Life Satisfaction, Income and Personality Theory

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Abstract: Neuroticism is responsible for the decline of happiness with high income and its increase for lower incomes in both SOEP and BHPS datasets. We suggest that the effect is due to the psychological cost of the gap between aspiration and realized income. High income individuals fail to meet expectation, this explains lower increase or decrease of life satisfaction for highly neurotic individuals for higher income levels. Data show a hump-shaped relation between income and life satisfaction, with a bliss point between 250-300K 2005 USD. For highly neurotic this peak occurs at lower income, and disappears for non neurotic individuals.

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1 Introduction

An important relation between subjective and objective measures that is still being investigated is that between well being and income. A linear regression of life satisfaction on income using cross-section survey data in a developed country generally produces a significant, positive, but small estimated coefficient on income (see e.g. Blanchflower and Oswald 2004). Recently, in USA data, Kahneman and Deaton (2010) argue that the effect of income on the emotional dimension of well-being reaches a maximum at an annual income of 75,000 USD, and has no further positive influence for higher values.

These findings, support the idea that life satisfaction increases with income at a decreasing marginal rate, the same relation assumed between utility and income. [1] However, there is a significant amount of evidence suggesting that the link between life satisfaction is more complex than that. In a well known finding, Easterlin reported no relationship between happiness and income in cross country analysis. For example, the income per capita in the USA in the period 1974-2004 almost doubled, but the average level of happiness shows no appreciable trend upwards. This puzzling finding, appropriately called the Easterlin Paradox (Easterlin (1974)), has been confirmed in similar studies by psychologists (Diener et al. (1995)) and political scientists (Inglehart (1990)), and for other countries (Japan, Easterlin (1995), European countries, Easterlin, R. A. (2005)).

A potential explanation of the paradox is that individuals adapt to conditions, therefore the levels of subjective well being tend to revert to a baseline level depending on a reference point, an idea originally proposed by Brickman and Campbell (1971). Aspirations have been naturally associated to the reference points, hence to the extend that an increase in income leads to an increase in aspirations, changes in income may not have a long-run effect

[1] For example, Layard et al. (2008) find that the marginal life satisfaction with respect to income declines at a faster rate than the one implied by a logarithm utility function.

on subjective well being.[2]

The observed lower than expected elasticity between individual income and subjective well being recently motivated some psychology literature. In particular it is interesting to mention that Kahneman et al. (2006) and Akin et al. (2009) argue that individuals tend to underestimate the life satisfaction of the poorer. Their conclusion is that individuals work to become richer because of the illusion that wealth brings happiness. The present paper tries to shed lights on the reason of the small elasticity in the relation between income and life satisfaction by bringing into the analysis the personality theory,[3] and suggests a different reading of these empirical findings, based on the gap between aspiration and real income. So that richer people estimate correctly how bad they would feel if they themselves were poorer, and it is actually for this reason that they are not poorer.

The empirical support for this claim is provided by the way personality traits interact with income in affecting Life Satisfaction. Using the German Socioeconomic Panel (SOEP) and British Household Panel Survey (BHPS), we find that Neuroticism increases the elasticity for lower and medium incomes and decreases it for high income. This relation is qualitatively similar in the two datasets and no other traits have a similar effect in both SOEP and BHPS. In a regression between a quadratic function of income and life satisfaction, this translate into a positive coefficient of the interaction between income and Neuroticism and a negative one in the interaction between squared income and Neuroticism.

Why do we observe this strong effect? Neuroticism is linked to higher sensitivity to negative emotions like anger, hostility or depression (e.g. Clark

[2]Another advocated explanation of the Easterlin Paradox hinges on the concept of relative income, an idea that can de dated back to Duesenberry (1949). This is complementary and often conceptually undistinguishable from the reference-point hypothesis (Stutzer 2004). See Clark et al. (2008) for an extensive survey of the theoretical and empirical literature explaining the Easterlin Paradox.

[3]It is known that personality traits tend to interact significantly in a linear model with income in a life satisfaction equation (Boyce and Wood (2010)).

and Watson, 2008), is associated with structural features of the brain systems associated with sensitivity to threat and punishment (DeYoung et Al. 2010) and with low levels of serotonin in turns associated with aggression, poor impulse control, depression, and anxiety (Spoont 1992). For this reason modern studies identify this personality trait with sensibility to negative outcomes, threats and punishments (see DeYoung and Gray (2010) for a recent survey). It is therefore possible to argue that Neurotic people experience higher sensitivity to losses or failure to meet the expectations. Accordingly, we propose an explanation of why Neuroticism decreases the elasticity between income and life satisfaction for high income level and increase this elasticity for lower income levels that is based on the sensitivity to the gap between aspiration and realization in income.

In a simple structural model, we take the aspiration determined by personality traits, and income to be monotonic and concave function of aspiration: hence the gap between realized and aspired income decreases in average with the realized income and we assume this gap to become negative for higher incomes. We assume that neuroticism is a measure of the responsiveness of life satisfaction to the gap between aspired and realized household income. The model shows that we can expect the elasticity between income and life satisfaction to increase with neuroticism for lower incomes when aspirations are in average fulfilled and decline at higher incomes when aspirations are in average unfulfilled. For high income levels the gap tend to be high and its cost can overweight the benefit of the high income, so to generate an ex-post hump-shaped relation between income and life satisfaction. A pattern consistent with Bejamin et al. (2011) recently providing evidence that individuals do not necessarily aim to maximize their subjective well being.[4]

We test this model by estimating a system of structural equations with observed endogenous variables Household Income and Life Satisfaction, and

[4]and with Kimball and Willis (2006) and Becker and Rayo (2008) theoretical contributions, who cut the identity between happiness and utility.

a latent endogenous variable, Desired Income level. This model is able to generate a reduced form equation, with Neuroticism interacting with the linear and quadratic term of income. Given the existence of the latent variable we cannot fully identify the structural model, but we expect the quadratic interaction with neuroticism being negative as a sensitivity to the failure of not fulfilling aspirations for high income earners, while a positive sign of the linear interaction would signal an high effect "relief" for lower earners fulfilling their aspiration. The results of the estimation of this structural model are largely in line with our predictions and, therefore, explains the findings of the simple OLS model. In the equation for Life Satisfaction, the estimated coefficients of the interaction of Neuroticism and income are negative and significant for the quadratic term, and it is positive and significant for the linear term, in both BHPS and SOEP datasets.

Moreover, the estimation of the reduced form of our structural model unveil other relevant empirical results. Individuals with higher Neuroticism score experience a decline of the life satisfaction for high household income levels. Once the effect of Neuroticism is taken into account, income has to a large extent a positive effect on life satisfaction in all the estimates. We also note that traits underlying motivation, like Conscientiousness, Openness and Extraversion, increase income significantly. These results confirm that personality traits are important for predicting life outcomes, income in this case (see Roberts et al. (2007) and Burks et al. (2009) for other life outcomes).

In the last part of the paper we asses the existence of the hump shaped relation between income and life satisfaction suggested by the estimation of the reduced form of the structural model. Data are consistent with a bliss point corresponding to an household income of 250K USD per year in the German data and 290K in the UK data. This remains true even after controlling for a large number of moderating factors and the individuals effects.

The rest of the paper is organized as follows. In section 2 we describe

datasets and main variables. In Section 3 we show the empirical results. In section 4 we describe our theory and estimate the structural model. In section 5 we specifically test the existence of a hump-shaped relation between income and life satisfaction. Section 6 concludes. Additional analysis and more technical details are in the appendix.

2 Data

We use two national data sets: the British Household Panel Survey (BHPS), covering the years 1996-2008 since the question about Life Satisfaction has been introduced in 1996 and the German Socioeconomic Panel Study (SOEP), available for the years 1984-2009. Both SOEP and BHPS have longitudinal data, with the same individuals interviewed every year. All main data are presented in tables 1 and 2. A brief description of the main variables follows.

Big 5 Personality Traits The big five are usually measured through self-report based on the well-known NEO Five-Factor Inventory (Costa and McCrae, 1989). There is large literature demonstrating the reliability of this questionnaire and the stability of the personality traits. For example, using analysis based on the difference between DZ and MZ twins Rieman et al. (1997) show for all five factors, genetic effects were the strongest source of the phenotypic variance on the personality traits measured vis self-report, accounting of about 50 percent of the variance. Other studies (see Loehlin's (1992) meta analysis) based on the difference between reared apart and twins reared together show that shared sibling environment effects contributed little to phenotypic variance. They were negligible for Extraversion (2 percent) and small for Openness (6 percent), Conscientiousness (7 percent). Neuroticism (7 percent), and Agreeableness (11 percent).

Data on Personality traits are considered at least as stable as the economic preferences on risk, intertemporal discount rates, altruism and leisure (Borghans, Duckworth, Heckman and Weel, 2007). And have a stronger

predictive power than economic preferences for many important economic outcomes (Anderson et al. 2011).

The data used in the current paper have been elaborated from the standard short questionnaire present in the BHPS and SOEP data-set (in the year 2005), Personality traits are usually assessed with the NEO-Five Factor Inventory (NEO-FFI) with 60 items (12 items per domain). However, recent scale-development studies have indicated that the Big Five traits can be reliably assessed with a small number of items (e.g., Gosling et al., 2003). For instance, pilot work from the German Socio-Economic Panel (GSOEP) study led to a 15-item version of the well-validated Big Five Inventory (Benet-Martinez and John, 1998) that can be used in large-scale surveys (the questions are presented in section A of the appendix).

Life Satisfaction BHPS the life satisfaction question takes the form: *"How dissatisfied or satisfied are you with your life overall?"* and it is coded on a scale from 1 (not satisfied at all) to 7 (completely satisfied). In the SOEP the questions is phrased as *"We would like to ask you about your satisfaction with your life in general"*, coded on a scale from 0 (completely dissatisfied) to 10 (completely satisfied).

To ease comparability of the statistical results for different data sets, we transformed the measures of Life Satisfaction to lie in a range between 1 and 7 in all cases. Accordingly we transformed the index of the SOEP according to the formula (1+Life Satisfaction) $* 7/11$.

Household income In both SOEP and BSHP datasets the income has been transformed in USD at 2005 constant prices, using the Consumer Price Index (CPI) of World Bank-World Development indicators, data on income are in 10K units. In figure 5 in the appendix we show histogram of Income distribution for UK and Germany.

