to find out whether higher income has long-lasting (historical) impacts on happiness or whether these effects dissipate over time. We use two different strategies. In the first, we focus on panels (of countries and of people). We estimate regressions of the form, $Happiness^g = (\alpha_0 \log y^g + \alpha_{-1} \log y_{-1}^g + .. \alpha_{-T}^g \log y_{-T}^g) + e^g$, where there are "*T*" lags of (each individual's or country's) income, *y*. The possibility that, once basic needs are satisfied, income has no long-lasting effects on happiness, can be tested by partitioning our data by wealth level, *g*=poor or *g*=rich. If the levels and lags of income sum to a positive number for the "poor" and to zero for the "rich" then we will be able to explain both the observed time-series and cross-sectional patterns between happiness and income. (For a continuum of wealth levels, we just interact each of the levels and lags of income with each level of wealth). The individual panel data from the German Socioeconomic panel shows that home-owners, who are presumably wealthier than renters, adapt fully to the effects of higher income (after around seven years) whereas renters do not. We also find evidence consistent with full adaptation to (the logarithm of) GDP per capita in the wealthy countries within Europe, though not in the poor. However even in the wealthy developed countries adaptation may take at least 5 years so the happiness gains that they experience from higher income levels, whilst not permanent, can still be very long-lasting.

In the second approach, we focus on the cross-section of countries included in the 2005 Gallup World Poll. Using the well being question from 2005, but data for GDP per capita for 1960-2005 we can evaluate different theories connecting income to well-being. For example, we can estimate the correlation between happiness (measured by the Cantril 'Ladder of Life' question) and the growth rate, conditional on initial levels of GDP per capita. We find that the past 45 years of economic growth (from 1960 to 2005) in the rich nations of the world has 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 have 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 only the absolute level of (the logarithm of) income that matters for happiness.

A small literature in economics has emerged following Easterlin's paper.[4] Of particular interest given our focus on adaptation effects are the models of Pollak (1970), Wathieu (2004), Rayo and Becker (2003), *inter alia*. Although habituation has been studied in the context of physical disability, marriage, divorce, unemployment and other life circumstances, our interest is primarily on habituation to income changes. An influential paper in psychology is Brickman, Coates and Janoff-Bullman (1978), who showed that individuals who had won between $50,000 and $1,000,000 at the lottery the previous year reported comparable life satisfaction levels as those that didn't.[5] Frederick and Loewenstein (1999) and Diener and Diener (2002) present reviews of the evidence available, gathered largely by psychologists. Recent studies of habituation using happiness data include Clark (1999) on how (job) satisfaction adapts to changes in wages, Di Tella *et al* (2003), who estimate the effect of income lags on happiness in a panel of 12 OECD countries and Gardner and Oswald (2001) who use data on a panel of individuals that receive windfalls (by winning a lottery or receiving an inheritance). Di Tella, Haisken-De New and MacCulloch (2005) regress life satisfaction on current and several lags of personal income (and on current and several lags of status) and find that full adaptation occurs to income after about four years (but not to higher levels of status). Our explanation is related to the work on satisfaction with income (rather than with life) by van Praag and Kapteyn (1973) showing that income aspirations rise in proportion to income (sometimes called "preference drift"). Indeed, van de Stadt, Kapteyn and van de Geer (1985) find that the hypothesis of one-for-one changes in income aspirations and income cannot be rejected (see also van Praag and Ferrer-i-Carbonell, 2004 and Stutzer, 2003). More recently, Easterlin (2003) argues that family aspirations do not change as marital status and family size change but that material aspirations increase commensurately with household wealth.

Two caveats are in order. We do not devote too much space to the development of a careful definition of "basic needs", although we do think that an exact empirical definition would be of considerable value, in particular one that clarifies the extent to which basic needs are socially

[4] See Frey and Stutzer (2002), Graham and Pettinato (2002), Senik (2005) and Clark *et al* (2008) for reviews as well as Helliwell (2002) for a broader discussion. An important precursor of the happiness literature is work on the individual welfare function of income (e.g, van Praag and Kapteyn, 1973).

[5] This is also sometimes called the "hedonic treadmill" hypothesis or the "setpoint" model (see Costa *et al*, 1987 and Diener et al, 2005). Easterlin (2003) stresses that the evidence (based on small samples) is consistent only with incomplete adaptation. Using the German Panel, Clark *et al* (2003a, b) study adaptation to labor and life events (unemployment, layoffs, marriage and divorce). See also Clark (2003) and Lucas et al (2003a).

determined. Instead our approach is to split the sample across relatively rich and poor sub-samples in each of the data sets that we use. Given the quality of wealth data we use broad categories, such as top and bottom half of the samples using within sample income data or home ownership status. Of course, with the sample split this way, it is imprecise to say that the bottom half has not met their "basic needs" (for more on this see, Di Tella and MacCulloch, 2008b). The second caveat is that we will focus on three different data sets and the well-being questions available in each of them vary somewhat. The precise wording of the questions is important because it is possible that they tap into different emotions. For economists who think these emotions aggregate up into a summary measure of utility, this is less problematic (although for evidence that the measures available for contentment and happiness correlate differently with macroeconomic variables and age, see Di Tella and MacCulloch, 2008a, and Deaton, 2008; see also Konow and Early, 1999, for evidence on material motivation using well-being data).

The rest of the paper is organized as follows. Section II discusses the data and empirical strategy used to quantify the behavioral effects (at least in the sub-samples where they are found to exist). Section III presents the results. The final section concludes.

II. Data and Empirical Strategy

Each of the data sets, and the empirical strategy that we use, is described in the following sections.

a. Individual-Level Panel Data: the German Socio-Economic Panel, 1984-2000

We use the German Socio-economic Panel, a longitudinal data set begun in 1984 that randomly samples households living in the western states of the Federal Republic of Germany. In 1990 the eastern states were added to provide a representative sample of the (reunited) Germany, although in this paper we concentrate only in the West German sample. The survey contains the following 'happiness' question: *"In conclusion, we would like to ask you about your satisfaction with your life in general, please answer according to the following scale: 0 means completely dissatisfied and 10 means completely satisfied: How satisfied are you with your life, all things considered?*". The possible answers appear on a scale showing the numbers "0 1 2 … 9 10". The words *"Completely dissatisfied"* correspond to "0" and *"Completely satisfied"* correspond to "10". The second key variable that we use is a measure of each individual's income, *y=Personal Income*. There are several different income-related questions in the

survey that are relevant to this measurement. We use 'Real Household Post-Government Income' from the Cross-National Equivalent File. Table A shows the summary statistics and the Appendix provides a richer description of the German Socio-economic Panel's sampling methods.

We run a series of regression specifications that are based on the following general form:

$$Happiness_{i,t}{}^{g} = (\alpha_0{}^{g} \log y_{i,t}{}^{g} + \alpha_{-1}{}^{g} \log y_{i,t-1}{}^{g} + \ .. \ \alpha_{-T}{}^{g} \log y_{i,t-T}{}^{g}) + \delta^{g} \underline{X}_{i,t}{}^{g} + f_i{}^{g} + \eta_t{}^{g} + e_{i,t}{}^{g} \qquad (1)$$

where lags on (the logarithm of) income, $\log y_{it}^{g}$ are used to explain (current) life satisfaction levels, $Happiness_{i,t}^{g}$, of individual, i, at year, t.[6] The level of income is measured by the logarithm of real (net) household income from all sources during the current year. Consequently the equation measures the degree to which people's happiness adapts to income over time. We also include an unobserved individual and year fixed effect, $f_i{}^{g}$ and $\eta_t{}^{g}$, respectively. The maximum number of lags used is T=7 and the equation is estimated for different groups, g, of people. The (i.i.d.) random noise term is $e_{i,t}^{g}$.

The vector $\underline{X}_{i,t}^{g}$ consists of individual characteristics: *Marital state* (a set of dummies depending on whether the respondent is married, divorced, separated or widowed), *Employment state* (a set of dummies depending on whether the respondent is retired, at school, at home, in the military, self-employed or a public servant) and *Education* (a set of dummies measuring their level of high school achievement, vocational training or college degree). Data on all of these variables exist for a sample of 4,987 West Germans from 1985-2000. Estimation is done using an Ordinary Least Squares (fixed-effects) model although similar conclusions emerge when a more flexible cardinalization is used (see Ferrer-i-Carbonell and Frijters, 2004, for a discussion and the results in Kohler, Behrman and Skytte, 2005; see also the approach in Di Tella and MacCulloch, 2005).

