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Beyond the Joneses: Inter-country income comparisons and happiness

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Abstract

Our paper provides some novel evidence on the burgeoning literature on life satisfaction and relative comparisons by showing that in the last 30 years comparisons with the wellbeing of top income countries have generated progressively more negative feelings on a large sample of individuals in the Eurobarometer survey. The paper contributes in two main directions: (i) it shows that countries, and not just neighbors, can be reference groups; (ii) it documents a globalization effect by which distant countries become progressively closer and comparisons among them more intense and relevant. Our findings may be interpreted in support of the well known hypothesis that migratory decisions are affected by the gap in economic wellbeing between origin and destination country since they document that such gap affects individual life satisfaction.

Keywords: life satisfaction, relative income, standard of living, comparisons.
JEL Classification: D31, E01, I31, J61.

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1. Introduction

Economists have become progressively aware of the importance of others and of relative comparisons for individual wellbeing. Such relevance has been recently confirmed by multi country experiments (Corazzini et al., 2010) were individuals face trade-offs between group ranking and absolute payoffs. These experiments document that many of them prefer being first, even at the cost of a lower income, and that such preference is associated to male gender, higher education and residence in a high income country.

While a first traditional field in which relative preferences were taken into account was the literature of wage fairness in labor economics (see, among others, Rees, 1993 and Fehr et al., 2007), a more recent field of inquiry in which the same question has been investigated is the life satisfaction literature. The merit of this new burgeoning literature has been not just that of assuming a priori a structure of preferences which include others, but rather of illustrating directly how objective measures of differences in performance with respect to reference groups may affect our satisfaction.

From a theoretical point of view contributions from this literature (Duesenberry, 1949; Frank, 2005 and Layard, 2005) argue that positional competition with peers may generate "treadmill effects", up to the extreme case of fully relative preferences where only relative and not absolute income matters. In such case it may paradoxically happen that an increase in personal income, if paralleled by an equal increase in income of all individuals in the reference group, does not affect individual life satisfaction.

From an empirical perspective a starting point in this literature has been the introduction, in standard life satisfaction estimates, of the income of variously defined reference groups. Such groups have been generally created by combining geographical location, gender, age cohorts and professional characteristics (Ferrer-i-Carbonell, 2005; Dorn, Fischer, Kirchgassner and Sousa-Poza, 2008). This literature has shown that, while relative income matters, positional effects do not fully crowd out the positive effect of personal income on individual well being. Furthermore, several studies have documented that an increase in the reference group income may become not necessarily bad news for individuals living (or perceiving to live) in socioeconomic environments characterized by high vertical mobility (Senik, 2004; Jiang et al., 2009; Becchetti and Savastano, 2009). The same literature has been extended to the role played by various inequality dimensions (income, weight) between partners and to that exerted by regional unemployment on the satisfaction of the unemployed (Clark, 2008 and Clark et al. 2009).

Summing up, the main question in the agenda of the literature on life satisfaction and relative comparisons remains: who compares with whom and with which intensity (constant or time varying)? Our paper aims to provide a novel contribution in this field. The two considerations from which we start are that: (i) individuals conventionally tend to compare the quality of life of their country with that of others and (ii) globalization and the development of transportation and telecommunication technologies (internet, social networks, etc.) have dramatically increased the frequency of comparisons of standard of living in different countries. Based on these considerations we document, with an econometric analysis on the Eurobarometer survey, that life satisfaction has been increasingly negatively affected by the distance between the average national gross disposable income and that of the richest country in a given geographical area. In this respect the contribution of our paper is fourfold.

First, we consider that countries, and not just group of peers, may be reference groups. When doing so, we obviously control whether the country relative effect persists after controlling for various types of standard reference group effects[1]. Our findings provide additional insights on the well known treadmill effects and Easterlin paradox. In fact, it has been mentioned above that, under the extreme case in which only relative and not absolute income matter, an equiproportional increase in individual economic wellbeing leaves individual life satisfaction unaffected. Our results imply that life satisfaction may even fall if this event is paralleled by a higher increase in per capita income of peer countries.