Control variables In almost all regressions, we control for demographic variables as age and gender, marital status, number of children in the household, academic qualifications, number of visits to the doctor, to control for

the health status. We will also introduce dummies to control for region of residence and labor force participation status like home caring, unemployed, retired and so on. In some regression we also introduce labor environment related controls, like worked hours, sector, socioeconomic status and firm size.

3 Analysis

Figures 1 and 2 display the residuals Life Satisfaction – after controlling for age, age^2, gender and wave–, as a function of income for individuals in different quintiles of score of each Personality trait, in UK and Germany respectively (similar patterns would be displayed even if we consider the raw Life Satisfaction data). In individuals with high Neuroticism score, the curve is more concave and the peak is reached at levels of income lower than average and for those with low score the relation seem to be always non decreasing (like in the UK) or the decreasing part is very mild (like in Germany). No other trait has such a clear effect on the relation we are analyzing: in none of the other traits the distributions of the two extremes are both significantly different from the distribution of the average.

The curves in figures 1 and 2 represent fractional polynomial interpolation. The fractional polynomial is far more flexible of the conventional linear and quadratic functions limited in their range of curve shapes, at the same time they do not feature the undesirable aspect of the higher-order curves that often fit badly at the extremes (Royston and Altman 1994), a problem particularly serious for our data containing very high income levels. We will discuss more on the reliability of the fractional polynomial fitting in section 5 where we will present evidence that the relationship between income and life satisfaction is in general hump-shaped.

Figures 1 and 2 are based on data pooled across wave, in order to exploit the longitudinal nature of our dataset by taking into account individuals'

heterogeneity and exclude the role of possible omitted variables, we estimate a number of econometric models controlling for a large number of potentially confounding factors. For computational reasons we need to assume a more rigid functional form. A quadratic form seems in principle to approximate well the data, but given its symmetry it would give excessive weight to the high level of income. By excluding incomes larger than 800K USD per year in UK (42 observations) and 700K USD in Germany (45 observations) a quadratic regression of income over life satisfaction residuals generate an interpolating curve with a peak at 231K for Germany and 276K for the UK, similar to the peak reached in the dashed line curves in figures 1 and 2 respectively (that we recall, it represents the interpolating lines using the fractional polynomial fitting without income exclusions). In the appendix we show that results are qualitatively robust with different incomes' upper bound.

Accordingly, we will estimate the following econometric model:

$$h_{it} = \beta_1 y_{it} + \beta_2 y_{it}^2 + \beta_1' \theta_i y_{it} + \beta_2' \theta_i y_{it}^2 + \Gamma z_{it} + \Lambda \theta_i + \epsilon_i + \eta_t + e_{it} \qquad (1)$$

where i represents the individual and t the year of the survey, h_{it} is Life Satisfaction , y_{it} the household income. The individual fixed effect is described as $\Lambda\theta_i + \epsilon_i$, where

$$\theta_i = (N_i, E_i, C_i, A_i, O_i, M_i) \qquad (2)$$

with $N = Neuroticism, E = Extraversion, C = Conscientiousness, A = Agreeableness, O = Openness, M = Male$ and ϵ_i is the individual specific random effect. Moreover $\beta_1' \theta_i y_{it} + \beta_2' \theta_i y_{it}^2$ are the terms interacting each personality trait index with the income variables; vector, z_{it}, consists of time changing individual characteristics: age, age^2, Marital state (a set of dummies depending on whether the respondent is married, divorced, separated or widowed), Education (a set of dummies measuring high school achievement, vocational training or college degree); number of children in the household,

Region of residence (a set of dummies one for each region of residence of the household), Health status (a set of dummies indicating intervals in terms of number of visits to the doctor); Labor force participation (a set of dummies depending on whether the individual is employed, house carer, unemployed, retired); occupation types (a large set of dummies for socioeconomic status (manager, employed, professional, white-collar, blue collar, farm-worker and so on), worked hours per week and its squared term; η_t is a year (and wave) fixed effect and e_{it} is random noise.

In table 3, we report the OLS estimation the model 1,[5] the estimation results confirms the pattern of figures 1 and 2 by showing that in both datasets Neuroticism is the only trait to affect the relation between Income and Life Satisfaction in a qualitatively similar way. In particular, from column 1 we note that in Germany, Neuroticism decreases the elasticity between income and life satisfaction for income larger than about 120K USD, while it decreases the elasticity for smaller incomes. From column 3, in the UK Neuroticism decreases the elasticity for income larger than about 330K USD, while it increases it otherwise.

A possible concern is that there is an error of measurement on the personality traits due to difference in languages or reporting biases. We therefore rescale each personality trait i of the individual j, $T_{i,j}$, according to the formula

$$\underline{T_{i,j}} = \frac{T_{i,j} - Min[PTQ_j]}{Max[PTQ_j] - Min[PTQ_j]} \tag{3}$$

where PTQ_j is the vector representing each single of the 15 reports of the personality questionnaire for each individual j. In table 10 of the appendix we present the results of the estimation of the model 1 with the adjusted trait. They are qualitatively the same and quantitatively very similar to the one in table 3.

Although in the range of age considered traits are stable, there is still a significant small variation (for example in a regression of neuroticism with

[5]In the appendix, table 12 we report the result of the ordered probit estimations

age and age^2 the $R^2 = 0.0027$ in the SOEP and $R^2 = 0.0025$ in the BHPS). Therefore in table 11 of the appendix, we present the estimations of the model 1 using the residuals of the traits after controlling for age and, to control for the effect of gender differences in traits, we also introduced the terms Male*Income and Male*Income^2. Again the results are qualitatively similar, Neuroticism is the only trait that in both datasets systematically affect the elasticity between income and life satisfaction.

4 Happiness and Personality

The data we have seen suggest that Neuroticism affects systematically the relation between Life Satisfaction and Income, increasing its elasticity for low and medium income and decreasing it for high income levels. To provide a possible explanation, we present a model based on the modern personality traits theory; we then show that this model is able to produce an equation similar to equation 1 as a reduced form and we will estimate this model using an appropriate econometric estimator. In the model, behavior is explained by traits that characterize an individual, rather than by optimization.

We use the convention that the coefficients are assumed to be positive. The terms $e_{it}; u_{it}; v_{it}$ are error terms. The model has three equations. The dependent observable variables are the household income y_{it} and the life satisfaction h_{it}. The dependent latent variable is the *desired income* for any individual i at time t is denoted by a_{it}.

The *Level of income* depends on the desired income:

$$y_{it} = \alpha_2 + \beta_2 a_{it} + u_{it} \tag{4}$$

We assume that $\alpha_2 > 0$ and $\beta_2 \in (0, 1)$. The interpretation of the equation: the aspiration to an income a_{it} induces (through effort, persistence, and confidence) a real level of income that is increasing in the aspiration level, but at a rate smaller than 1. Individuals with low aspirations in average overshoot

by earning more. The linear form is for convenience: what is essential is that the relationship is monotonic and has decreasing returns.

We summarize the argument in the following hypotheses: *(i)* higher motivation produces aspiration to higher income, and hence to higher realized income; *(ii)* High aspirations are necessary to become rich, but the higher they are, the more likely it is that they go unfulfilled. The effect of aspiration on realized income however occurs at a decreasing rate. This is the standard assumption of decreasing marginal returns. To illustrate it, consider the search for a new occupation. An individual searching for a job may set a reservation wage to be reached before he stops searching. The higher the aspiration level the higher the wage found will be, everything else being equal, although perhaps at a later date. Increasing aspiration may increase realized income, however, only up to a point.

Given that we do not observe the desired income, a_{it}, we are not able to test the assumption made on equation 4. However, we consider the question present in the SOEP dataset, "do success is important in job?", coded from Unimportant (1) to Very Important (4).[6]. The answers to this question correlate positively and significantly with the traits implying motivations: openness, conscientiousness and extraversion (and negatively with the others). Therefore, it is natural to assume that Individuals who believe that success on the job is important have high aspirations. Table 15 in the appendix shows a concave relation between importance of success and the household income in a regression with individual fixed effect. This is consistent with our hypothesis of income with decreasing marginal return in aspirations.

The *Life Satisfaction* depends on the realized income and other variables:

[6]This question is present in the waves 1990, 1992, 1995, 2004, 2008 and it is inversely coded.

$$
\begin{aligned}
h_{it} &= \alpha_1 + \beta_1 y_{it} + \delta y_{it}^2 + \\
&\quad + \gamma_1 N_i \left(a_{it} - y_{it}\right) + \gamma_2 N_i \left(a_{it} - y_{it}\right)^{+2} + \Gamma_1 z_{it} + \Lambda_1 \theta_{hi} + e_{it}.
\end{aligned} \tag{5}
$$

The interpretation of the equation: Life Satisfaction increases with income, but – since we expect both γ_1 and γ_2 to be negative– it decreases at an increasing rate with the positive gap between aspirations and realizations, $(a_{it} - y_{it})$. Personality terms also affect the Life Satisfaction by shifting the intercept and interacting with income. The vector $\theta_{h,i}$ includes Neuroticism and Extraversion, in addition to the gender (variable Male). The dependence of the γ_1 and γ_2 coefficients is assumed to be linear (so the effect is a multiplicative interaction).

Trying to become rich has a psychological cost in terms of gap between real and aspired income. An individual's sensitivity to this gap depends on his personality. Modern literature in psychology views neuroticism as sensibility to negative outcomes (DeYoung and Gray, 2010), akin to Prospect Theory's loss aversion. Ex-post, individuals perceive the gap between real and aspired income as a negative outcome, and the higher their Neuroticism score, the higher is the potential subjective welfare cost of this gap. Since higher aspirations are associated both with higher income and higher gap, the psychological cost of becoming rich in terms of life satisfaction is higher for individuals with higher Neuroticism score. On the other hand lower aspiration implies that individuals in average "overshoot" in the sense of achieving an income larger than their own aspiration and this has a benefit in terms of relief for an avoided threat; an effect perfectly in line with Carver's (2009) finding that relief strongly correlates with threat sensitivity, hence, as argued above, with Neuroticism.

Accordingly, the hypothesis *(i)*, *(ii)* together may explain the slow increase or decline of reported life satisfaction with higher levels of income.

The psychological cost of the gap compensates the increase in Life Satisfaction due to higher income, hence when we look at the final level of Life Satisfaction as a function of income we observe an increase in Life Satisfaction for lower levels of income and possibly a decline in it when the cost becomes dominant.

