Au-delà du PIB : une évaluation de la croissance du bien-être monétaire dans 14 pays européens et aux États-Unis

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Annexe en ligne

S1 – Accounting for Unemployment: Two Dimensions Real Feel GDP

Our measure of well-being does not pretend or even seek to construct a full measure of welfare. On the contrary, we assume to stick as much as possible to the income contribution to welfare. This is the reason not accounting for important no-monetary dimensions of subjective well-being such as leisure or security.

Nonetheless, the exception we may consider is unemployment. Disregards of the social disutility of unemployment, the direct effect of losing his job is to have a sharp decrease in income, more or less important, depending upon how protective are unemployment insurance benefits. In a perfect world, the income data would capture income loss; in the real world, they are many good reasons to think that it is not the case. First, income in not perfectly measured by surveys. In addition, surveys rely on so-called "ordinary households", and thus exclude a significant part of unemployed persons, particularly among young or homeless people.

Apart from measurement issues, accounting for unemployment in our effort to measure monetary well-being would attempt to incorporate some prospective elements in the evaluation of current monetary well-being. Indeed, a branch of welfare economic define well-being as the discounted sum of current and future incomes. In this framework, a higher unemployment rate increases the probability to lose one's job, or the frequency of expected unemployment periods and therefore decreases expected well-being.

Accounting for unemployment implies modifying the preference curve (5) as follows:

$$LS_i = \omega + \mu \frac{(y_i/\bar{y})^{1-\tau}}{1-\tau} + \delta\, U_i + \theta_i \qquad \text{(S1.1)}$$

where U_i is a dummy equal to 1 if individual i is unemployed. We estimate this new specification on the French SRCV survey, setting the parameter τ at 1.9 as in Section 3 above. We gather the results of the linear estimation are given in Table S1-1 below.

Table S1-1 **– Two dimensions satisfaction curve (Income & Unemployment)**

Dependent variable	Estimated value	Standard error	t-test value
Income	τ =1.988383***	0.0438	45.35
Income	ω =0.661845***	0.0118	56.01
Unemployment	δ=−0.61948***	0.0200	−13.46
Intercept	μ =8.141783***	0.0380	214.09
DDL-Error	149E3	Root MSE	84.2835
R square	0.0533	Adjusted R-square	0.0533
Year	2010-2019	Number of obs.	149.066

We find a very significant effect of unemployment life satisfaction,[1] losing one's job resulting, everything else being equal, in a 0.62 decrease in life satisfaction within a 95% confidence interval of [0.58-0.66]. Note that the marginal satisfaction of income τ (1.99+/−0.04) is very close to the value obtained without including unemployment within dependent variable (2.06 +/−0.04).

[1] *We certainly also capture purely subjective effect link we unemployment status, which justify a specific denomination for the synthetic index accounting for unemployment.*

Money value of mean national satisfaction y^* now satisfies the equation:

$$n\mu\bar{y}(\sigma)^{1-\tau}\frac{(y*/\bar{y})^{1-\tau}}{1-\tau}+\delta\, n\times u^* = \mu\sum_i\frac{(y_i/\bar{y})^{1-\tau}}{1-\tau}+\delta\, n_U \qquad \text{(S1.2)}$$

where n_U is the number of unemployed in the country and u^* the probability of being unemployed in the reference situation ("full employment"). Since basic RFGDP relates to income by the equation $\sum_i\frac{(y_i/\bar{y})^{1-\tau}}{1-\tau} = n/(1-\tau)\times RFGDP^{1-\tau}$, the two dimensions real feel GDP (from now on referred as *2D.RFGDP*) derives simply from *RFDGP* as follows:

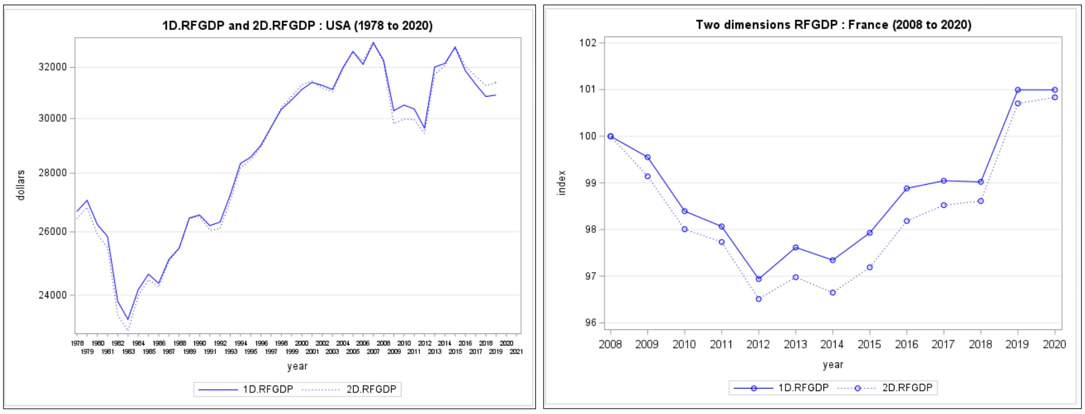
$$2D.RFGDP = \left[RFGDP^{1-\tau}+\frac{\delta}{\mu\,\bar{y}}(1-\tau)(u-u^*)\right]^{1/(1-\tau)} \qquad \text{(S1.3)}$$

where u is the rate of unemployment. Since our τ is greater than 1 and δ negative, the higher the employment rate u the lower $2D.RFGDP$.

Not surprisingly, levels and trends of *RFDGP* and *2D.RFDGP* are roughly comparable (see Figure S1-I). More significant, though not decisive are the cyclical patterns: our two-dimensions indicator of well-being is higher in periods of low unemployment and lower in the counterfactual situation.

For the USA, the fall monetary well-being between 2007 and the 2012 bottom is of 10.8% with the *2D. RFGDP*, compared to −10.2% with real feel GDP. If we compute one-dimension indicator with the τ and μ preferences of Table S1-1 (with unemployment) instead of Table 1 (without unemployment), we would have found −7.4%. This means that the money value of loss well-being during the 2007 due to unemployment equals 3.4% that is on third of national well-being loss. But as anticipated above, a part of it is captured by the income effect and in the end the one-dimension indicator (without GDP) only underestimates the two-dimensions one by 0.8%.

Figure S1-I – **Two dimensions Real Feel GDP for USA (left) and France (right)**



We end that section noting that one can straightforwardly extend (S1.1) to other non-monetary dimensions of life satisfaction such as health, security, framework of relationship, etc.:

$$nD.RFGDP = \left[RFGDP^{1-\tau}+\sum_{k=1}^{n}\frac{\delta_k}{\mu\,\bar{y}}(\tau-1)(e^*-e_k)\right]^{1/(1-\tau)} \qquad \text{(S1.4)}$$

where e_k is a state variable equal to 0 if bad (bad health, unemployed, etc.) and 1 if good, and e^* a reference probability of good value for e_k. On difficulty would be the data availability to compute *nD.RFGDP* over a large number of country and periods of time. For example, we could easily estimate preferences of the following form:

$$LS_i = \omega + \mu \frac{(y_i/\bar{y})^{1-\tau}}{1-\tau} + \delta\, U_i + \gamma\, S_i + \theta_i \qquad \text{(S1.5)}$$

with $S_i = 0$ if i has a serious illness or disability, and $S_i = 1$ otherwise. However times series and international comparisons would require international data basis of the number of persons having a serious illness or disability, which is not the case. The next generation of national accounts, to be issued in 2025, will include, among other extension, satellite accounts on health, education. Agreeing on such statistics, beyond widespread life expectancy indictor, would certainly allow significant step forward in welfare economics.

With health and unemployment (25) look like very similar to Boarini et *al.* (2016) multi-dimensional standard of living (MDLS, see Online Appendix S2). However, while they estimate μ and δ_k from cross-country regression and take a normative value for τ, we would estimate all three parameters on a micro data within country basis.