The formal hypothesis that we use to test for adaptation effects are:

$$H_o: \ \sum_{i=1}^{T} \alpha_{-i}^{g} = 0 \quad \text{versus} \quad H_1: \ \sum_{i=1}^{T} \alpha_{-i}^{g} \neq 0 \qquad (2)$$

[6] See Di Tella and MacCulloch (2008b) for a more detailed explanation.

If individuals adapt to the effects of the higher income levels, then we would expect the sum of the lagged income coefficients (above) to be negative.

The formal hypothesis that we use to test for long-run income effects is:

$$H_o: \sum_{i=0}^{T} \alpha_i^g = 0 \quad \text{versus} \quad H_1: \sum_{i=0}^{T} \alpha_i^g \neq 0 \qquad (3)$$

If there are long-lasting effects of income on happiness, then we would expect the sum of the present and lagged income coefficients (above) to be positive.

The two groups, *g*, of particular interest to us are the wealthy and the poor. Due to the scarcity of wealth data, the proxy that we use in the German Socio-Economic Panel is whether or not the individual owns their own home. The survey question that was used to generate this variable asks: *"Are you a tenant or an owner? 1. Tenant or 2. Owner"*. That is, *g*=Tenant or *g*=Owner, depending on the person's response.

b. Pooled Cross Country-Time Series Data: The Euro-barometer Cumulative Surveys, 1975-2002

We also use pooled cross-country time series data from the Euro-Barometer Survey Series. These surveys interview a random sample of Europeans during the 28-year period, 1975-2002, and ask a series of socio-economic questions. The main question of interest asks: *"On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?"* (The small *"Don't know"* and *"No answer"* categories are not studied here). Data are available on this question for 605,020 people in 16 countries for whom a complete set of data on a large number of personal characteristics is also available. Table B shows the summary statistics and the Appendix provides a richer description of the Euro-barometer's sampling methods.

We run a series of regression specifications that are based on the following general form:

$$Happiness_{i,c,t}{}^g = (\beta_0{}^g \log y_{c,t}{}^g + \beta_1{}^g \log y_{c,t-1}{}^g + .. \beta_T{}^g \log y_{c,t-T}{}^g) + \delta^g \underline{Z}_{i,c,t}{}^g + k_c{}^g + YEAR_t{}^g + \phi_t{}^g + \varepsilon_{i,c,t}{}^g \qquad (4)$$

where lags on (the logarithm of) real *GDP per capita*, $y_{c,t}{}^g$, are used to explain the (current) life satisfaction level, $Happiness_{i,c,t}{}^g$, of individual, *i*, in country, *c*, and year, *t*. We also include an

unobserved country and year fixed effect, k_c^g, and ϕ_t^g, respectively. Finally $YEAR_c^g$ denotes a country-specific time trend. The maximum number of lags used is T=7 and the equation is estimated for different groups, g, of people. The (i.i.d.) random noise term is $\varepsilon_{i,c,t}^{\ g}$. The vector $\underline{Z}_{i,c,t}^{\ g}$ consists of individual characteristics: *Marital state* (a set of dummies depending on whether the respondent is married, divorced, separated or widowed), *Employment state* (a set of dummies depending on whether the respondent is retired, at school, at home, in the military, self-employed or a public servant) and *Education* (a set of dummies measuring the respondent's level of low, middle or higher education). Estimation is done using an Ordered Probit Model.

If individuals adapt to the effects of higher levels of GDP per capita, then we would expect the sum of the lagged income coefficients to be negative. The formal hypothesis test that we use is:

$$H_o: \sum_{i=1}^{T} \beta_{-i}^{g} = 0 \quad \text{versus} \quad H_1: \sum_{i=1}^{T} \beta_{-i}^{g} \neq 0 \tag{5}$$

If there are long-lasting effects of income on happiness, then we would expect the sum of the present and lagged income coefficients to be positive. The formal hypothesis test that we use is:

$$H_o: \sum_{i=0}^{T} \beta_{-i}^{g} = 0 \quad \text{versus} \quad H_1: \sum_{i=0}^{T} \beta_{-i}^{g} \neq 0 \tag{6}$$

The two groups of particular interest to us are the wealthy and the poor. As we do not have wealth data for individuals in the Euro-barometer Surveys, we use the initial level of GDP per capita at the start of the sample period in 1975 as a proxy for the average level of wealth for individuals in their respective country. We divide the sample into two halves. That is, g=Bottom half of individuals as ranked by their country's GDP per capita in 1975, or g=Top half of individual's as ranked by their country's GDP per capita in 1975.

c. Cross Country Data: The World Gallup Poll, 2005

The final test we use to identify whether higher levels of GDP per capita lead to long-lasting impacts on happiness, or whether these effects disappear over time once basic needs have been satisfied, uses cross-sectional data. This comes from the cross-country surveys of subjective well-

being in the 2005 Gallup World Poll, measured consistently across 132 countries. Similar questions were asked in all countries, and the survey contains data for each country that are nationally representative of people aged 15 and older (with sample size close to 1,000 in each country). The survey asks a variety of subjective well-being questions. The one we use is the Cantril "ladder of life" question that asks *"Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. Suppose we say that the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?"*. We use country averages of the well- being question. Table C shows the summary statistics and the Appendix provides a richer description of the Gallup World Poll's sampling methods.

We can indirectly test for the importance of adaptation to income versus basic needs using the Gallup Poll by regressing well-being 'now' on historical past levels of GDP almost half a century ago - and also the growth in income over the past half century. That way we can see whether the latter has bought extra happiness.[7] First note that:

$$\log GDP_{2005} = \log\left\{GDP_T(1+\frac{\Delta GDP_{2005-T}}{GDP_T})\right\} \tag{7}$$

where GDP_T is GDP per capita in year, T, and $\Delta GDP_{2005\text{-}T}=GDP_{2005}-GDP_T$. We then estimate the following OLS, setting T=1960:

$$Happiness^{g}_{2005,c} = \alpha \log GDP^{g}_{1960,c} + \beta \log(1+GDPGrowthRate^{g}_{2005-1960,c}) + \varepsilon^{g}_{c} \tag{8}$$

where $Happiness_{2005,c}{}^{g}$ is the average happiness (on the 0-10 scale) across individuals living in country, c, in year, 2005. We use measures of real GDP per capita (in 2000 US dollars) from the World Development Indicators as our proxy for average income in each country.[8] The *GDP Growth Rate*$_{2005\text{-}1960}$ is defined as $\Delta GDP_{2005\text{-}1960}/GDP_{1960}$. The (i.i.d.) random noise term is ε^{g}_{c} and the equation is estimated for different groups, g, of countries.

[7] Deaton (2008) finds a linear relationship between current subjective well-being and the current logarithm of GDP per capita in these data but, conditional on *current* GDP per capita, a negative relationship between happiness and recent economic growth.

[8] An alternative is to locate Purchasing Power Parity measures from the World Bank back to 1960 for our sample.

We test the null hypothesis that current happiness depends solely on the logarithm of the current level of GDP per capita (i.e., the Deaton, 2008, hypothesis):

$$H_0: \ \alpha = \beta \qquad \text{versus} \qquad H_1: \ \alpha \neq \beta \tag{9}$$

Rejection of the above null hypothesis in favour of $\alpha > \beta$ would imply that people may not be experiencing happiness gains from the more recent growth of their living standards (since the 1960s) much above those happiness gains that were already in place in 1960. In this case, basic needs would already have been (partially) satisfied in 1960 so that further increases in income since the 1960s may have been subject to adaptation.