Note that this model is consistent with the standard "Keeping up with the Jones" argument if we consider that aspiration could be set to depend on the top incomes of some reference group and has a further empirical validation to the extent that within groups wage's variance increases with the average. Hence the difference between aspired and expected wages increase with the level of aspired wages.

For treatability reason, we therefore assume that aspirations are exogenous with respect to individuals' choices. Following the literature on the hedonic treadmill theory (Diener et Lucas, 1999), we assume that past income as well as personality affect expectations, hence:

$$a_{it} = \alpha_0 + \eta_0 y_{it-1} + \Gamma_0 z_{it} + \Lambda_0 \theta_{ai} + v_{it} \tag{6}$$

where θ_{ai} is a vector containing time independent personal characteristics (gender and the personality traits), $z_{i,t}$ are the time dependent personal characteristics (education and age), y_{it-1} is the real income in the previous wave. The interpretation of the equation: at any time t, individuals form realistic expectations on next period income, with an upward adjustment affected by individuals' characteristics, education and age.

The main problem in estimating the model described by 4, 5 and 6 is the unobservability of aspiration level of income, a_{it}. We solve equation 4 by a_{it}, and substitute it in 5 to have the following equation:

For $y_{i,t} > \frac{u_{i,t}+\alpha_2}{1-\beta_2}$

$$h_{it} = \gamma_2 N_i \left(\frac{-u_{i,t} + y_{i,t} - \alpha_2}{\beta_2} - y_{i,t} \right)^2 + \gamma_1 N_i \left(\frac{-u_{i,t} + y_{i,t} - \alpha_2}{\beta_2} - y_{i,t} \right) + \beta_1 y_{i,t} + \delta y_{i,t}^2 + \Gamma_1 z_{i,t} + \Lambda_1 \theta_{hi} + \alpha_1 + e_{i,t}. \tag{7}$$

For $y_{i,t} < \frac{u_{i,t}+\alpha_2}{1-\beta_2}$

$$h_{it} = \gamma_1 N_i \left(\frac{-u_{i,t} + y_{i,t} - \alpha_2}{\beta_2} - y_{i,t} \right) + \beta_1 y_{i,t} + \delta y_{i,t}^2 + \Gamma_1 z_{i,t} + \Lambda_1 \theta_{hi} + \alpha_1 + e_{i,t} \tag{8}$$

Since we are not observing α_2, we will estimate the model 7 for the entire range of $y_{i,t}$. We will exclude the term $\gamma_2 \left(\frac{-u_{i,t}+y_{i,t}-\alpha_2}{\beta_2} - y_{i,t} \right)^2$, which implies that, when the value between brackets is positive (i.e. for smaller values of $y_{i,t}$), if γ_2 turn up to be negative, its magnitude would be underestimated.

Equation 7 can be rewritten as

$$h_{it} = \alpha_1 + \beta_1 y_{it} + \delta y_{it}^2 + \gamma_2 \left(\frac{1-\beta_2}{\beta_2} \right)^2 N_i y_{it}^2 + (C u_{it} + B) N_i y_{it} + N_i \left(F u_{it}^2 + G u_{it} + D \right) + \Gamma_1 z_{it} + \lambda_E E_i + e_{it}; \tag{9}$$

where B, C, D, F and G are constants that depend on the parameters of the

structural model.[7] Moreover, substituting 4 in 6 we have [8]:

$$y_{it} = A_2 + B_2 y_{it-1} + C_2 z_{it} + D_2 \theta_{ai} + \beta_2 v_{it} + u_{it}. \tag{10}$$

Several predictions follow from our model. Higher income may be associated with higher cost of the gap between expectation and realization. This cost is proportional to Neuroticism; hence higher Neuroticism implies higher loss for high incomes, associated with higher gap. Once we control for the effect of the interaction between Neuroticism and income, the residual effect on Life Satisfaction of income should be positive. On the other hand, lower income individuals may be associated with the real income to overshoot the aspired income, for this reason highly neurotic individuals with lower income might enjoy an increase of income even more than low neurotic individuals

[7] More precisely:

$$\begin{aligned} B &= \frac{(1-\beta_2)(\beta_2\gamma_1 - 2\alpha_2\gamma_2)}{\beta_2^2} \\ C &= -\frac{2(1-\beta_2)\gamma_2}{\beta_2^2} \\ D &= \lambda_N - \frac{\alpha_2^2\gamma_2}{\beta_2^2} - \frac{\alpha_2\gamma_1}{\beta_2} \\ F &= -\frac{\gamma_2}{\beta_2^2} \\ G &= \frac{\beta_2\gamma_1 - 2\alpha_2\gamma_2}{\beta_2^2} \end{aligned}$$

[8] Here

$$\begin{aligned} A_2 &= \alpha_2 + \alpha_0\beta_2 \\ B_2 &= \beta_2\eta_0 \\ C_2 &= \beta_2\Gamma_0 \\ D_2 &= \beta_2\Lambda_0, \end{aligned}$$

because of the removed threat of not fulfilling aspirations.

In other words, from the estimation of the reduced form equation 9 we expect that that both γ_1 and γ_2 are negative. The sign of the coefficient of $N_i y_{it}^2$ must be negative if $\gamma_2 < 0$. The sign of the coefficient of γ_1 is not identified but provided that $\gamma_2 < 0$ a positive coefficient of $N_i y_{it}$, B, might well be compatible with $\gamma_1 < 0$, this happens especially if α_2 is large, i.e. individuals with low income (and low aspiration) overshoot more often. Therefore the benefit of more income in terms of life satisfaction increases more due to this extra-effect of overshooting on aspirations. Furthermore, we will identify the direct effect of income on life satisfaction characterized by parameters β_1 and δ. We expect this direct effect being always positive or at least non negative.

Motivation is likely to increase income; hence Openness, Conscientiousness and Extraversion (traits underlying motivation) should affect income positively.[9] Personality traits should also have direct effects (not necessarily interacting with income) on Life Satisfaction, with Neuroticism reducing Life Satisfaction and Extraversion increasing it.

We therefore test these predictions estimating the system represented by equations 9 and 10. We show in section B of the appendix that the system can be estimated by using a two or a three stage least square estimator.

The results presented in table 4–, where we used the year the traits have been measured– are largely in line with our predictions. In the equation for Life Satisfaction, the estimated coefficients of the interaction of Neuroticism and income are negative and significant for the quadratic term in both samples. Once the effect of Neuroticism is taken into account, income has a linear positive effect on life satisfaction on life satisfaction in the German dataset, while in the UK data it appears non significant. The reason of this difference is perhaps due to the fact that in Germany life satisfaction is measured in

[9]Boyce et al. (2010) succesfully test a related assumption that conscientiousness matters for life satisfaction indirectly when interacted with unemployment

10 points scale, while in the UK is measured on a 7 points scale, so there is more variability in the former.

The estimates for the Household Income equation in table 4 report the effects of personality on income. Conscientiousness, Openness and Extraversion increase income significantly, whereas Neuroticism decreases income. The effects per year are noticeable: for example in the UK sample the size is around $7K$ USD for Conscientiousness, $9K$ USD for Openness, $-11.5K$ USD for Neuroticism, and $8.6K$ USD for Extraversion. For comparison, the effect of Male is $3.3K$ USD per year, hence the effects of some personality traits are between two and four times larger than the gender gap. These results confirm that personality traits are important for predicting life outcomes, income in this case (see Roberts et al. (2007) Burks et al. (2009) for other life outcomes). Consistently with the literature (Cohen et al. (2003), Vitters and Nilsen (2002)), the direct effects of Neuroticism on Life Satisfaction are negative, large and significant; those of Extraversion are positive and significant.

As we argued above there is widespread agreement among psychologists that traits are largely exogenous and stable, and this holds for the sample we are considering (non students from 18 to 65 years). Still, we address the possibility that traits are endogenous by using the entire panel of data. In this way we are considering a span of 26 years of data for Germany and 12 years for the UK while the traits are relative to a single year. In table 5 we present the estimation of the same equations as in table 4, but this time using the entire panel of data available for the two countries, with a Two Stage Least Square estimator (2SLS) with random effect. The results are largely in line with the one in table 4: the interactions between Neuroticism and income are positive and the ones with squared income are negative. Once neuroticism is taken into account, the simple relation between income and life satisfaction is increasing for Germany and non significant for the UK.

Our empirical test provides therefore a support of our theory based on the

gap between aspiration and income, explaining our above findings that Life Satisfaction declines faster at higher income when Neuroticism is higher. Further research will explore the merit of alternative explanations. A plausible alternative hypothesis, always consistent with the notion of Neuroticism as elasticity to punishment, is that higher income is also associated with higher variance of the income; this higher income variance and the associated anticipated anxiety might hurt the level of Life Satisfaction in individuals with higher score in Neuroticism. In this explanation the effect of Neuroticism is produced by the anticipation of future fluctuations in income, rather than the comparison with past aspiration levels. This hypothesis is harder to test with the data we are using, although we see it as complementary to the one discussed here.

5 The hump-shaped Relation between income and Life satisfaction

We showed that neuroticism is responsible of the decreasing elasticity in the relation between income and life satisfaction, in figures 1 and 2 we note that for level of Household Yearly Income larger than about 250K for Germany and about 290K for UK this translate in a decreasing relation. Figure 3 shows the fractional polynomial fitting of the life satisfaction residuals after controlling for age, gender and wave on Household Income (this corresponds to the dashed lines of figures 1 and 2), with the 95 percent confidence level. The number of observation with incomes larger than each bliss point is reasonably large: there are 146 individuals and 213 total observations in the German data and 264 individuals and 379 total observations in the UK data. Note that In the BHPS data, the share of individuals with income above 290K 2005 USD is 0.3 percent in 2005 and in the same year the share of individuals reporting an income above 210K is just above 1 percent. This figure is very similar if we consider the minimum income reported by top 1

percent of individuals in the UK official statistics for the 2005 fiscal year.[10]

The analytical representation of the curves depicted in figure 3 is $\beta_0 - \beta_1 X^0.5 + \beta_2 X^0.5 logX$ for Germany; and : $\beta_0 - \beta_1 X^0.5 + \beta_2 X$ for UK data, where X represents a linear function of the income. We tested the effectiveness of the fractional polynomial in predicting correctly the existence of a bliss point using a Monte Carlo procedure to find that when we simulate a logarithmic relation between income and life satisfaction, the best fractional polynomial is a non decreasing function with a 99 percent confidence interval (the outcomes of the simulations are available upon request).