S2 – Real Feel GDP and Multi-Dimensional Standard of Living

There is a certain similarity between our perceived GDP and the multidimensional standard of living, the MDSL (for Multi-Dimensional Standard of Living) of the OECD. With some simplifications, on can write MDSL as: $\left(1/n \sum_i {y_i^*}^{1-\tau}\right)^{1/(1-\tau)}$ where y_i^* is the "equivalent income", i.e. the income providing the same overall level of satisfaction as the actual situation as the actual income, but with reference values for the non-monetary dimensions of well-being between terms of well-being.

By noting m_i the income, Λ_i non-monetary determinant of well-being (employment status, health, social relations, etc.), the m_i^*s are calculated by solving the equation: $V(y_i, \Lambda_i) = V(y_i^*, \Lambda^*)$) where the Λ^* are the reference values of the Λ_i.

Taking as functional form of the welfare function$V(y_i, \Lambda_i) = \log(y_i) + \Gamma\Lambda_i$, one obtains as value of equivalent income as: $y_i^* = y_i \times \exp(\Gamma(\Lambda_i - \Lambda^*))$. They finally aggregate the equivalent incomes of individuals or groups of individuals using Atkinson's generalized mean:

$$MDSL \equiv (1/n \sum_i y_i \times \exp[\Gamma(\Lambda_i - \Lambda^*)]^{1-\tau})^{1/(1-\tau)} \qquad \text{(S2.1)}$$

Equation S2.1 show similarities with RFGDP, which we shall write as (see equation (4) in the core of the paper):

$$RFGDP \equiv \left(1/n \sum_i (y_i + X_i Q)^{1-\hat{\tau}}\right)^{1/(1-\hat{\tau})} \qquad \text{(S2.2)}$$

where y_i is disposable income of individual i and $X_i Q$ a monetary value of public services expenditure.

However; as far as MDSL is concerned, the non-monetary components of well-being are valued according to their impact on life satisfaction, while in our real feel GDP, they are proportional to the public expenditure devoted to public services contributing to the quality of life. In a sense, real feel GDP accounts for non-monetary aspects of well-being in a way corresponding to the notion of capabilities as conceptualized by Sen (1994).

The second difference is that the relative aversion to inequalities τ, and therefore the weight of each social group in the overall index, is a normative parameter with the MDSL whereas it is estimated with the real feel GDP, under the natural hypothesis, admittedly normative but nevertheless widely acceptable, of a social well-being adding up individual well-being.

S3 – RFDGP and Equivalence Scales

We deal here with the important question the consequences of equivalence scales choices on RFGDP computation. Y_i of individual i, but in reality is not observable. What is generally in the datasets is the total income of households. Primary incomes such as wages are paid on an individual basis, but transfers such as family or social allowances follow a household logic. The same goes for taxes: social security contributions or the CSG are individual levies, but income tax relates to the household. This arises the question of how to attribute this household to individuals.

Reasoning at the level of household income rather than individual is clearly to be ruled out. One cannot consider a couple with same income for the two as single person for itself having with the same income. Then remains three possibilities. The most next immediate method is to divide household income by the number of family members (*equally split* equivalence scale). An intermediate solution, recommended in the WIL DNA handbook to avoid the delicate question of attributed income of children as individuals, is to split the income of the household between the adults as, either equally (*equally split adult* equivalence scale) or when data is available such as for USA, splitting equally only non-individualizable income.

The third method is to use an equivalence scale accounting for "economies of scale" within households due to common goods (see Nelson (1992) for a survey). National Institute of Statistics usually use the OECD scale, attributing 1 to the reference adult of household and 0.5 to other persons over 14 years old (0.3 under 14). Another current equivalent scale relies on the square root of the family size. The total rescaled family size is called "consumption unit".