We divide the sample into two halves, *g*=poor and *g*=rich countries, to check whether this is the case for the rich countries (i.e., $\alpha > \beta$ for *g*=rich) whereas for the poor countries people may still be trying to satisfy basic needs (i.e., $\alpha = \beta$ for *g*=poor).[9]

III. Main Results: Adaptation to Income and Basic Needs

a. Individual-Level Panel Data: German Socio-Economic Panel

The first column in Table 1 presents a benchmark estimate of the effect of the level of the logarithm of current income on the current level of life satisfaction in Germany, together with individual and year fixed effects, as well as a set of personal characteristics. That is, it estimates equation (1) but restricting all lagged coefficients, a_{-t}, to be zero. The coefficient is positive and highly significant – suggesting that the log of income is a significant determinant of happiness. However the size of the effect is not large: a doubling of income would move one up just 0.15 units on the 0-10 happiness scale. Note that the summary statistics reported in Table A show that happiness has a total standard deviation equal to 1.67 (the between- equals 1.40 and the within- equals 1.05). Thus, a one standard deviation increase in log income accounts for 6.9% of a

[9] Since $\log GDP_{2005} = \left[\log GDP_{1960} (1 + \frac{\Delta GDP_{T-1960}}{GDP_{1960}})(1 + \frac{\Delta GDP_{2005-T}}{GDP_T}) \right]$ we can similarly test for the importance of initial income conditions and GDP growth rates across several different time periods by estimating the following regression: $Happiness_{2005,c} = \alpha \log GDP_{1960,c} + \beta \log(1 + \frac{\Delta GDP_{T-1960,c}}{GDP_{1960,c}}) + \chi \log(1 + \frac{\Delta GDP_{2005-T,c}}{GDP_{T,c}}) + \varepsilon_c$.

standard deviation increase in happiness (0.21*0.55/1.67).

In column (2) we add an arbitrary number of lags of each individual's income. To keep it general we include seven (but see the discussion below).[10] The coefficient on current income is still positive and significant. One measure of the amount of adaptation to income in the sample is captured by the sum of the coefficients on the lags (from one to seven). The sum is negative and an F-test shows that it is significant at the 1 per cent level, which allows us to reject the hypothesis of no adaptation (see equation 1 with T=7). The sum of the lagged coefficients is equal to -0.21 (i.e., 0.01-0.10-0.02-0.02+0.02-0.07-0.03). Consequently of the initial impact of income, 80.8% is lost over the ensuing seven years (i.e., 0.21/0.26) leaving a long run effect of 0.05. Put another way, although the current effect of income from this specification suggests that a rise in average real incomes of 12% (from 56,429 DM in 1986 to 63,042 DM in 2000) would have added 0.03 units onto happiness scores (i.e., 0.26*log(1.12)) adaptation effects reduce the size of the effect to only 0.01 units (i.e., 0.05*log(1.12)).

We are also not able to reject that adaptation to income after seven years of time is total. An F-test of whether the sum of all eight coefficients on income (i.e., current and seven lags) is equal to zero cannot be rejected at the 1 per cent level of significance.[11] Note that in Di Tella, Haisken-De New and MacCulloch (2005) where each individual's job status is also used as an explanatory variable, the period of time over which we cannot reject full adaptation reduces to four years.

Our approach allows us to provide estimates across different sub-groups.[12] For example, we can estimate and compare adaptation to income amongst the poor and the wealthy. As accurate wealth data are not easily available, we use whether a person is a tenant or a home-owner as a proxy for their wealth level. In column (3) the hypothesis that renters do not adapt to higher levels of (the

[10] The number of observations is dramatically affected by the long lag structure which requires a continuous time series that is only available for a subset of individuals (on average, we have 5.9 years of observations for each person, with a range from 1 to 15).

[11] These results on adaptation effects raise the question of why individuals spend so much effort in trying to improve their economic condition. Some have argued that humans do not predict utility very well. For example, Ubel, Jepson and Loewenstein (2001) study happiness predictions amongst people waiting for a kidney transplant. They find that those who receive one tend to report lower levels than they had predicted, whereas those who do not receive transplants report a higher quality of life that they had predicted. See also Gilbert *et al* (1998) for evidence concerning predictions amongst academics concerning being denied tenure, Loewenstein and Schkade (1999) for a review of the evidence and Loewenstein, O'Donoghue and Rabin (2003) and Frey and Stutzer (2003) for detailed discussions.

[12] For example, Diener, Lucas and Scollon (2005) argue that people adapt to different baselines, depending on their emotional dispositions. Luttmer (2004) and Stutzer and LaLive (2000) discuss the role of comparison groups.

logarithm of) income after seven years cannot be rejected at conventional levels. And the hypothesis that they *stop* enjoying higher happiness levels after seven years due to an increase in the level of their personal income *can* be rejected at the 2 per cent level. In other words, we can reject full adaptation to the effects of higher income for the tenants in our sample (i.e., the sum of the coefficients on the current and seven lags of income is 0.18 which the F-test shows is significant at the 2 per cent level). Turning to column (4) the hypothesis that home-owners do not adapt to higher levels of (the logarithm of) income after seven years can now be rejected at the 1% level. But the hypothesis that they stop enjoying higher happiness levels after seven years from an increase in the level of their personal income *cannot* (in contrast to the result for tenants) be rejected at conventional levels. In other words, we cannot reject the hypothesis of full adaptation to the effects of higher income for the homeowners in our sample – but we can for the tenants.

Causality

Part of the interest of the results in the above section (estimating differential adaptation across the rich and poor in a panel of individuals) is that the classic concern in this type of setting is that personality traits maybe driving the connection between happiness and income. One answer is to employ a panel of individuals, so that the inclusion of individual fixed effects can deal with the special case of fixed traits, such as ability, preferences, personality or family background.[13] However there is still the possibility that time-varying shocks to happiness may later change an individual's income.[14] Such shocks are closer to measures of happiness and positive affect than to those of overall life satisfaction and Cantril's "Ladder of Life" that we employ in this paper. Work by Lucas *et al* (1996) suggests that overall life satisfaction is not influenced by the affective state of the person at the time of the interview.[15]

Di Tella and MacCulloch (2008a) provide one rough estimate of the extent to which endogeneity

[13] See, for example, Clark and Oswald (1994) for a study showing that the unemployed are unhappier and discussing the implications for economic theory and Winkelmann and Winkelmann (1998) for an early study of unemployment with a panel strategy. An interesting variation on the fixed individual effects strategy has recently been explored in Kohler *et al* (2005) in their study of fertility and partnership decisions. Using happiness data on identical (monozygotic) twins, the authors are able to control for unobserved endowments (ranging from preferences and abilities arising in genetic dispositions to family history) that affect both happiness and fertility/marriage decisions.

[14] Gardner and Oswald (2001) have argued that we can use windfalls (winning the lottery and receiving an inheritance) as exogenous events.

[15] Using self-reports measured across 4 weeks and 2 years apart, life satisfaction measures never failed to meet Campbell and Fiske's (1959) criteria for discriminant validity from the affective components of subjective well-being. Using third-party reports on individual well-being (in which convergent validity coefficients could be expected to be lower) life satisfaction failed to meet the criterion only 4 times out of 32 comparisons with positive affect.

(due to time-varying shocks to happiness) is of sufficient economic magnitude to bias the results in this setting. They argue that a person may get depressed and start working less, causing them to lose their job and income. They then focus on those individuals who suffer an unemployment spell and compare the happiness response to an exogenous economic loss caused by one's plant closing down with a potentially endogenous one arising from being fired. The 2.7% of our sample whose plant was closed experienced a decline in happiness from 7.0 to 6.5 (i.e., 0.5 on average) and the 5.7% who got fired experienced a drop from 7.2 to 6.6 (i.e., 0.6 on average). The difference is insignificant suggesting that endogeneity due to time-varying shocks is not materially biasing our coefficients.

b. Pooled Cross Country-Time Series Data: The Euro-barometer Cumulative Surveys

The first column in Table 2 presents a benchmark estimate of the effect of the level of (the logarithm of) current income on the current level of life satisfaction for 16 nations in Europe over the past 28 years. The regression controls for a set of country and year effects, country-specific time trends, as well as a large set of personal characteristics. That is, it estimates equation (4) but restricts all lagged coefficients, β_{-n}, to be zero. The coefficient is positive and highly significant, suggesting that (the log of) *GDP per capita* may be an important determinant of the average level of happiness in countries.