Figure 4 displays the relationship between Average Life Satisfaction for individuals within the same 1K income brackets and Household Income in Germany and UK (a similar pattern would be displayed if we use the residuals of Life Satisfaction after regressing it on age and gender, as we did in the previous figures). We consider individuals between 18 and 65 years of age. We note a statistically significant hum-shaped relation.

To exclude the role of omitted variables and controlling for individual effects, we estimate a number of econometric models using the same controls we used to estimate equation 1. We therefore run a series of regression specifications based on the following general form:

$$h_{it} = \beta_1 y_{it} + \beta_2 y_{it}^2 + \Gamma z_{it} + f_i + \eta_t + e_{it} \tag{11}$$

where i represents the individual and t the year of the survey, h_{it} is Life Satisfaction , y_{it} the household income, vector, z_{it}, consists of time changing individual characteristics, the same used in equation 1; f_i is an unobserved time invariant characteristics, like gender or personality trait. η_t is a year (and wave) fixed effect and e_{it} is random noise. In table 6 we estimate 11 using an an OLS estimator with individual fixed effect, for Germany and UK.[11] For

[10]To the best of our knowledge there are not similar readily available official statistics for Germany

[11]In the appendix, table 13, we report a similar estimation using an ordered probit

the reason already mentioned we exclude from the UK data observations with an income larger than 800K per year and from the German data income larger than 700K per year. Nevertheless in table 16 in the appendix we show how results changes only quantitatively with different income upper thresholds.

The coefficient of the linear term is positive and significant and the quadratic negative and significant. As we can see in column 1 for Germany the turning point is about 264K, while in column 2 we note that for the UK it is about 305K. The turning points are roughly similar to the ones in Figure 3. This implies that the quadratic interpolating lines of the regressions that exclude individuals with income above 800K in the UK data and individuals with income above 700K in the German data, are similar to the polynomial line depicted in figure 3, which is calculated by using the whole set of data.

Always in table 6, it is instructive to compare column 2 and 3 for UK. The turning point disappears in the UK data, when we introduce the marital status: divorced and separated. Therefore the negative slope of the relation seems to be linked to the household dynamics between partners at least in UK. However, we note from table 3 that marital status does not affect the interactions between income and neuroticism, suggesting that neuroticism affect the interaction between income and life satisfaction through deterioration in marital status (although this effect cannot be observed in German data).

In table 7 we regress the individual life satisfaction against dummies indicating 50K income brackets. It shows consistent results: in both datasets the coefficient of the dummies indicating an income larger than 300K is smaller than the one in the brackets $[250K; 300K]$. In the german data, in columns 1 and 2, the hypothesis that those coefficient are equal can be rejected at 5 percent confidence level, while in the UK data it is not possible to reject such hypothesis.[12] Table 7 therefore suggests an hump-shaped relation between

estimator and a logit estimator with individual fixed effect

[12]The hypothesis that the dummies' coefficient, indicating an income larger than 100K, are equal in the UK data cannot be rejected, with the only exception of the the coefficient

income and life satisfaction similar to the one in figures 3 and 4 and in table 6.

Using the World Value Survey data, Figure 6 of the Appendix shows a comparable pattern for US, the only country in the WVS for which an 11 income brackets scale is available. We see that Life Satisfaction distribution in the last income group – the 11th income bracket for individuals with an household income larger than 175K 2006 USD – is stochastically dominated, with a $p-$value close to 5 percent, by the one in the 10th brackets.

The effect of household income on Life Satisfaction could be generated by an increase of inequality within household. Clark (1996) shows that within partners' inequality has a negative impact on individual satisfaction. Considering table 8 we note that the squared income terms interacted with the gender variable is non significant. Furthermore, in table 9, where the main independent variable is individual labor income (rather than the households' aggregate income) there is a similar hump-shaped relation between income and life satisfaction. Both tables 8 and 9, seem to rule out inequality within household as a possible explanation of the hump-shaped pattern.

Finally a word deserves the possible objection that the bliss point can be determined by measurement errors. The fact that they are closely connected to neuroticism excludes random mistakes in the data compilation. Given that we observe a hump-shaped relation even when we control for individuals fixed effect a possibility is that individuals lies in exaggerating their income increase but do not lie in their life satisfaction report. According to the existing literature in income measurement errors this is not a commonly recorded bias. Studies comparing income reported in survey with external source almost invariably conclude that in survey individuals tend to underreport incomes (see More et al 2000 for a review of this studies). A study based on the SOEP dataset argue that the typical behavior of individuals who believe his income is inadequate is to refuse to respond (Schrapler 2002).

of $[200K; 250K]$ larger than the coefficient $[150K; 200K]$

Finally, we note that the inflation of income for vanity is not a typical behavior for a neurotic individuals.

6 Conclusions

Neuroticism is responsible for slow increase (or even decline) of Life Satisfaction with high income and its increase for lower incomes. Our hypothesis suggests that the effect is due to the psychological cost of the gap between aspiration and realized income, positive for lower incomes' level and negative for higher income levels. Motivation induces higher aspirations in income, and on average also to higher incomes. This effect occurs however at a decreasing rate, and thus generates a gap between desired and realized income which is negative and in absolute values higher for higher incomes, and this in turn induces a decrease in Life Satisfaction. Neuroticism measures the sensitivity to the gap, and in fact individuals with higher score in neuroticism have a stronger decline of happiness with income, for high income and a stronger increase for lower income when, the gap is positive.

This conclusion suggests a different interpretation of the well established fact that life satisfaction increases slowly, or is completely flat at high levels of income (Kanheman and Deaton 2010). This finding has been so far interpreted with the argument that the marginal life satisfaction is decreasing, just as utility. Our results suggest a stronger reason: the flatness of happiness with income is the effect of opposite forces on Life Satisfaction: a natural effect of increasing happiness with income, and a negative effect induced by the gap between aspiration and realization. This second effect becomes dominant for high incomes, but is likely to operate over a much larger spectrum. If this is the case, then our results concern the life satisfaction of a substantial fraction of the population, and not just the very rich individuals.

Furthermore, our analysis shows that Life Satisfaction may be decreasing

in income for high levels of income. The finding is puzzling if one assumes that people earn income as a mean to increase happiness. We saw the phenomenon has an explanation when we bring personality traits into the analysis: they explain the pattern of the relationship between happiness and income.

Table 1: Germany: SOEP dataset years 1984-2009, Main Variables used in the regressions

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Life Satisfaction	5.078	1.158	0.636	7	330140
Income	3.853	2.47	0	151.554	314967
Age	41.777	12.841	18	65	331114
Male	0.491	0.5	0	1	331114
Neuroticism	0.501	0.2	0	1	223984
Extraversion	0.634	0.188	0	1	224018
Conscentiouseness	0.826	0.15	0	1	223260
Openness	0.577	0.2	0	1	223000
Agreeableness	0.739	0.162	0	1	223853
Labor Income	3.392	2.773	0.001	155.691	238754
Hours worked	28.693	20.279	0	80	310016

Table 2: UK: BHPS dataset years 1996-2008, Main Variables used in the regressions

Variable	**Mean**	**Std. Dev.**	**Min.**	**Max.**	**N**
Life Satisfaction	5.145	1.267	1	7	119367
Income	6.658	4.72	0	187.543	139308
Age	41.236	12.794	18	65	139308
Male	0.468	0.499	0	1	139307
Neuroticism	0.451	0.215	0	1	107713
Extraversion	0.584	0.192	0	1	107539
Conscientiouseness	0.725	0.174	0	1	107427

Continued on next page...

... table 2 continued

Variable	Mean	Std. Dev.	Min.	Max.	N
Openness	0.581	0.195	0	1	107330
Agreeableness	0.741	0.163	0	1	107595
Hours worked	25.96	18.825	0	99	135418
Labor Income	2.56	1.627	0	105.518	89393

Figure 1: **Life satisfaction, Household Income and Personality Traits in UK**. The five graphs show the fractional polynomial best fitting of the Life Satisfaction residuals with Income for the entire sample (dashed line), and the one related to the individuals belonging to the last quintile (lowest score, dotted lines with confidence intervals) and to the first quintile (highest score, solid lines with confidence intervals) in the traits distribution.

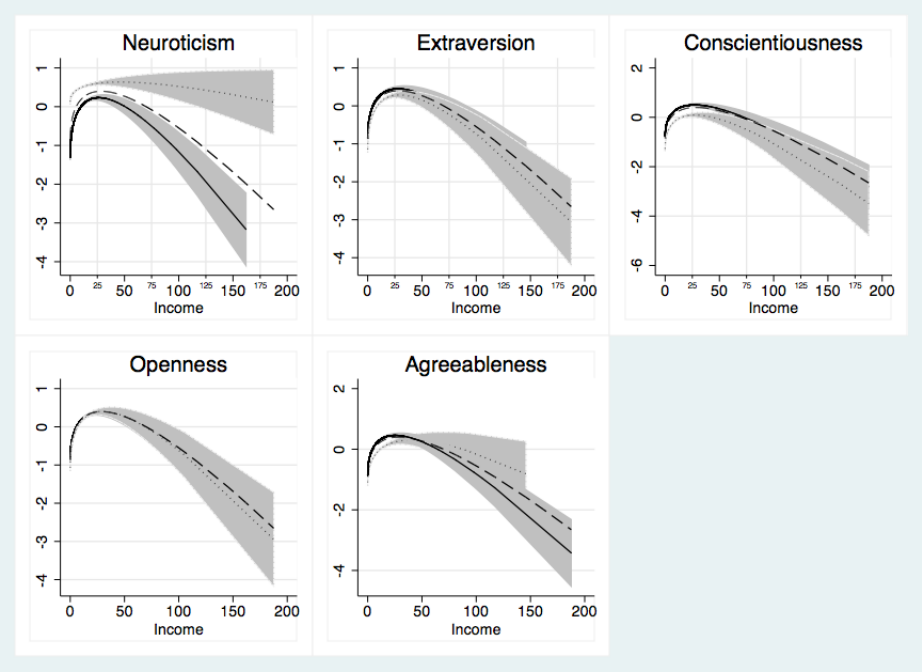

Figure 2: **Life satisfaction, Household Income and Personality Traits in Germany**. See caption in figure 1.