We call Y_{ij} the income of individual i of family j, n_j the family size, $\sigma(n_j)$ the number of consumption units and $Y_{.j}$ the household income, we get $Y_{ij} = Y_{.j}/\sigma(n_j)$. If we define RFGDP as $\Upsilon(\hat{\tau})$ where $\Upsilon(\tau)$=$(1/n\sum_{ij} Y_{ij}^{1-\tau})^{\frac{1}{1-\tau}}$, the property of an indicator equating GDP for τ=0 does not hold. In this case indeed:

$$\Upsilon(\tau) = (1/n\sum_j n_j \left(\frac{Y_{.j}}{\sigma(n_j)}\right)^{1-\tau})^{\frac{1}{1-\hat{\tau}}} \qquad \text{(S3.1)}$$

$$\Upsilon(0) = 1/n\sum_j n_j/\sigma(n_j)Y_{.j} \qquad \text{(S3.2)}$$

The right-hand side terms of equation (S3.2) sums to *Y/n* only in the case $\sigma(n_j) = n_j$. In other cases, since If $\sigma(n_j) < n_j$, we have $\Upsilon(0) > GDP$. Even with household having no aversion to the risk of income loss, a society with more families would be better than a society with more singles because of those economies of scale. Note that within a group household by family type k, if we call μ_k=$n_j/\sigma(n_j)$ the multiplier effect, and $\Upsilon(\hat{\tau},\mathrm{k})$ the real feel GDP of the corresponding individuals, we have:

$$\Upsilon(\hat{\tau},\mathrm{k}) = \mu_k\left[1/n_k\sum_{j\in k} n_j \left(\frac{Y_{.j}}{n_j}\right)^{1-\hat{\tau}}\right]^{\frac{1}{1-\hat{\tau}}} \qquad \text{(S3.4)}$$

The real feel GDP of a group of individuals with this same economy of scale $1/\mu_k$ is equal to the real feel GDP of group k computed with equally split equivalence scale multiplied by μ_k. For $\hat{\tau} = 0$, we find that $RFGDP(0,\mathrm{k})$ is equal to the per capita net national income time μ_k. If we decompose (19A) by group of income, we can write: $\Upsilon(\hat{\tau})^{1-\hat{\tau}} = 1/n\sum_k \mu_k \sum_{j\in k} n_j\left(Y_{.j}/n_j\right)^{1-\hat{\tau}}$. Since $\Upsilon(\hat{\tau},\mathrm{k})^{1-\hat{\tau}} = 1/n_k\sum_{j\in k} n_j\left(Y_{.j}/n_j\right)^{1-\hat{\tau}}$, we find that $\Upsilon(\hat{\tau})$ is equals to:

$$\text{RFDGP} = \Upsilon(\hat{\tau}) = \mathrm{M} \times \left(\sum_k \theta_k \Upsilon(\hat{\tau}, \mathrm{k})^{1-\hat{\tau}}\right)^{\frac{1}{1-\hat{\tau}}} \qquad \text{(S3.5)}$$

where $M = \sum_k \mu_k n_k \,/ \sum_k n_k$ and $\theta_k = \mu_k n_k / \sum_k \mu_k n_k$. Real feel GDP is equal to the product of a weighted general average of $\mathcal{R}(\hat{\tau}, \mathrm{k})$ times a multiplying factor M representing the national economy of scale due to family compositions. For $\hat{\tau}, \Upsilon(O) = M \sum_k \theta_k \bar{Y}_{.k}$, is a weighted average of per capita income times the multiplying factor. Note that $\theta_k \bar{Y}_{.k}$=$n_k Y_{.k} / \sigma(n_k) / \sum_k \mu_k n_k$ so that $RFGDP(O)$ is also equal to $1/n \sum_k n_k Y_{.k} / \sigma(n_k)$ or, the weighted average of per category and per consumption unit net national income.

This simple calculation shows that in a welfare approach, even ignoring aversion to inequality, per consumption unit incomes should be aggregated regarding to the number of individual in each category n_k rather than to consumption unit, even if the result is different from aggregated net national income per consumption unit ($\Upsilon/\sigma(n) \neq 1/n \sum_k n_k Y_{.k}/\sigma(n_k)$).