In column (2) we add an arbitrary number of lags to the logarithm of each nation's *GDP per capita*. We experimented with different lag lengths, starting with same number (seven) as we used for the German Socio-economic Panel. In the present case, we are not able to reject full adaptation to higher levels of GDP per capita after 5 years. The coefficient on current income is still positive and significant. The degree of adaptation is summarized by the sum of the coefficients on the lags (from one to five). The sum is negative (=-1.07) and an F-test shows that it is significant at the 28 per cent level. Consequently of the initial impact of income, 83.6% is lost over the ensuing seven years (i.e., 1.07/1.28).

Given that the estimated long-run effect of income is positive (and insignificant) we can also focus exclusively on the size of the estimated effects and ask if they are enough to explain the observed gap between happiness and income levels in Europe. In other words, can we account for the observed flat happiness levels over long-run periods of time by people adapting to income, using

the estimated coefficients? First, we observe that the original 'Easterlin Paradox' referred to the fact that *"for the one time series studied, that for the United States since 1946 higher income was not systematically accompanied by greater happiness"* (see pg 118 of Easterlin, 1974). A more recent calculation has been done by Blanchflower and Oswald (2004) using the US General Social Surveys between 1972 and 1998. They note that there is a reasonable amount of stability in the proportion of people giving different well-being scores over this period. In terms of the Table 2 results, since (the logarithm of) *GDP per capita* increased by 0.46 between 1975 and 2002, the impact would have been to raise happiness by 0.59 units had no adaptation occurred (=1.28*0.46 using the coefficient on the current level of *GDP per capita* in column 2).[16] Put another way, 9 percentage points more people would say that they were either "*fairly satisfied*" or *"very satisfied with life"* in 2002 compared to 1975. However we would expect the increase to have been just 0.10 units after taking account of adaptation (i.e., 0.21*0.46 using the long-run effect calculated from column 2). Put another way, just 2 percentage points more people would say that they were either "*fairly satisfied*" or *"very satisfied"* with life after taking account of adaptation to income between 1975 and 2002. (The actual proportion fell 5 percentage points). These "back of the envelope" calculations suggest that our estimates of adaptation may be sufficiently large as to be able to explain why no long-run trend in happiness has been observable over several decades of time.

In columns (3) and (4) in Table 2 we divide the sample of 605,020 individuals living in 16 countries into two groups, the "poor" and "wealthy". The "poor" and "wealthy" are defined as being in the bottom and top half of the income distribution, respectively, based on their real *GDP per capita* ranking at the start of the sample period in 1975.[17] To illustrate, the life-satisfaction time series for Portugal is shown in Figure 2. In column (3) for the "poor" countries there is significant adaptation to higher levels of income. Of the initial effect of income on happiness, 62.1% is lost over the following five years (=1.13/1.82). However the remaining long-run effect is still positive and significant at the 1% level, suggesting that higher levels of *GDP per capita* may still have brought greater happiness in these nations. Column (4) shows the results for the "wealthy"

[16] The corresponding cut points between "*not at all satisfied*", "*not very satisfied*", "*fairly satisfied*" and "*very satisfied*" are equal to -3.0 units, -2.1units and -0.3 units, respectively.

[17] The "poor" individuals, based on the 1975 GDP per capita level in their country, live in Portugal, Spain, Greece, Ireland, Italy, West Germany or Belgium. The "rich" individuals, based on the 1975 GDP per capita level in their country, live in France, The Netherlands, Luxembourg, Denmark, the United Kingdom, Norway, Finland, Sweden or Austria. The sample is divided into "rich" and "poor" halves based on numbers of individuals (i.e., not numbers of countries) though the results are similar regardless of how the split is made.

countries. The sum of the lags is negative and significant at the 10% level. And the sum of the level and five lagged coefficients on *GDP per capita* is now negative. That is, after the initial positive (and significant) impact of higher levels of income on happiness, all of the effect is lost over the subsequent five years leaving us unable to reject the hypothesis that there is no long-run effect for the "wealthy" countries.

c. Cross Country Data: The World Gallup Poll

We now focus on cross-country evidence available from the Gallup World Poll 2005. We start by looking at the data at two points in time. Figure 3 shows how the average responses in each country to the "ladder-of-life" satisfaction question asked in 2005 (on a 0-10 scale) varies with *GDP per capita* in 2005. Figure 4 makes one change - to the date at which GDP is being measured. It shows how the average responses in each country to the "ladder-of-life" question in 2005 vary with *GDP per capita* measured in 1960 (i.e., forty five years before). Figures 5 and 6 show the same two relationships, but instead use the logarithm of *GDP per capita* measured in 2005 and 1960, respectively. If anything, the relationship looks tighter between 2005 "ladder-of-life" satisfaction and the logarithm of *1960 GDP per capita*, than with the logarithm of *2005 GDP per capita*.

Table 3 summarizes (and extends) these results by presenting a series of regression results. In column (1) the "ladder-of-life" question (averaged at the country level) is regressed on the logarithm of *GDP per capita* in 2005. The coefficient of 0.59 is significant at the 1 per cent level. It suggests that a 20% rise in GDP per capita would move a person up 0.11 units (on the 0-10 scale). In column (2) we restrict the sample to those countries that we also have measurements of their *GDP per capita* in 1960. The results are similar. In column (3) the "ladder-of-life" question is regressed on the logarithm of *GDP per capita* in 1960. The size of the coefficient rises to 0.73 (the difference with 0.62 in the previous column, is significant at the 10 per cent level).

What explains the results in columns (2) and (3)? Why should the relationship between the "ladder-of-life" satisfaction in 2005 and *GDP per capita* strengthen when we measure GDP in 1960, instead of concurrently with the Gallup World Poll survey question in 2005? The next three columns attempt to provide the answer.

We begin by estimating equation (8) in section II above. Under the null hypothesis that it is just

the logarithm of *GDP per capita* in 2005 that matters for "ladder-of-life" satisfaction in 2005, the coefficients on the two variables, *log(GDP per capita in 1960)* and *log(1+growth rate of GDP per capita 1960-2005)* should be equal. In column (4) the coefficient on the former is 0.67 (standard error=0.05) and on the latter is 0.45 (standard error=0.10). An F-test of equality of these two coefficients can be rejected at the 8 per cent level. The effect of rising living standards since 1960 appear to have been of lesser importance to explaining world happiness in 2005 than the initial level of *GDP per capita* almost half a century before.[18] In the next two columns we investigate this finding further by partitioning the Gallup sample into the "bottom half" and "top half" of the world income distribution (as defined by ranking each country's *GDP per capita* in 1960).

Column (5) in Table 3 focuses on the relatively poorer nations in our sample, and shows that the coefficients on both *log(GDP per capita in 1960)* and *log(1+growth rate of GDP per capita 1960-2005)* are both positive and significant at the 1 per cent level. Since they are not significantly different from one another (=0.42-0.54=-0.12; standard error=0.19) we cannot reject the null hypothesis that the happiness gains the "poor" nations have experienced from the past 45 years of economic growth have been the same as the happiness gains from growth prior to the 1960s. In other words, for these nations, it is still only the absolute *level* of the (logarithm) of income that matters for happiness. We next try a similar test in column (6) for the "rich" nations. Whereas the coefficient on *log(GDP per capita in 1960)* is positive and significant at the 1 per cent level, the coefficient on *log(1+growth rate of GDP per capita 1960-2005)* is now insignificant. The two coefficients are also significantly different from each another at the 1 per cent level (=0.79-0.13=0.66; standard error=0.20). In other words, the past 45 years of economic growth (from 1960 to 2005) in the richest half of the world has *not* brought happiness gains above those that were already in place once the 1960s standard of living had been achieved.

IV. Conclusions

We test for whether, once "basic needs" are satisfied, there is adaptation to further economic growth or, more precisely, if adaptation differs across rich and poor. The paper uses three data

[18] Note that the correlation between *GDP per capita in 1960* and the growth rate of *GDP per capita* between 1960 and 2005 is -0.01 (and insignificant) across the 76 countries in our data set. Thus there do not appear to be sufficiently strong "catch-up" effects (whereby poorer nations have been experiencing faster growth rates than the rich nations) to affect our estimates.

sets: individual panel data from Germany, a panel of countries with well being data on over 600,000 Europeans from 1975-2002 and cross-sectional evidence from the Gallup World Poll for large sample of countries in 2005. In the first part of the paper we find that home-owners in Germany (who are presumably wealthier than tenants) adapt fully to the effects of higher levels of the logarithm of income (after around seven years) whereas the tenants do not. We also find evidence consistent with full adaptation to the logarithm of GDP per capita in the wealthy, though not poor, countries within Europe. However even in the wealthy European countries full adaptation may take at least 5 years so the happiness gains that they experience from higher income levels, whilst not permanent, can still be long-lasting.