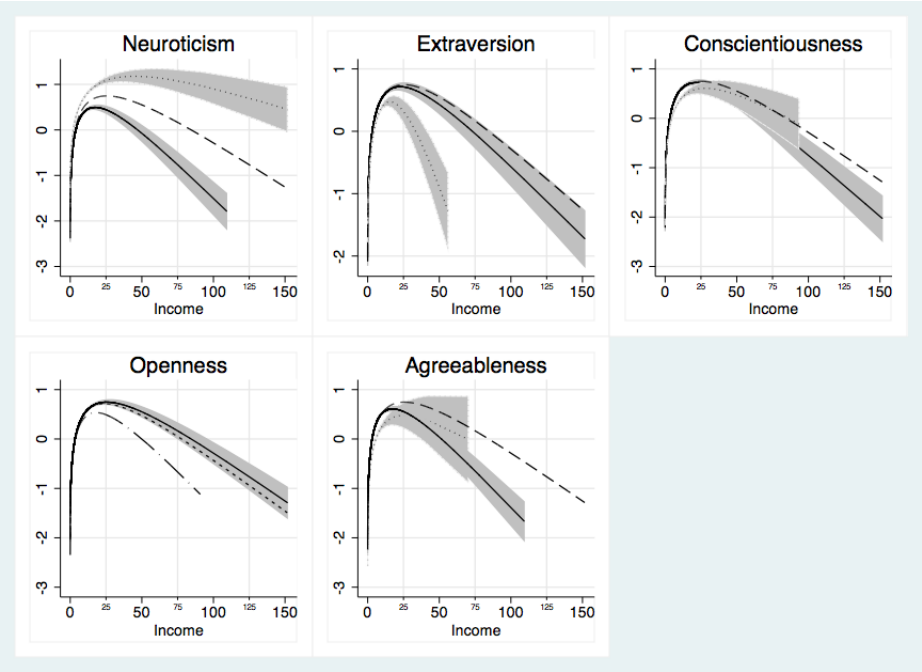

Figure 3: **Individuals Life satisfaction and Household Income**. Fractional polynomial best of the Life Satisfaction residuals with Income.

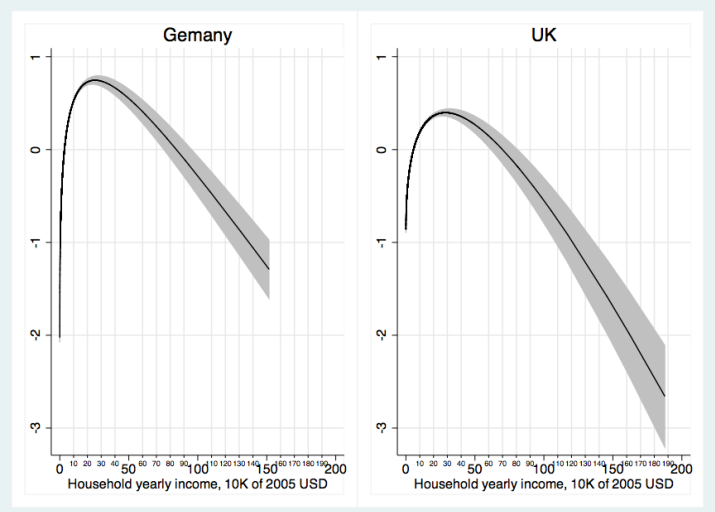

Figure 4: **Average Life satisfaction, Household Income**. The vertical axes report the average Life Satisfaction of all those individuals who are within the same interval of income of 1K width. The individuals with income exceeding 400K have been averaged together in the last 1K income bracket. The broken lines are the lowess estimate and polynomial fittings (almost non distinguishable).

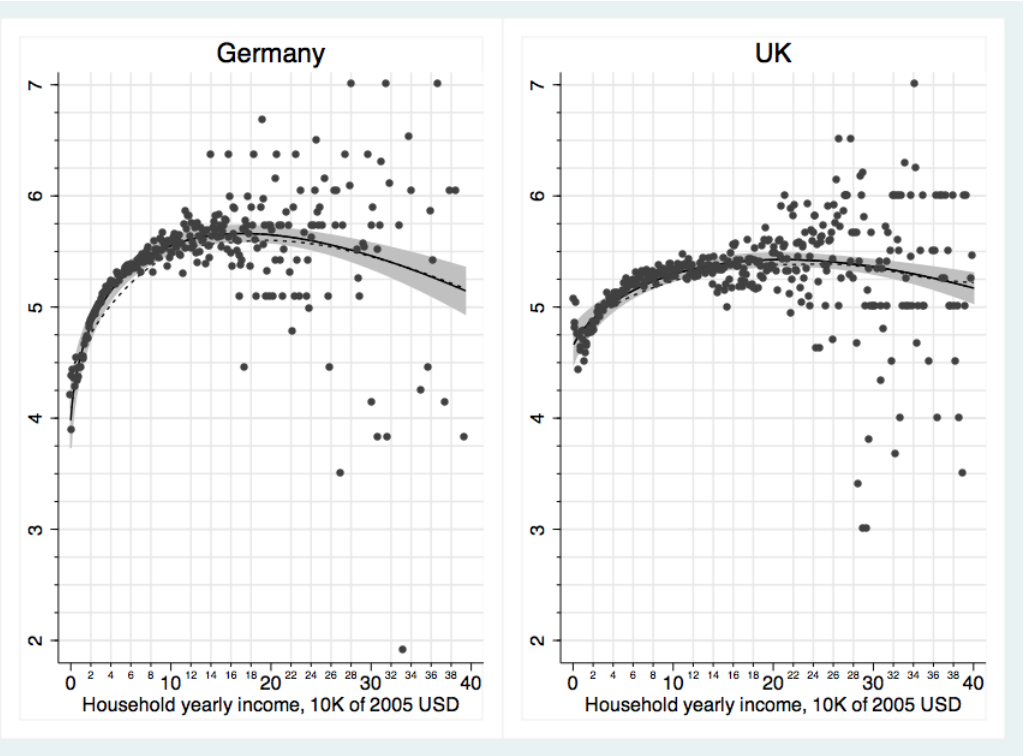

Table 3: **Life Satisfaction Income and Personality Traits in UK and Germany.** Panel Data with Individual Random Effects. Dependent variable is Life satisfaction, all regressions include control for Age, Age^2, Gender, omitted from the table. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors)

	Germany 1984-09 b/p	Germany 1984-09 b/p	UK 1996-08 b/p	UK 1996-08 b/p	UK 1996-08 b/p
Income	0.0467***	0.0005	–0.0005	0.0012	0.0084
	(0.0000)	(0.9800)	(0.8331)	(0.7234)	(0.2588)
Income^2	–0.0005***	0.0002		–0.0000	
	(0.0068)	(0.8608)		(0.8490)	
Neur*Inc	0.0369***	0.0471***	0.0201***	0.0199**	0.0212**
	(0.0015)	(0.0002)	(0.0007)	(0.0270)	(0.0124)
Neur*Inc^2	–0.0015***	–0.0019***	–0.0003**	–0.0003	–0.0004*
	(0.0005)	(0.0002)	(0.0266)	(0.3482)	(0.0681)
Ext*Inc		0.0384**			–0.0032
		(0.0160)			(0.7443)
Ext*Inc^2		–0.0015*			–0.0001
		(0.0519)			(0.7740)
Cons*Inc		0.0380**			–0.0085
		(0.0396)			(0.4766)
Cons*Inc^2		–0.0000			0.0002
		(0.9651)			(0.4306)
Open*Inc		–0.0070			0.0095
		(0.6213)			(0.3468)
Open*Inc^2		0.0003			–0.0003
		(0.6115)			(0.2685)
Agr*Inc		–0.0137			–0.0102
		(0.4076)			(0.3874)
Agr*Inc^2		0.0004			0.0002
		(0.5227)			(0.6448)
Neuroticism	–0.9850***	–1.0150***	–1.4000***	–1.1128***	–1.3965***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Extraversion	0.2176***	0.1003	0.3667***	0.3324***	0.3909***
	(0.0000)	(0.1107)	(0.0000)	(0.0000)	(0.0000)
Conscientiousness	0.2261***	0.0743	0.6625***	0.5456***	0.7025***
	(0.0000)	(0.3239)	(0.0000)	(0.0000)	(0.0000)
Openness	0.2061***	0.2281***	–0.1079**	–0.0164	–0.1479**
	(0.0000)	(0.0001)	(0.0249)	(0.6536)	(0.0470)
Agreableness	0.3786***	0.4260***	0.5249***	0.4356***	0.5795***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Wave effects	Yes	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes	Yes
Occupation type	Yes	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes	Yes
Worked Hours	Yes	Yes	Yes	Yes	No
Worked Hours^2	Yes	Yes	Yes	Yes	No
r2					
N	180985	180985	90703	90623	92927

Table 4: **Life Satisfaction, Household Income and Personality Traits in a 3SLS structural model.** Dependent variable is Life Satisfaction, Income is in 10K USD, traits are normalized between 0 and 1 (p-values in brackets, robust std errors).

	Germany 2005 b/p	Germany 2005 b/p	UK 2005 b/p	UK 2005 b/p
Life Satisfaction				
Income	0.032	0.050***	–0.024	0.002
	(0.551)	(0.000)	(0.201)	(0.825)
Income^2	0.003		0.001	
	(0.396)		(0.185)	
Neur.× Income	0.215***	0.231***	0.231***	0.225***
	(0.009)	(0.000)	(0.000)	(0.000)
Neur.× Income^2	–0.008	–0.006***	–0.006***	–0.007***
	(0.101)	(0.000)	(0.005)	(0.000)
Neuroticism	–2.106***	–2.219***	–2.971***	–2.909***
	(0.000)	(0.000)	(0.000)	(0.000)
Extraversion	0.498***	0.499***	0.721***	0.717***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	–0.061***	–0.062***	–0.050***	–0.051***
	(0.000)	(0.000)	(0.000)	(0.000)
Age^2	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Male	–0.170***	–0.171***	–0.222***	–0.226***
	(0.000)	(0.000)	(0.000)	(0.000)
Education	Yes	Yes	Yes	Yes
Income				
Agreeableness	0.075	0.063	0.279*	0.273*
	(0.439)	(0.517)	(0.075)	(0.083)
Conscientiousness	0.140	0.130	0.774***	0.760***
	(0.183)	(0.218)	(0.000)	(0.000)
Openess	0.756***	0.753***	0.974***	0.944***
	(0.000)	(0.000)	(0.000)	(0.000)
Extraversion	0.215**	0.222**	0.873***	0.857***
	(0.013)	(0.011)	(0.000)	(0.000)
Neuroticism	–0.892***	–0.922***	–1.358***	–1.262***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	0.018***	0.018***	–0.009***	–0.009***
	(0.000)	(0.000)	(0.000)	(0.000)
Male	0.135***	0.136***	0.321***	0.324***
	(0.000)	(0.000)	(0.000)	(0.000)
Income at t−1	0.412***	0.411***	0.612***	0.619***
	(0.000)	(0.000)	(0.000)	(0.000)
N	13738	13738	9979	9979

Table 5: **Life Satisfaction Income and Personality Traits, structural 2SLS model using the entire panel of Germany and UK data**. Dependent variable is Life Satisfaction, Income is in 10K USD, traits are normalized between 0 and 1. Estimates of the structural model using a 2SLS estimator with individual random effects. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors).