For the equally split adult scale of equivalence, Alvaro *et al.* (2016) consider only parents. If we follow this convention, real feel GDP would be equal to:

$$\widehat{\Upsilon}(\hat{\tau}) = \left(1/n_A \sum_j n_j^A \left(Y_{.j}/n_j^A\right)^{1-\hat{\tau}}\right)^{\frac{1}{1-\hat{\tau}}} \qquad \text{(S3.6)}$$

where n_j^A is the number of adults in household j (1 or 2) and n_A the number or household in the economy. $\widehat{\Upsilon}(\hat{0})$ would be equal to per adult net national income. The multiplying factor aforementioned would implicitly be equals to the ratio of total population to adult population. An alternative would be to re-introduce children in the analysis, and attribute them the standard of living of their parents. Then real feel GDP equals to:

$$\widetilde{\Upsilon}(\hat{\tau}) = \left[1/n \sum_j n_j \left(\frac{Y_{.j}}{n_j^A}\right)^{1-\hat{\tau}}\right]^{\frac{1}{1-\hat{\tau}}} \qquad \text{(S3.7)}$$

In this case, equality (S3.5) holds with multiply effect of economies of scales equals to $\mu_k = \frac{k}{2}$ for two parents' families of size k, and $\mu_k = k$ for mono parental families with k-1 children.

S4 – Robustness

4.1. Robustness of Inequality Aversion Parameter Estimates

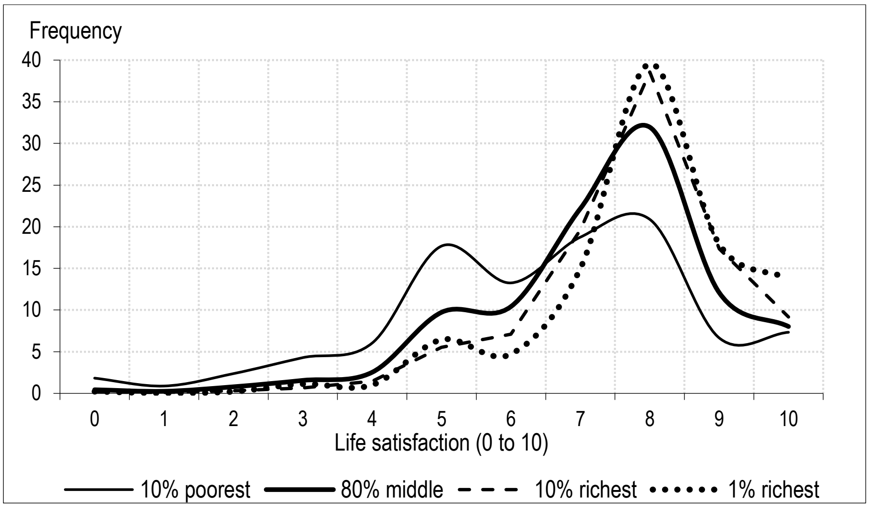
Critical in our results is the satisfaction function estimate. In the limit, in a world with infinite income substitution elasticity, Real Feel GDP would be equal to GDP, or more precisely to per capita net national product. For this reason, we took great care in estimating the τ parameter, confronting microeconomic data estimates on large samples surveys, and cross-country assessments.

In this box, we examine a question that we have temporarily left out. We have done so far as if the answers to the survey question on life satisfaction was life satisfaction itself. However, the people surveyed are not asked to rate their well-being freely, but to do so in a scale of 0 to 10, 0 meaning as already said, “not at all satisfied”, and 10 “very satisfied. If one answers 10 for a giving year and feels even more satisfied in life the following year, he/she would be forced by the questionnaire to answer 10, whilst he/she would have liked to spontaneously note her life at 11, 12 or more.

This classical truncation effect could have a particularly damaging effect for our purpose, since it could bring out the monetary well-being function more curved than it really is. To look at this question, we first examine the distribution of life satisfaction for the bottom 10%, 80% middle, 10% and 1% richest. Figure S4-I suggests that this phenomenon exists, but is not likely to modify our results in a decisive way. First, among the 10% at the top of the income ladder, only 9% answer 10. Say otherwise, 91% of them are not constrained by the 10 ceiling of the Cantril ladder. The percentage of 10 increases as income rises, but very slightly, reaching 13% for the 1% richer, while 7% of the 10% poorest also answer to be very satisfied of their life.