The final part of the paper starts by showing that although there is a strong correlation between happiness in 2005 and (the logarithm of) GDP per capita in 2005 using the Gallup World Poll cross-section, the correlation between 2005 happiness and (the logarithm of) 1960 GDP per capita is significantly higher. We investigate the reason for this puzzling result by partitioning the Gallup World Poll into the rich ½ and poor ½ of nations and find that the past 45 years of economic growth (from 1960 to 2005) in the rich nations has *not* brought happiness gains above those that were already in place once the 1960s standard of living had been achieved. However in the poorest ½ of countries we cannot reject the null hypothesis that the happiness gains they have experienced from the past 45 years of economic growth have been the *same* as the gains from growth prior to the 1960s. In other words, for these nations, it is the absolute level of the logarithm of current income that matters for happiness. Overall our evidence supports the view that once basic needs have been satisfied, there is full adaptation to further economic growth, although that process may take a long period of time, in excess of 5 years.

Table A
Summary Statistics for the German Socio-Economic Panel, 1985-2000.

Variable	Units	No. of Obs.	Mean	Std dev	Min.	Max.
Happiness	0-10 *scale*	Total=29,852	7.13	1.67	0	10
- between		n=4,987		1.40	0	10
- within		$\bar{t}$ =5.9		1.05	-0.86	13.91
Personal Income	1995 *Deutschmarks*	Total=29,852	61,974	32,958	150	724,403
- between		n=4,987		30,462	176	438,790
- within		$\bar{t}$ =5.9		13,377	-143,155	347,586
log(Personal income)	log*(Real Income)*	Total=29,852	10.90	0.55	5.01	13.49
- between		n=4,987		0.53	5.17	12.93
- within		$\bar{t}$ =5.9		0.24	6.46	13.62

Table B
Summary Statistics for the European Pooled Cross-Section Time Series: 1975-2002.

Variable	Units	No. of Obs.	Mean	Std dev	Min.	Max.
Happiness	1-4 *scale*	Total=605,02	3.07	0.28	1	4
- between		n=31,511		0.27	2.63	3.57
- within		$\bar{t}$ =19.2		0.08	2.84	3.29
GDP per capita	2000 *US $*	Total=307	19,012	6,913	6,424	48,655
- between		n=16		6,605	9,059	34,011
- within		$\bar{t}$ =19.2		3,466	6,050	33,656
log(GDP per capita)	Log*(Real Income)*	Total=307	9.79	0.35	8.77	10.79
- between		n=16		0.35	9.10	10.40
- within		$\bar{t}$ =19.2		0.17	9.34	10.37

Table C
Summary Statistics for the Gallup World Poll, 2006.

Variable	Units	No. of Obs.	Mean	Std dev	Min.	Max.
Cantril Ladder of Life	0-10 *scale*	76	5.60	1.25	3.24	8.00
GDP per capita in 1960	2000 *US $*	76	2909	3874	98	18,580
log (GDP per capita in 1960)	2000 *US $*	76	7.05	1.45	4.58	9.83
GDP per capita in 2005	2000 *US $*	76	9128	11,818	100	40,597
log (GDP per capita in 2005)	2000 *US $*	76	7.91	1.78	4.61	10.61
log (1+growth rate of GDP per cap 1960-2005)	2000 *US $*	76	0.86	0.73	-0.70	2.89

Note: All variable definitions are in the appendix.

Table 1
Happiness, West Germany, 1985-2000: Adaptation to Income

Dependent Variable: *Happiness (Life Satisfaction 0-10)*	*All* (1)	(2)	*Wealth Proxy* *Tenant* (3)	*Owner* (4)
Current level of real income				
log (Personal Income in year *t*)	**0.21** **(0.02)**	**0.26** **(0.03)**	**0.27** **(0.05)**	**0.25** **(0.05)**
Past levels of real income				
log (Personal Income *t*-1)		0.01 (0.04)	0.07 (0.06)	-0.06 (0.06)
log (Personal Income *t*-2)		**-0.10** **(0.04)**	**-0.16** **(0.06)**	-0.03 (0.06)
log (Personal Income *t*-3)		-0.02 (0.04)	0.08 (0.06)	**-0.13** **(0.06)**
log (Personal Income *t*-4)		-0.02 (0.04)	-0.08 (0.06)	0.05 (0.06)
log (Personal Income *t*-5)		0.02 (0.04)	**0.12** **(0.06)**	-0.12* (0.07)
log (Personal Income *t*-6)		-0.07* (0.04)	**-0.15** **(0.06)**	0.05 (0.06)
log (Personal Income *t*-7)		-0.03 (0.03)	0.03 (0.05)	**-0.12** **(0.05)**
Results of F tests				
Σ Income Lags		**-0.21**	-0.09	**-0.18**
Prob *(Σ Lags* > F*)*		0	0.28	0
Σ Current & Lagged Income		0.05	**0.18**	0.07
Prob *(Σ Current & Lagged Income*>F*)*		0.33	0.02	0.26
R^2 **overall**	0.03	0.03	0.04	0.01

Note: [1] All regressions are robust OLS and include individual and year fixed effects. Starred tests are significant at the 10 percent level. Tests in bold face are significant at the 5 percent level. Total no. of observations is 29,852, individuals is 4,987 and mean years is 6.0 for col. (1); 29,852 observations, 4,987 individuals and 6.0 mean years for col. (2); 14,951 observations, 2,603 individuals and 5.7 mean years for col. (3); 14,901 observations, 2,384 individuals and 6.3 mean years for col. (4) [2] Dependent variable is the individual responses to the question: *"Please answer according to the following scale: 0 means completely dissatisfied and 10 means completely satisfied: How satisfied are you with your life, all things considered?". Personal Income* is real household net income. [3] *Wealth* is proxied by whether you own your own house or have been renting during the sample period. All regressions include controls for employment status, personal income, education and marital status.

Table 2
Happiness, 16 European Countries, 1975-2002: Adaptation to Income

Dependent Variable: *Happiness (Life Satisfaction 1-4)*	*All Countries*		*Wealth Proxy*	
			Bottom half: 1975 GDP	*Top half: 1975 GDP*
	(1)	(2)	(3)	(4)
Current level of real income				
log (GDP per capita *t*)	**0.65**	**1.28**	**1.82**	**1.35**
	(0.52)	**(0.40)**	**(0.50)**	**(0.54)**
Past levels of real income				
log (GDP per capita *t*-1)		0.29	0.63	-0.77
		(0.70)	(0.81)	(0.79)
log (GDP per capita *t*-2)		**-0.92**	**-1.66**	-0.06
		(0.44)	**(0.46)**	(0.44)
log (GDP per capita *t*-3)		-0.61	-0.79	-0.46
		(0.60)	(0.72)	(0.44)
log (GDP per capita *t*-4)		0.55	**1.82**	-0.002
		(0.48)	**(0.36)**	(0.47)
log (GDP per capita *t*-5)		-0.38	-1.12*	-0.24
		(0.32)	(0.61)	(0.41)
Results of F tests				
Σ Income Lags		-1.07	**-1.13**	-1.53*
Prob *(Σ Lags* > F*)*		0.28	0.0	0.1
Σ Current & Lagged Income		0.21	**0.69**	-0.18
Prob *(Σ Current & Lagged Income*>F*)*		0.31	0	0.56
R^2 **overall**	0.09	0.09	0.06	0.09

Note: [1] All regressions are ordered probits and include controls for age, sex, employment status, personal income, education and marital status at the micro level, and for unemployment and inflation rates at the macro level. A complete set of country and year fixed effects is also included, as well as country-specific time trends. Starred tests are significant at the 10 percent level. Tests in bold face are significant at the 5 percent level. Total no. of observations is 605,020 individuals for col. (1), 605,020 individuals for col. (2), 323,815 observations for col. (3) and 281,205 observations for col. (4). [2] Dependent variable is the individual responses to the Euro-Barometer Survey question that reads: "*On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?".* Accordingly, four ordered categories were created. *GDP per capita* is real Gross Domestic Product per capita in 2000 US dollars. [3] *Wealth* is proxied by whether an individual is in the bottom or top half of the income distribution, ranked on the basis of GDP per capita in their nation 1975.