	Germany (1) 1984-09 b/p	Germany (2) 1984-09 b/p	UK (3) 1996-08 b/p	UK (4) 1996-08 b/p
Income	0.101***		0.004	0.002
	(0.000)		(0.838)	(0.754)
Income^2	–0.002	0.004***	–0.000	
	(0.132)	(0.000)	(0.980)	
Neur.× Income	–0.013	0.161***	0.232***	0.236***
	(0.711)	(0.000)	(0.000)	(0.000)
Neur.× Income^2	0.001	–0.010***	–0.010***	–0.010***
	(0.721)	(0.000)	(0.000)	(0.000)
Neuroticism	–1.015***	–1.471***	–2.403***	–2.426***
	(0.000)	(0.000)	(0.000)	(0.000)
Extraversion	0.316***	0.317***	0.423***	0.423***
	(0.000)	(0.000)	(0.000)	(0.000)
Age	–0.027***	–0.026***	–0.043***	–0.043***
	(0.000)	(0.000)	(0.000)	(0.000)
Age^2	0.000***	0.000***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Male	–0.120***	–0.118***	–0.177***	–0.177***
	(0.000)	(0.000)	(0.000)	(0.000)
Education	0.019***	0.020***	0.007**	0.007***
	(0.000)	(0.000)	(0.012)	(0.010)
Wave effect	Yes	Yes	Yes	Yes
N	188433	188433	85171	85171

Table 6: **Life Satisfaction and Household Income in Germany and UK** Panel OLS with individual fixed effect for the German and UK data. Dependent variable is individual Life Satisfaction. Income is the Household Income in 10K 2005 USD. Controls for Employment status includes dummies for student, retired, unemployed, house-caring. Controls for occupation type are 43 dummies for German and 38 for UK data and includes sectors, socioeconomic groups and number of co-workers, health status is measured in terms of visits to the doctor. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors).

	Germany 1984-09 b/p	UK 1996-08 b/p	UK 1996-08 b/p
Income	0.0482***	0.0076***	0.0043**
	(0.0000)	(0.0002)	(0.0285)
Income^2	–0.0009***	–0.0001**	–0.0001
	(0.0000)	(0.0109)	(0.1623)
Age	–0.0117	–0.0492***	–0.0469***
	(0.7111)	(0.0006)	(0.0008)
Age^2	0.0003***	0.0004***	0.0004***
	(0.0000)	(0.0000)	(0.0000)
Worked hours	0.0087***	0.0016	0.0016
	(0.0000)	(0.1849)	(0.1809)
Worked hours^2	–0.0001***	–0.0000	–0.0000
	(0.0000)	(0.1283)	(0.1136)
Separated			–0.3818***
			(0.0000)
Divorced			–0.1662***
			(0.0000)
Wave effects	Yes	Yes	Yes
Region effects	Yes	Yes	Yes
Number of children	Yes	Yes	Yes
Education	Yes	Yes	Yes
Employment status	Yes	Yes	Yes
Marital status	Yes	No	No
Occupation type	Yes	Yes	Yes
Health Status	Yes	Yes	Yes
r2	0.043	0.021	0.023
N	260838	114304	115134

Table 7: **Life Satisfaction and Household Income in Germany and UK** Dependent variable is individual Life Satisfaction. Income is the Household Income in 10K 2005 USD (p-values in brackets).

	Germany Ord. Probit b/p	Germany OLS Panel fe b/p	UK Ord. Probit b/p	UK OLS Panel fe b/p
main				
Income in [50K;100K]	0.2078***	0.0669***	0.1753***	0.0443***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Income in [100K;150K]	0.4286***	0.1513***	0.2386***	0.0479***
	(0.0000)	(0.0000)	(0.0000)	(0.0002)
Income in [150K;200K]	0.4630***	0.1404***	0.2495***	0.0321
	(0.0000)	(0.0011)	(0.0000)	(0.1491)
Income in [200K;250K]	0.6160***	0.1742**	0.3565***	0.0784**
	(0.0000)	(0.0187)	(0.0000)	(0.0312)
Income in [250K;300K]	0.6112***	0.2701**	0.3711***	0.0781
	(0.0000)	(0.0394)	(0.0000)	(0.2022)
Income > 300K	0.0959***	0.0075	0.3446***	0.0631
	(0.0000)	(0.4735)	(0.0000)	(0.2983)
Age	–0.0688***	–0.0121	–0.0582***	–0.0493***
	(0.0000)	(0.2371)	(0.0000)	(0.0000)
Age^2	0.0008***	0.0003***	0.0007***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Male	–0.0833***		–0.0847***	
	(0.0000)		(0.0000)	
Worked hours	0.0062***	0.0090***	–0.0038***	0.0016
	(0.0000)	(0.0000)	(0.0000)	(0.1422)
Worked hours^2	–0.0001***	–0.0001***	0.0000	–0.0000
	(0.0000)	(0.0000)	(0.3919)	(0.1015)
Wave effects	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	No	No
Occupation type	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes
r2		0.040		0.021
N	273457	273457	114335	114335

Table 8: **Life Satisfaction, Income and Gender.** Panel Data with Individual Fixed Effects. Dependent variable is Life satisfaction, it includes control for age, age^2. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors),

	Germany	UK
	1984-09	1996-08
	b/p	b/p
Income	0.0425***	0.0075***
	(0.0000)	(0.0067)
Income^2	–0.0008***	–0.0001**
	(0.0000)	(0.0304)
Male*Income	0.0119**	0.0003
	(0.0133)	(0.9439)
Male*Income^2	–0.0002	0.0000
	(0.3060)	(0.6755)
Age	–0.0117	–0.0491***
	(0.7115)	(0.0006)
Age^2	0.0003***	0.0004***
	(0.0000)	(0.0000)
Worked hours	0.0087***	0.0016
	(0.0000)	(0.1825)
Worked hours^2	–0.0001***	–0.0000
	(0.0000)	(0.1257)
Wave effects	Yes	Yes
Region effects	Yes	Yes
Number of children	Yes	Yes
Education	Yes	Yes
Employment status	Yes	Yes
Marital status	Yes	No
Occupation type	Yes	Yes
Health Status	Yes	Yes
r2	0.043	0.021
N	260838	114304

Table 9: **Life Satisfaction and Individual Labor Income** with different income boundary. Panel Data with Individual Fixed Effects. Life satisfaction is the dependent variable, income is in 10K USD. Apart the regression with UK data and all observations, the peaks are always significantly smaller than the income upper bound (p-value < 0.01). p-values in brackets, robust std errors.

	Germany Income$< 600K$ b/p	Germany All b/p	UK Income$< 700K$ b/p	UK All b/p
Labor Income	0.0597***	0.0417***	0.0338***	0.0257***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Labor Income^2	–0.0011***	–0.0003***	–0.0006**	–0.0002*
	(0.0000)	(0.0000)	(0.0142)	(0.0609)
Age	–0.0071	–0.0054	–0.0471***	–0.0464***
	(0.8120)	(0.8571)	(0.0010)	(0.0011)
Age^2	0.0003***	0.0003***	0.0005***	0.0005***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Worked hours	0.0032***	0.0042***	0.0014	0.0016
	(0.0024)	(0.0000)	(0.3670)	(0.2899)
Worked hours^2	–0.0001***	–0.0001***	–0.0000**	–0.0000**
	(0.0000)	(0.0000)	(0.0401)	(0.0351)
Wave effects	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes
Occupation type	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes
r2	0.028	0.028	0.018	0.018
N	201454	201474	76119	76120

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Appendices

A The "Big Five" in the SOEP and BHPS datasets

I see myself as someone who:

1. (A) Is sometimes rude to others (*reverse-scored*).
2. (C) Does a thorough job.
3. (E) Is talkative.
4. (N) Worries a lot.
5. (O) Is original, comes up with new ideas.
6. (A) Has a forgiving nature.
7. (C) Tends to be lazy (*reverse-scored*).
8. (E) Is outgoing, sociable.
9. (N) Gets nervous easily.
10. (O) Values artistic, aesthetic experiences.
11. (A) Is considerate and kind to almost everyone.
12. (C) Does things efficiently.
13. (E) Is reserved (*reverse-scored*).
14. (N) Is relaxed, handles stress well (*reverse-scored*).
15. (O) Has an active imagination.

B Estimating the Structural Model

Now we determine the correct estimator for the model represented by equations 9 and 10. The error term of the latter, $\epsilon^y_{it} = \beta_2 v_{it} + u_{it}$, poses no problem, given that both 2SLS and 3SLS are non biased estimator when errors are cross-correlated between equations.

Considering now the 9, this can be rewritten as:

$$\begin{aligned} h_{it} = \alpha_1 + \beta_1 y_{it} + \delta y^2_{it} - \gamma \left(\frac{1-\beta_2}{\beta_2}\right)^2 N_i y^2_{it} - (Cu_{it} + B) N_i y_{it} + \\ - N_i \left(FE(u^2) + Gu_{it} + D\right) + FN_i \left(u^2_{it} - E(u^2)\right) + \Gamma_1 z_{it} + \lambda_E E_i + e_{it} \end{aligned} \tag{12}$$

Its error term can be written as:

$$\underline{\epsilon}^h_{it} = -GN_i u_{it} - CN_i y_{it} u_{it} + e_{it} \tag{13}$$

Given 4, y_{it} and u_{it} are correlated by construction. Substituting 10 in 13, we obtain:

$$\begin{aligned} \underline{\epsilon}^h_{it} = & - GN_i u_{it} - CN_i(A_2 + B_2 y_{it-1} + C_2 z_{it} + \\ & D_2\theta_{ai} + \beta_2 v_{it} + u_{it}) u_{it} + FN_i \left(u^2_{it} - E(u^2)\right) + e_{it} \end{aligned} \tag{14}$$

from where we note that

$$E(\underline{\epsilon}^h_{it}) - CN_i E(u^2) = 0. \tag{15}$$

Therefore, we define $\epsilon^h_{it} = \underline{\epsilon}^h_{it} + CN_i E(u^2)$ and we rewrite 12, as:

$$\begin{aligned} h_{it} = \alpha_1 + \beta_1 y_{it} + \delta y^2_{it} - \gamma \left(\frac{1-\beta_2}{\beta_2}\right)^2 N_i y^2_{it} - BN_i y_{it} + \\ - N_i \left((F+C)E(u^2) + D\right) + \Gamma_1 z_{it} + \lambda_E E_i + \epsilon^h_{it}, \end{aligned} \tag{16}$$

whose errors satisfy the conditional mean condition: $E(\epsilon^h_{it} | N_i, E_i, y_{it}, z_{it}) = 0$.