These distributions from the French SRCV surveys concerning the economic determinants of well-being should be interpreted as follows: money does not make happiness, but lacking money makes life more difficult: 33% of the poorest 10% rate their life satisfaction less than or equal to 5; the percentage is of 8% for the 10% richest.

Figure S4-I – **Life satisfaction distribution by income group**

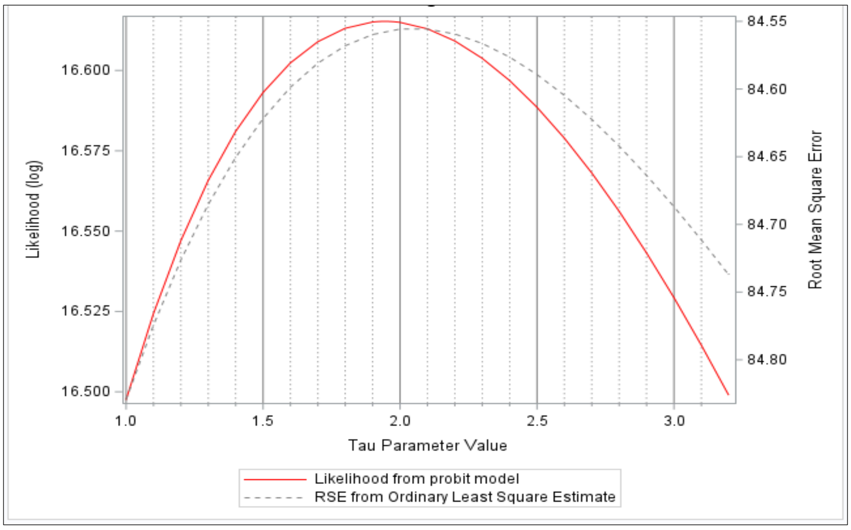


To measure the impact of discrete choices and 10 ceiling, we assume here that satisfaction is a continuous variable determined by $S_i = \mu/(1-\tau)\,(r_i/\bar{r})^{1-\tau} + \omega + \varepsilon_i$ where ε_i is a randomly distributed residual with respectively density f and cumulative density F. We note $R_i(S_i)$ the discrete answer ranking from 0 to 10 of individual i when surveyed on life satisfaction. Individual i is supposed to answer k if: $k - 1 + \delta_{k-1} \leq S_i < k + \delta_k$. Hence: $p(R_i = k) = F^{-1}(k + \delta_k - \mu\,/(1-\tau)(r_i/\bar{r})^{1-\tau} - \omega) - F^{-1}(k - 1 + \delta_{k-1} - \mu/(1 - \tau)(r_i/\bar{r})^{1-\tau} - \omega)$. This implies: $F(p(R_i \leq k)) = \; k + \delta_k - \mu/(1-\tau)\,(r_i/\bar{r})^{1-\tau} - \omega$.

We recognize here the logistic model $g\big(p(R_i = k)\big) = \alpha_k + \beta x$ with the link function g equals to F, $x = (r_i/\bar{r})^{1-\tau}$, $\beta = \mu/(1-\tau)$, and $\alpha_k = k \,+\, \delta_k - \omega$.

We estimate the parameter τ with maximum likelihood method using alternatively, as link functions, a cumulative probit or cumulative logit. In both cases, the optimal value is 1.94, a value logically smaller than the one obtained through ordinary least square (1.94 *versus* 2.05), but, as could also be inferred from the distribution curve of Figure S4-I above, the OLS bias is quite low.

Figure S4-II – **Maximum likelihood estimate of τ with logistic model for satisfaction**



Full results for the logistic case with parameter τ equal to 1.94 are gathered on Table S4-I below. This Table also shows the estimated range of S for each value of the Cantril ladder ($k - 1 + \delta_{k-1} \leq S_i < k + \delta_k$). We would expect at least that $k + \delta_k$ would be lower than $k + 1$, which is generally the case.