Table 3
Cantril "Ladder of Life" in 2005 versus Levels and Long Run Changes in GDP, 1960-2005: The Role of Basic Needs versus Adaptation.

Dependent Variable: *Happiness (Cantril Ladder of Life)*	*All Countries*				Wealth Proxy *Bottom half: 1960 GDP*	Wealth Proxy *Top half: 1960 GDP*
	(1)	(2)	(3)	(4)	(5)	(6)
Current level of real income						
log (GDP per capita in 2005)	**0.59 (0.03)**	**0.62 (0.04)**				
log (GDP per capita in 1960)			**0.73 (0.05)**	**0.67 (0.05)**	**0.42 (0.13)**	**0.79 (0.10)**
Past levels of real income growth						
log (1+growth rate of GDP per cap 1960-2005)				**0.45 (0.10)**	**0.54 (0.14)**	0.13 (0.17)
Results of F tests						
Prob *(GDP in 1960 = Growth of GDP 1960-2005)*				0.08*	0.52	0
R-squared	0.60	0.61	0.67	0.60	0.41	0.60
Number of observations	121	76	76	76	38	38

Note: [1] All estimations are robust OLS. Starred tests are significant at the 10 percent level. Tests in bold face are significant at the 5 percent level. [2] Dependent variable is the country average of the individual responses to a question that asks people to imagine an eleven-rung ladder where the bottom (0) represents *"the worst possible life for you"* and the top (10) represents *"the best possible life for you."* Respondents are then asked to report *"on which step of the ladder do you feel you personally stand at the present time"* (see the Gallup World Poll, 2005). *GDP per capita* is measured in constant US dollars (2000 values). [3] Wealth: *Bottom half in 1960* is a country in the bottom half of the World Income Distribution in 1960. *Top half in 1960* is a country in the top half of the World Income Distribution in 1960.

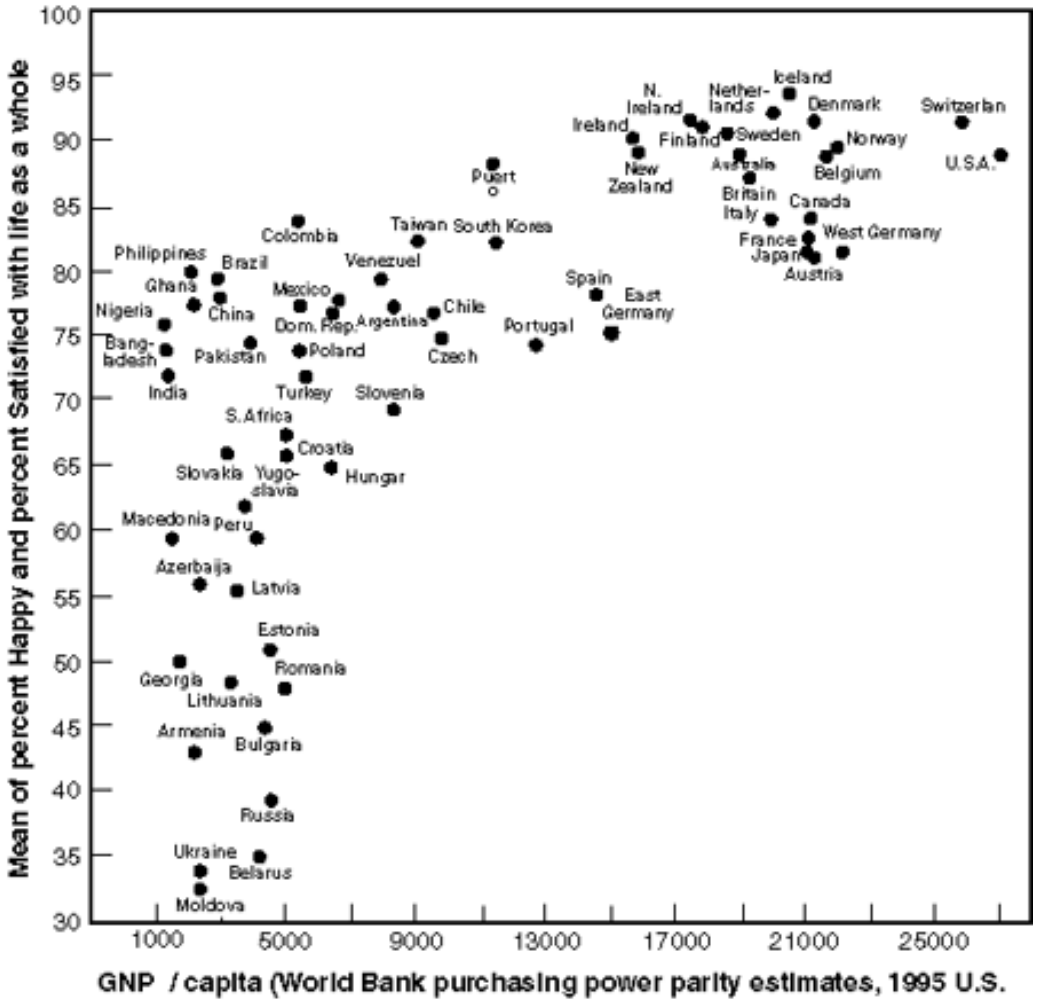

Figure 1:
The Cross-Section of Subjective well-being by level of economic development.
World Values Surveys; GNP/capita estimates from World Bank.
Source: Inglehart and Klingemann, 'Genes, Culture and Happiness', 2000.

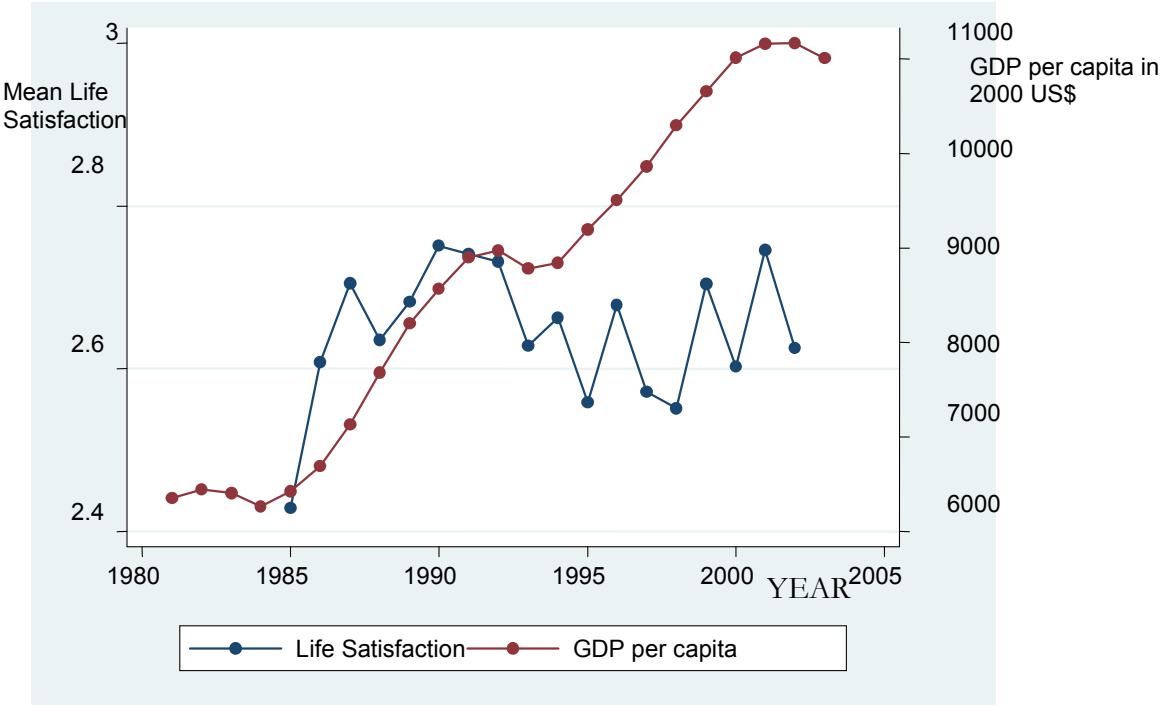

Figure 2:
Portugal's income rose from $6,424 in 1985 to $11,008 in 2003 (values are in 2000 US $)