Figure 5: **Household Income distribution UK and Germany. Income in 10K 2005 USD.**

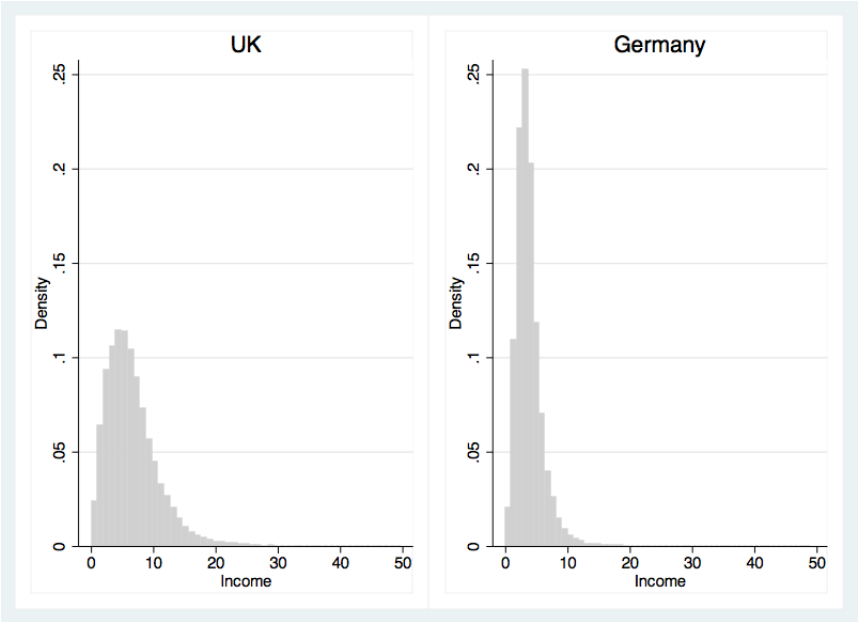

Figure 6: **USA: Happiness distributions in different income brackets**. The broken lines refer always to the richer of each pair. (Income expressed in 11 brackets). CDF of Life Satisfaction is in terms of residuals after removing the effects of age age^2 gender, year. In last panel, comparing groups with income in bracket 10 (income between 150K and 174K USD in the 2006 wave) and in brackets 11 (income >175K USD in the 2006 wave), the Kolmogorov-Smirnov test rejects the hypothesis that life satisfaction for poorer contains smaller values than for richer with a $p-$value $= 0.937$, while the opposite hypothesis hypothesis that life satisfaction for poorer contains larger values than for richer cannot be rejected at 10 percent confidence level, with a $p-$value $= 0.063$

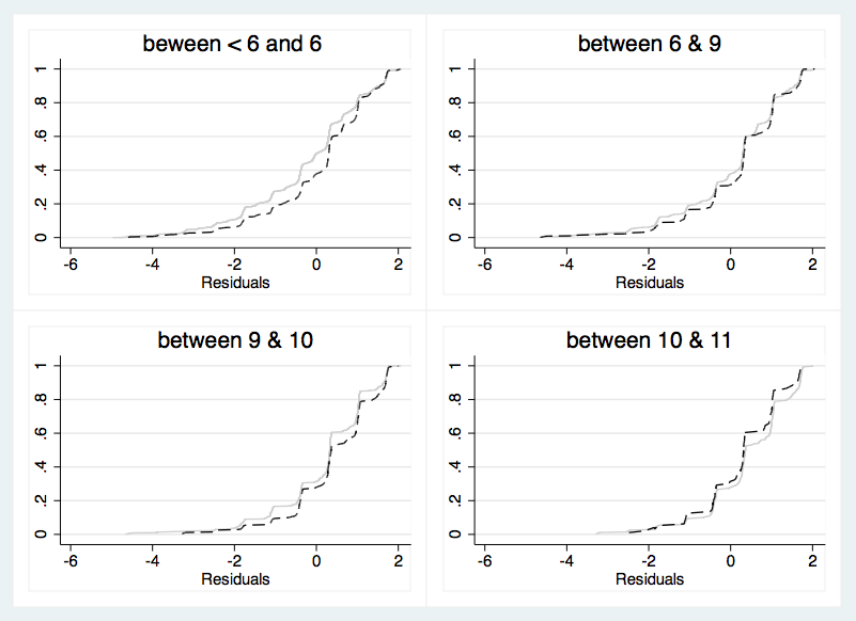

Table 10: **Life Satisfaction Income and Individually Adjusted Personality Traits in UK and Germany.** Panel Data with Individual Random Effects. Dependent variable is Life satisfaction, all regressions include control for Age, Age^2, Gender, omitted from the table. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors)

	Germany	Germany	UK	UK	UK
	1984-09	1984-09	1996-08	1996-08	1996-08
	b/p	b/p	b/p	b/p	b/p
Income	0.0533***	0.0363**	0.0006	0.0012	0.0086
	(0.0000)	(0.0253)	(0.7104)	(0.7234)	(0.1640)
Income^2	–0.0008***	–0.0011		–0.0000	
	(0.0000)	(0.1024)		(0.8490)	
Neur*Inc	0.0273***	0.0342***	0.0210***	0.0199**	0.0226***
	(0.0093)	(0.0019)	(0.0004)	(0.0270)	(0.0038)
Neur*Inc^2	–0.0011***	–0.0014***	–0.0003**	–0.0003	–0.0005**
	(0.0081)	(0.0022)	(0.0412)	(0.3482)	(0.0443)
Ext*Inc		0.0253**			–0.0015
		(0.0393)			(0.8485)
Ext*Inc^2		–0.0009			–0.0000
		(0.1193)			(0.8118)
Cons*Inc		0.0173			–0.0077
		(0.2735)			(0.3889)
Cons*Inc^2		0.0005			0.0001
		(0.4820)			(0.4952)
Open*Inc		–0.0006			0.0083
		(0.9590)			(0.2823)
Open*Inc^2		0.0000			–0.0002
		(0.9422)			(0.2596)
Agr*Inc		–0.0197			–0.0104
		(0.1344)			(0.2682)
Agr*Inc^2		0.0007			0.0002
		(0.2338)			(0.5626)
Neuroticism	–0.7841***	–0.8051***	–1.1173***	–1.1128***	–1.1184***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Extraversion	0.2167***	0.1359***	0.3324***	0.3324***	0.3427***
	(0.0000)	(0.0064)	(0.0000)	(0.0000)	(0.0000)
Conscientiousness	0.2086***	0.1262**	0.5456***	0.5456***	0.5874***
	(0.0000)	(0.0451)	(0.0000)	(0.0000)	(0.0000)
Openness	0.1860***	0.1885***	–0.0164	–0.0164	–0.0542
	(0.0000)	(0.0001)	(0.6531)	(0.6536)	(0.3481)
Agreableness	0.3316***	0.3967***	0.4357***	0.4356***	0.4922***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Wave effects	Yes	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes	Yes
Occupation type	Yes	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes	Yes
Worked Hours	Yes	Yes	Yes	Yes	No
Worked Hours^2	Yes	Yes	Yes	Yes	No
r2					
N	180907	180907	90623	90623	92846

Table 11: **Life Satisfaction Income and Residuals of Personality Traits in UK and Germany.** Panel Data with Individual Random Effects. Dependent variable is Life satisfaction, all regressions include control for Age, Age^2, Gender, omitted from the table. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-values in brackets, robust std errors)

	Germany 1984-09	Germany 1984-09	UK 1996-08	UK 1996-08
Income	0.0605***	0.0588***	0.0099***	0.0106***
	(0.0000)	(0.0000)	(0.0001)	(0.0000)
Income^2	–0.0012***	–0.0011***	–0.0002***	–0.0002***
	(0.0000)	(0.0000)	(0.0073)	(0.0078)
Male*Inc	0.0100**	0.0144***	0.0112***	0.0107***
	(0.0431)	(0.0031)	(0.0043)	(0.0075)
Male*Inc^2	–0.0002	–0.0004**	–0.0002	–0.0002*
	(0.4097)	(0.0329)	(0.1276)	(0.0931)
Neur*Inc	0.0066***	0.0087***	0.0059***	0.0055***
	(0.0008)	(0.0001)	(0.0002)	(0.0006)
Neur*Inc^2	–0.0003***	–0.0003***	–0.0001**	–0.0001**
	(0.0004)	(0.0001)	(0.0230)	(0.0194)
Ext*Inc		0.0081***		–0.0014
		(0.0023)		(0.4321)
Ext*Inc^2		–0.0003**		–0.0000
		(0.0119)		(0.9713)
Cons*Inc		0.0055*		–0.0013
		(0.0723)		(0.5283)
Cons*Inc^2		–0.0000		0.0000
		(0.9827)		(0.3785)
Open*Inc		–0.0009		–0.0009
		(0.7169)		(0.6394)
Open*Inc^2		0.0000		0.0000
		(0.7868)		(0.9473)
Agr*Inc		–0.0009		–0.0006
		(0.7449)		(0.7891)
Agr*Inc^2		0.0000		0.0000
		(0.7561)		(0.7427)
Neuroticism	–0.1658***	–0.1722***	–0.2723***	–0.2698***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Extraversion	0.0365***	0.0114	0.0533***	0.0625***
	(0.0000)	(0.2786)	(0.0000)	(0.0000)
Conscientiousness	0.0376***	0.0157	0.1273***	0.1326***
	(0.0000)	(0.2090)	(0.0000)	(0.0000)
Openness	0.0343***	0.0374***	–0.0156*	–0.0103
	(0.0000)	(0.0001)	(0.0616)	(0.4366)
Agreableness	0.0631***	0.0663***	0.0783***	0.0807***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Wave effects	Yes	Yes	No	No
Region effects	Yes	Yes	No	No
Number of children	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	No	No
Occupation type	Yes	Yes	No	No
Health Status	Yes	Yes	No	No
Worked Hours	Yes	Yes	No	No
Worked Hours^2	Yes	Yes	No	No
N	180985	180985	93725	93725