The exception is for R equal to 0 and 1: answers are 0 until S=1.8 while we would expect a answer of 1 for S<1 ; the shift is much smaller for R=1 since the rank here is 1.8<S<2.2 for an expected range of 1<S<2. Beyond that point, all results are consistent: R=2 for S between 2.2 and 2.9 for an expected interval of 2< S <3 , R=3 for S between 2.8 and 3.7…and so on. The three widest ranges are, in decreasing order, for 8 and for 5, unsurprisingly since we already noticed concentration of the distribution on those two values (cf. Figure S4-I).

Table S4-1 – **Estimate of satisfaction curve using logit model**

	Estimated value	Standard error	Estimated Range for S	Cantril ladder R(S)
$\mu/(1-\tau)$,	-0.7298***	0.000178		
α_0	-5.8878***	0.000647	S<1.8	0
α_1	-5.1384***	0.000487	1,8<S<2,2	1
α_2	-4.4159***	0.000392	2,2<S<2,9	2
α_3	-3.7843***	0.000340	2,9<S<3,7	3
α_4	-2.6713***	0.000290	3,7<S<4,3	4
α_5	-2.0178***	0.000274	4,3<S<5,4	5
α_6	-1.0331***	0.000258	5,3<S<6,1	6
α_7	0.4548***	0.000257	6,1<S<7,1	7
α_8	1.5251***	0.000289	7,1<S<8,6	8
α_9	-0.7298***	0.000178	8,6<S<9,6	9
			S>9,6	

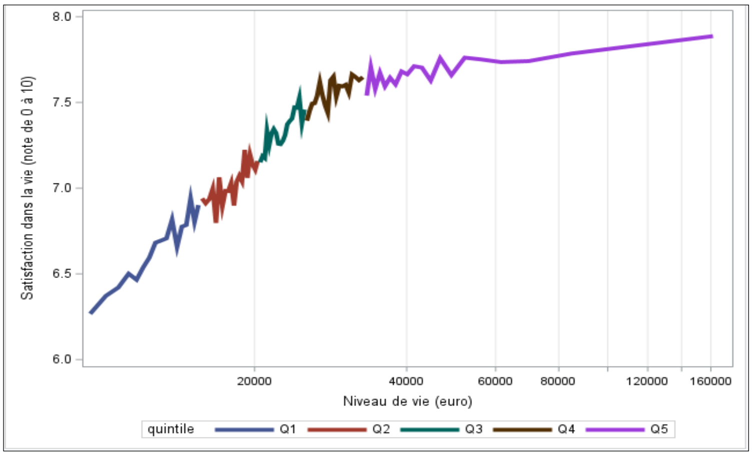
4.2. Robustness: Alternative to CRRA Preferences

The rejection of the log to represent preferences (cf. Section 3.1 and 3.2) does not mean that the log is disqualified for more homogeneous income subcategories of the population as in Boarini *et al.* (2022). On the contrary, by breaking down our sample by quintile (see Figure S4-II and Table S4-2), the logarithmic linearity appears consistent with our data for all quintiles with the notable exception of the top one. Another acceptable functional form of preferences could therefore be $V(y) = \omega + \mu_i \log\left(\frac{y}{\bar{y}}\right)$ for quintiles 1 to 4 with different parameter μ_1 to μ_4 and $V(y) = \omega + \mu_5 \frac{(y_i/\bar{y})^{1-\tau_5}}{1-\tau_5}$ for y's within the 5th quintile.[2]