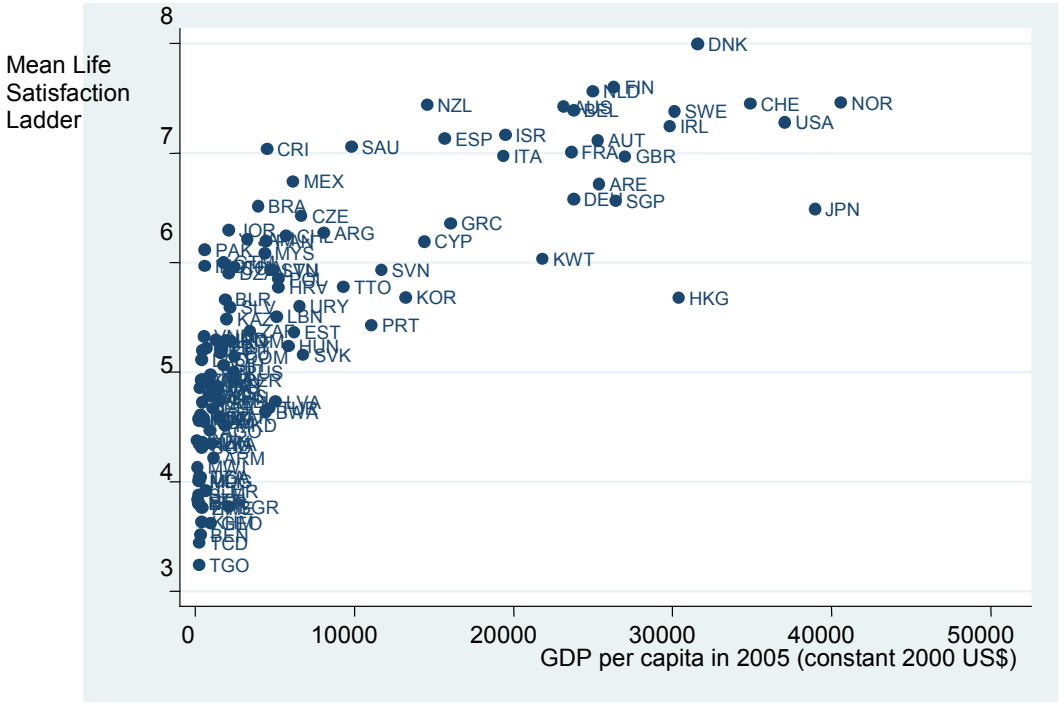

Figure 3:
The Cross-Section from the Gallup Poll: Happiness and GDP per capita, both measured in 2005

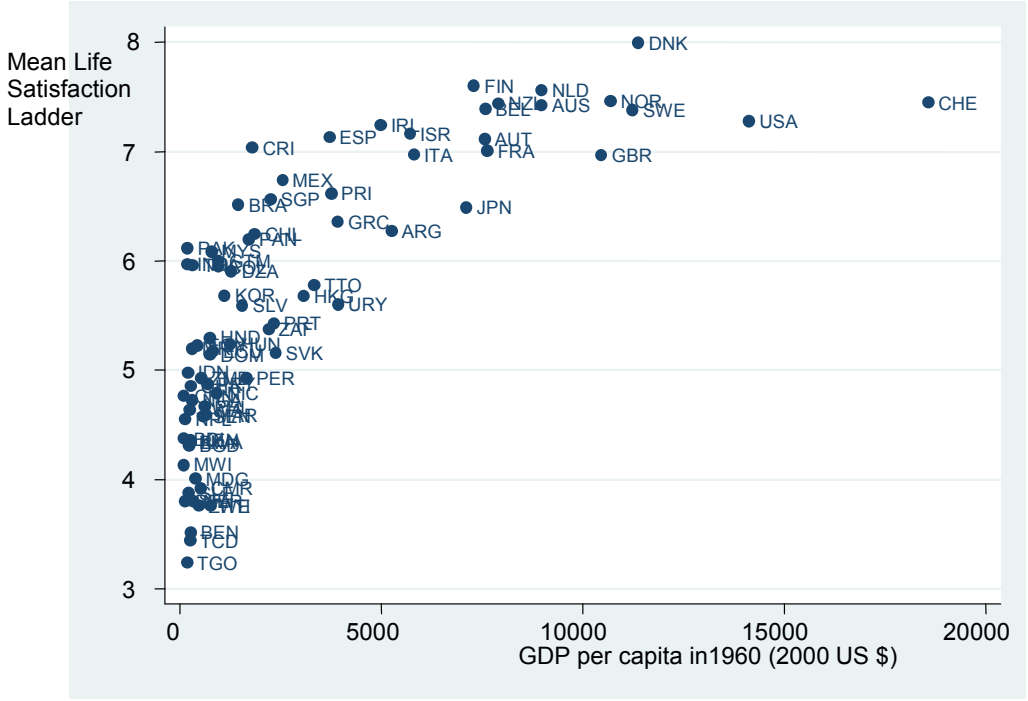

Figure 4:
The Cross-Section from the Gallup Poll: Happiness in 2005 versus Real GDP per Capita in 1960

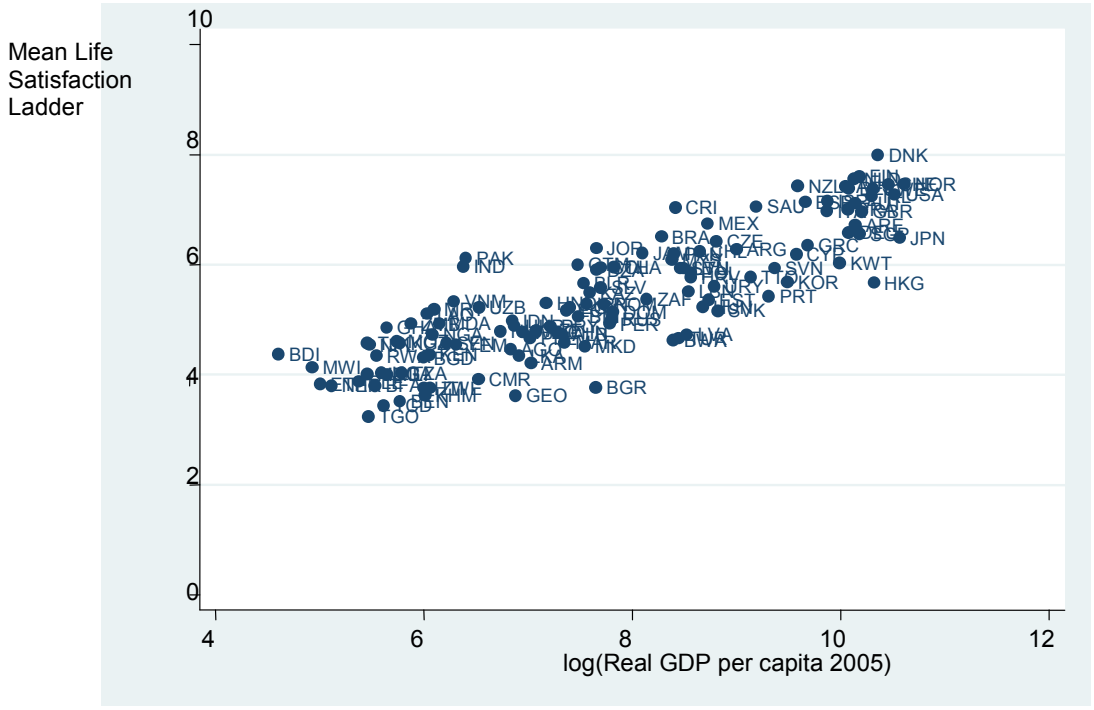

Figure 5:
The Cross-Section from the Gallup Poll: Happiness and log(Real GDP per Capita) both measured in 2005