Table 12: **Life Satisfaction, Household Income and Traits, Ordered Probit estimators.** In the Ordered probit models the dependent variable is individual Life Satisfaction. Income is the household income in 10K 2005. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. (p-value < 0.001). p-values in brackets, robust std errors. USD

	Germany 1984-09 b/p	Germany 1984-09 b/p	UK 1996-08 b/p	UK 1996-08 b/p
lfsato				
Income	–0.0040	0.0066	0.0158***	–0.0059
	(0.6378)	(0.6424)	(0.0000)	(0.5950)
Income^2		–0.0007	–0.0002***	–0.0000
		(0.3388)	(0.0003)	(0.9812)
Neur*Inc	0.0259***	0.0223**		0.0333***
	(0.0036)	(0.0213)		(0.0000)
Neur*Inc^2	–0.0012**	–0.0009*		–0.0004*
	(0.0152)	(0.0833)		(0.0728)
Ext*Inc	0.0467***	0.0428***		–0.0024
	(0.0002)	(0.0014)		(0.7810)
Ext*Inc^2	–0.0020**	–0.0017*		–0.0001
	(0.0160)	(0.0526)		(0.6389)
Cons*Inc	0.0426***	0.0376**		0.0033
	(0.0024)	(0.0107)		(0.7266)
Cons*Inc^2	–0.0001	0.0003		0.0003
	(0.9261)	(0.7638)		(0.3574)
Open*Inc	–0.0097	–0.0089		0.0006
	(0.4845)	(0.5215)		(0.9467)
Open*Inc^2	0.0010	0.0009		0.0001
	(0.3277)	(0.3698)		(0.7776)
Agr*Inc	0.0406***	0.0371***		0.0061
	(0.0017)	(0.0065)		(0.5929)
Agr*Inc^2	–0.0008	–0.0006		–0.0002
	(0.2896)	(0.4740)		(0.6186)
Neuroticism	–0.8956***	–0.8865***	–1.1533***	–1.3385***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Extraversion	0.0730*	0.0822**	0.3683***	0.3907***
	(0.0675)	(0.0466)	(0.0000)	(0.0000)
Conscientiousness	0.1415***	0.1540***	0.6263***	0.5793***
	(0.0024)	(0.0014)	(0.0000)	(0.0000)
Openness	0.2095***	0.2079***	–0.0969***	–0.0986*
	(0.0000)	(0.0000)	(0.0000)	(0.0544)
Agreableness	0.2679***	0.2768***	0.5583***	0.5349***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Wave effects	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Occupation type	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes
Worked Hours	Yes	Yes	Yes	No
Worked Hours^2	Yes	Yes	Yes	No
r2				
N	180985	180985	90651	92874

Table 13: **Life Satisfaction and household, Ordered Probit and Logit estimators.** In the Ordered probit models the dependent variable is individual Life Satisfaction, the individual random effect is included. In the logit models the dependent variables are expressed in terms of deviation from the personal life satisfaction intertemporal average, so that the dependent variables take the value 1 when the report is above or equal to each individual's average and 0 otherwise (see Ferrer-i-Carbonell and Frijters 2004). Income is the household income in 10K 2005. Individuals who reported household income larger that 700K USD and larger than 800K USD are excluded from respectively German and UK Data. The peaks are always significantly smaller than the income upper bound (p-value < 0.001). p-values in brackets, robust std errors. USD

	Germany Ord.Probit b/p	Germany Logit b/p	UK Ord.Probit b/p	UK Logit b/p
main				
Income	0.096***	0.105***	0.016***	0.016***
	(0.000)	(0.000)	(0.000)	(0.001)
Income^2	–0.002***	–0.002***	–0.000***	–0.000**
	(0.000)	(0.000)	(0.000)	(0.031)
Neuroticism	–0.822***		–1.153***	
	(0.000)		(0.000)	
Extraversion	0.211***		0.368***	
	(0.000)		(0.000)	
Conscientiousness	0.303***		0.626***	
	(0.000)		(0.000)	
Agreeableness	0.406***		0.558***	
	(0.000)		(0.000)	
Openness	0.191***		–0.097***	
	(0.000)		(0.000)	
Age	–0.073***	–0.098***	–0.070***	–0.101***
	(0.000)	(0.000)	(0.000)	(0.001)
Age^2	0.001***	0.001***	0.001***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Male	–0.090***		–0.122***	
	(0.000)		(0.000)	
Wave effects	Yes	No	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	No
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Occupation type	Yes	No	Yes	Yes
Health Status	Yes	No	Yes	Yes
Worked Hours	Yes	Yes	Yes	Yes
Worked Hours^2	Yes	Yes	Yes	Yes
N	180985	262419	90651	101967

Table 14: **Life Satisfaction, traits and household Income: different income boundary.** Panel Data with Individual Random Effects. Life satisfaction is the dependent variable, all regressions include control for age, age^2, gender, worked hours, worked hours^2; income is in 10K USD. p-values in brackets, robust std errors.

	Gearmany All b/p	Geamany income$< 500K$ b/p	UK All b/p	UK income$< 500K$ b/p
Income	–0.0056	0.0222	0.0077	0.0094
	(0.7233)	(0.3068)	(0.2158)	(0.2258)
Income^2	0.0007**	–0.0016		
	(0.0487)	(0.1144)		
Neur*Inc	0.0365***	0.0356***	0.0170***	0.0264**
	(0.0002)	(0.0070)	(0.0023)	(0.0115)
Neur*Inc^2	–0.0009***	–0.0011*	–0.0002***	–0.0007**
	(0.0003)	(0.0507)	(0.0000)	(0.0444)
Ext*Inc	0.0266**	0.0384**	–0.0062	–0.0158
	(0.0348)	(0.0435)	(0.4176)	(0.2035)
Ext*Inc^2	–0.0007	–0.0015	0.0001	0.0006
	(0.1025)	(0.1767)	(0.5905)	(0.1879)
Cons*Inc	0.0501***	0.0414**	–0.0040	–0.0061
	(0.0003)	(0.0450)	(0.6153)	(0.6710)
Cons*Inc^2	–0.0010***	–0.0002	0.0000	0.0001
	(0.0036)	(0.8405)	(0.6263)	(0.7731)
Open*Inc	–0.0206*	–0.0234	0.0043	0.0124
	(0.0689)	(0.1764)	(0.5632)	(0.3228)
Open*Inc^2	0.0009***	0.0018*	–0.0001	–0.0004
	(0.0019)	(0.0660)	(0.2732)	(0.2878)
Agr*Inc	–0.0017	–0.0175	–0.0073	–0.0043
	(0.8905)	(0.3376)	(0.3515)	(0.7630)
Agr*Inc^2	–0.0004*	0.0006	0.0001	–0.0002
	(0.0674)	(0.4691)	(0.3409)	(0.6435)
Neuroticism	–0.9964***	–0.9862***	–1.3820***	–1.4113***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Extraversion	0.1287**	0.1004	0.4031***	0.4331***
	(0.0267)	(0.1363)	(0.0000)	(0.0000)
Conscientiousness	0.0478	0.0648	0.6864***	0.6920***
	(0.4840)	(0.4097)	(0.0000)	(0.0000)
Openness	0.2699***	0.2610***	–0.1265*	–0.1579**
	(0.0000)	(0.0000)	(0.0628)	(0.0490)
Agreableness	0.3947***	0.4376***	0.5660***	0.5637***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Wave effects	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Occupation type	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes
r2				
N	181004	180974	92954	92885

Table 15: **Income and Job Motivation in Germany.** Panel Data with Individual Fixed Effects. Dependent variable is Household Income, (p-values in brackets, robust std errors)

	Germany Income b/p	Germany Income b/p	Germany Income b/p	Germany Log(Income) b/p
Success Important	0.2211***	0.1914***	0.1759***	
	(0.0002)	(0.0011)	(0.0030)	
Success Important^2	–0.0352***	–0.0282**	–0.0257**	
	(0.0015)	(0.0110)	(0.0214)	
Age		0.0135***	–0.2191*	
		(0.0000)	(0.0608)	
Log Success Imp.				0.0270***
				(0.0001)
Constant	3.6208***	3.0762***	10.4895***	1.1905***
	(0.0000)	(0.0000)	(0.0052)	(0.0000)
Wave effects	No	No	Yes	No
Education	No	No	Yes	No
r2	0.001	0.003	0.013	0.001
N	51717	51717	50598	51706

Table 16: **Life Satisfaction and household Income: different income boundary.** Panel Data with Individual Fixed Effects. Life satisfaction is the dependent variable, income is in 10K USD.(p-value < 0.01). p-values in brackets, robust std errors.

	Germany All b/p	Germany income$< 500K$ b/p	UK All b/p	UK income$< 500K$ b/p
Income	0.0393***	0.0549***	0.0048***	0.0124***
	(0.0000)	(0.0000)	(0.0006)	(0.0000)
Income^2	–0.0004***	–0.0014***	–0.0000	–0.0003***
	(0.0000)	(0.0000)	(0.1146)	(0.0000)
Age	–0.0113	–0.0119	–0.0489***	–0.0498***
	(0.7207)	(0.7059)	(0.0006)	(0.0005)
Age^2	0.0003***	0.0003***	0.0004***	0.0004***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Worked hours	0.0088***	0.0087***	0.0017	0.0015
	(0.0000)	(0.0000)	(0.1698)	(0.2152)
Worked hours^2	–0.0001***	–0.0001***	–0.0000	–0.0000
	(0.0000)	(0.0000)	(0.1264)	(0.1462)
Wave effects	Yes	Yes	Yes	Yes
Region effects	Yes	Yes	Yes	Yes
Number of children	Yes	Yes	Yes	Yes
Education	Yes	Yes	Yes	Yes
Employment status	Yes	Yes	Yes	Yes
Marital status	Yes	Yes	No	No
Occupation type	Yes	Yes	Yes	Yes
Health Status	Yes	Yes	Yes	Yes
r2	0.043	0.043	0.021	0.021
N	260861	260818	114335	114246