Table S4-2 – **Preferences estimates by quintile subgroups of individuals**

	τ	μ	$\hat{S}(\bar{y})$	Average income	Average satisfaction	Observations
All	2.06 (0.04)	0.70 (0.01)	7.44	26,600	7.24	148,619
Poorest 20% - Q1	1.47 (1.00)	1.26 (0.10)	6.55	11,800	6.61	25,029
Next 20% - Q2	1.13 (3.09)	1.29 (1.69)	6.51	18,100	7.02	30,472
Next 20% - Q3	1.10 (3.90)	1.41 (1.02)	7.64	22,700	7.32	305,722
Next 20% - Q4	3.59 (4.85)	0.78 (0.20)	7.53	28,700	7.56	30,834
Richest 20% - Q5	1.74 (0.49)	0.36 (0.13)	7.53	51,700	7.68	310,712
Poorest 20% - Q1	1.00	1.24 (0.09)	7.57	11,800	6.61	25,029
Next 20% - Q2	1.00	1.11 (0.14)	7.47	18,100	7.02	30,472
Next 20% - Q3	1.00	1.43 (0.15)	7.59	22,700	7.32	305,722
Next 20% - Q4	1.00	0.68 (0.11)	7.53	28,700	7.52	30,834
Richest 20% - Q5	1.00	0.20 (0.02)	7.58	51,700	7.68	30,712

Figure S4-III – **Life satisfaction as a function of log income**



Note that the log would be an acceptable representation of preferences on the condition that all μ_k would be equal and that τ_5 would equal one, which our data exclude (Table S4-2). Indeed, the μ_k starting from a level around 1.3 on average for the first three quintiles, then decrease sharply with μ_4=0.68 and μ_5=0.20 compared to the first three quintiles of μ between 1.11 and 1.43. Our data do not confirm the existence of a "social comparison" effect, which would lead to people comparing themselves more to those in an identical situation than to others. On the contrary, $S(\bar{y})$ is lower for the two lower quintiles than the rest of the population.

4.3. Robustness: Scales of Equivalence

We end this section by examining the impact of the choice of equivalence scale on the preference function. In previous assessments, income per person is calculated by dividing

[2]*In this case, the equal equivalent income* y^* *can be derived from* $log\left[\frac{y^*}{\bar{y}}\right] = 1/n \times \left[\sum_{i \notin Q_5} \mu_{q(i)}/\mu_{q(y^*)} \, log\left(\frac{y_i}{\bar{y}}\right) + \sum_{i \in Q_5} \mu_5/\mu_{q(y^*)} \frac{(y_i/\bar{y})^{1-\tau_5}}{1-\tau_5}\right]$ *where* $q(y^*)$ *is the quintile of* y^* *-supposed not being the top one.*

household income by a number of "consumption units" taking into account household size and the "economies of scale" of family life such as sharing accommodation or vehicle.

We carry out our regression successively: *i)* with the OECD scale which, to calculate the number of consumption units (CU), assigns a weight of one to the first adult and 0.5 for any additional person in the household (0.3 for children under 14); *ii)* with a number of CUs equal to the square root of the number of people in the household; *iii)* income split equally between adults (WIL's equally split adult scale); *iv)* with a number of CUs equal to the number of people in the household; *v)* by taking into account the number of people in the household (UC=1).

We find values consistent with our central estimate of τ=2.06 (OECD scale) for the square root and equally distributed adult scales (Table S4-3). Although we do not use them, we also run our estimates with per capita income, as well as for the off-scale household estimate used in Layard (2008). The logarithmic hypothesis is again ruled out, but with much lower values of τ (respectively 1.47 and 1.45). Apart from the harmful consequences of excluding the incomes of the top 5%, this result provides a strong reason underlying the differences between our results and those of Layard (2008).

Table S4-3 – **Estimating preferences under different hypotheses of equivalence scales**

	τ	μ	$\hat{S}(\bar{y})$	Average income	Average satisfaction	Observations	P3
OECD scale	2.06 (0.04)	0.70 (0.01)	7.44	26,600	7.24	148,619	9,059
R square	2.10 (0.04)	0.76 (0.01)	7.42	28,900	7.24	148,892	9,606
Equally split	1.47 (0.07)	0.35 (0.01)	7.48	19,400	7.24	148,976	5,678
Equally split adult	2.26 (0.06)	0.47 (0.01)	7.42	27,500	7.24	148,693	9,113
No scale	1.45 (0.02)	0.86 (0.01)	7.08	45,600	7.24	148,976	11,660

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