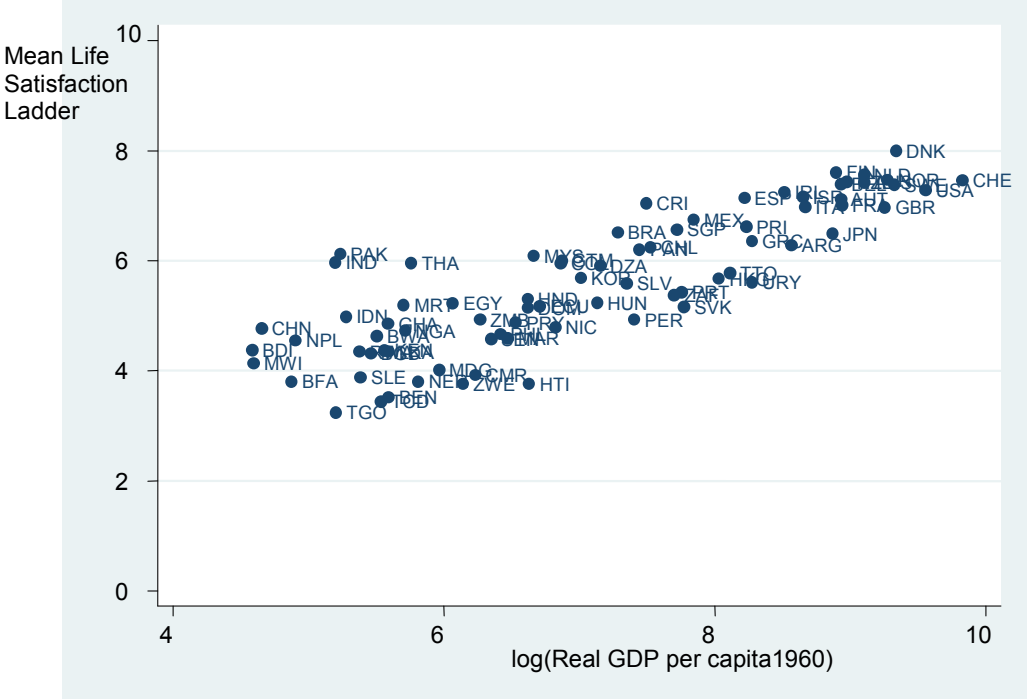

Figure 6:
The Cross-Section from the Gallup Poll: Happiness in 2005 and log(Real GDP per Capita) in 1960

Appendix: Our 3 Data Sources (with Variable Definitions)

1. The German Socioeconomic Panel

The GSOEP is the public use version of the Socio-Economic Panel (SOEP), a longitudinal data set begun in 1984. It was developed in a former Special Research Unit at the Universities of Frankfurt/Main and Mannheim in cooperation with the DIW, and initially financed by the German National Research Fund (DFG). In 1990, the DIW assumed control of the panel with funding from the Joint Federal-Land Commission for Promotion of Research Activities. The SOEP began with a sample of 6,000 households living in the western states of the Federal Republic of Germany, including a disproportionate number of non-German migrant workers. In November 1990, the eastern states of Germany were reunited with the western states of the Federal Republic of Germany. In June 1990, the DIW began a survey of families in the eastern states and merged these data with the existing SOEP population to provide a representative sample of reunited Germany.

Definitions

Happiness (Life Satisfaction 0-10): The individual responses to the question: *"In conclusion, we would like to ask you about your satisfaction with your life in general, please answer according to the following scale, 0 means completely dissatisfied and 10 means completely satisfied: How satisfied are you with your life, all things considered?*

0 1 2 3 4 5 6 7 8 9 10
completely dissatisfied completely satisfied"

Personal Income: Real Household Post-Government Income from the *Cross-National Equivalent File 1980-2000*. This variable represents the combined income after taxes and government transfers of the head, partner, and other family members.

Employment state: A set of dummy variables taking the value 1 depending on the respondent's employment state: (1) unemployed (2) retired (3) at school (4) at home (5) in the military (6) self-employed (7) public servant. The base category is employed (in the private sector).

Marital state: A set of dummy variables taking the value 1 depending on the respondent got married, divorced, separated or widowed over the course of the past year. The base category is being single.

Education: A generated variable determined from the following questions: *"Now to a completely different topic: education and training. First, what type of school leaving certificate do you possess? Have you (successfully) completed vocational training or studies (at an institution of higher education)? Yes/No. What type of vocational or higher education degree was that? Now to the topic of further education and training. Have you participated in further education in one of the following areas within the past year?".*

Tenant, Owner: Two dummy variables that correspond to the response to the question: *"Are you a tenant or an owner? 1. Tenant or 2. Owner".*

2. The Euro-Barometer Survey Series

The Euro-Barometer Surveys were conducted by various research firms operated within European Community nations under the direction of the European Commission. Either a nationwide multi-stage probability sample or a nationwide stratified quota sample of persons aged 15 and over was selected in each nation. The cumulative data file used contains 36 attitudinal, 21 demographic and 10 analysis variables selected from the European Communities Studies, 1970-1973, and Euro-Barometers, 3-38.

Definitions

Happiness (Life Satisfaction 1-4): The individual responses to the Euro-Barometer Survey question that reads: *On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?".* Accordingly, four ordered categories were created.

GDP per capita: Real GDP per capita at the price levels and exchange rates of 2000 in U.S. dollars obtained from World Development Indicators, World Bank, 2008.

Employment state: A set of dummy variables taking the value 1 depending on the respondent's employment status: unemployed, retired, housewife, in school or the military and self-employed. The base category is employed.

Male: A dummy taking the value 1 if respondent is male and 0 otherwise.

Age: The respondent's age in years.

Personal Income Position: A set of 4 dummy variables which take the value 1 depending on which income quartile the respondent's family income lies. The base category is the lowest income quartile.

Marital state: A set of dummy variables taking the value 1 depending on the respondent's marital status: married, living as married, defacto married, divorced, separated or widowed. The base category is never married.

Education: This heading refers to a set of dummy variables which take the value 1 depending on the age at which the respondent finished full-time education: up to 15-18 years old or up to more than 18 years old. The base category is education up to 14 years old.

3. The Gallup World Poll

The analysis is based on the Gallup World Poll, which collected data from samples of people in each of 132 countries during 2005; with the exception of Angola, Cuba, and Myanmar, the samples are nationally representative of people aged 15 and older. To assure the Gallup World Poll survey data is representative of 95% of the world's adult population, two primary methodological designs are employed: A Random-Digit-Dial (RDD) telephone survey design is used in countries where 80% or more of the population has landline phones. This situation is typical in the United States, Canada, Western Europe, Japan, Australia, etc. In the developing world, including much of Latin America, the former Soviet Union countries, nearly all of Asia, the Middle East, and Africa, an area frame design is used for face-to-face interviewing. The following are key aspects of the overall Gallup World Poll survey philosophy:

- The sample represents all parts of each country, including all rural areas. Countries are reviewed on a case-by-case basis when part of a country cannot be included in the sample design. The review determines whether the survey should be carried out.
- Face-to-face interviews are approximately one hour in length. Telephone interviews are considerably shorter, about 30 minutes in length.
- There is a standard set of questions used around the world.
- In the parts of the world where face-to-face surveys are conducted, the questionnaire includes questions tailored to each region. For example, the questions used in heavily indebted poor countries are tailored toward providing information about progress on the Millennium Development Goals.
- The questionnaire is translated into the major languages of each country.
- Interviewing supervisors and interviewers are trained, not only on the questionnaire, but also on the execution of field procedures. This interviewing training usually takes place in a central location.
- Quality control procedures are used to validate that correct samples are selected and that the correct person is randomly selected in each household. Random respondent selection uses either the latest birthday method or the Kish grid.

Definitions

Happiness (Cantril Ladder of Life): The response to the survey questions that asks: "Please imagine a ladder with steps numbered from zero at the bottom to ten at the top. Suppose we say that the top of the ladder represents the best possible life for you and the bottom of the ladder represents the worst possible life for you. If the top step is 10 and the bottom step is 0, on which step of the ladder do you feel you personally stand at the present time?". Accordingly a 0-10 cardinal scale was created.

GDP per capita: Real GDP per capita at the price levels and exchange rates of 2000 in U.S. dollars obtained from World Development Indicators, World Bank, 2008.

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