Second, we show that the mean is not the only relevant moment of the distributions on which relative comparisons are drawn. More specifically, we document that the maximum of country means is important since, in our case, it identifies a peak of average wellbeing which has been achieved in some parts of the world and becomes desirable for those who enjoy lower living standards.

Third, we document that the salience of comparisons of domestic wellbeing with that of other (often geographically distant) countries grows over time and becomes relevant after the '80s. Our interpretation is that this is likely to be due to the ICT revolution and the enhanced freedom and intensity of movement across borders and.

With respect to the former, the Schengen agreement[2] allows people to move freely around the 28 subscribing countries without any controls at the borders while the diffusion of low cost companies has considerably reduced the price of airplane tickets[3]. As a result, nowadays it is easier and cheaper to visit neighboring countries. Furthermore, the Erasmus exchange program launched in 1987 enables 200,000 students to spend one or two semesters abroad each year. The program has an annual budget in excess of 450 million euro and more than 4,000 partner institutions in 33 countries, more universities waiting to join. Around 2.5 million students have participated since its establishment in 1987, as well as 250,000 higher education teachers and other staff members[4].

With respect to the second candidate for explaining the increased salience of inter-country comparisons (ICT revolution), at the beginning of the '90s a series of innovations in the fields of electronics and telecommunications drastically reduced the costs of movement of all "weightless" commodities such as money, data, images, voice, etc. Such revolution dramatically increased the opportunity of interacting

[1] The implication that an improvement in wellbeing occurred abroad may reduce life satisfaction of individuals in a given country is that wellbeing innovations which historically originate in a first pioneering country may generate protests and manifestations in others where individuals feel worse off until they can catch up. This argument may be supported by several historical anecdotes. To provide an example, the eight hour working day was introduced in countries such as New Zealand before the 20th century while it became law in many others only between 1916 and 1925. Before it the introduction of the reform in the first country generated protests and manifestations as expressions of discontent in other countries. A similar historical process can be observed for the introduction of the vote for women which occurred first in New Zealand in 1893 and, after a while, in other high income countries after demonstration and popular unrest.

[2] Initially signed in 1985 in the town of Schengen in Luxembourg between five of the ten member States (Germany, France, Belgium, the Netherlands and Luxemburg) and implemented in 1990, the agreement was extended over time to 28 countries: the EU members (except the United Kingdom and Ireland), some non-EU members (Iceland, Norway and Switzerland). At the border between two neighboring countries which subscribed the agreement there are no controls, apart from Cyprus, Romania and Bulgaria which are still subject to some controls since they still do not fulfill all the needed requirements.

[3] The imminent liberalization of the European railways is expected to reduce even more the transportation costs and should contribute to reduce the distances among countries.

[4] http://ec.europa.eu/education/lifelong-learning-programme/doc80_en.htm.

with people in distant countries and of comparing one's own level of wellbeing with that of those countries.

Fourth, we argue that our results identify a missing link in the theory of the determinants of migration. As it is well known several empirical contributions demonstrate that migratory flows are function of the income gap between country of origin and country of destination. The seminal papers claiming that migration is determined by wage differentials among geographical areas are those from Todaro (1969) and Harris and Todaro (1970) where migration is driven by *expected* rather than *actual* wage differentials[5]. However, if we rule out cases of absolute necessity, the wage differential is a non sufficient condition for triggering migratory movements since the decision to move occurs if the income gap between countries has negative effects on individual wellbeing: this is what we demonstrate in our paper.

Last but not least, the phenomenon we observe may be an additional explanation of what drives conditional convergence (see, among others, Temple, 1999 and Durlauf and Quah, 1999). This fundamental theory in the economic growth literature tells us that, once conditional convergence factors are accounted for, the distance between per capita income of a leading and of a lagging country may determine a higher pace of economic growth in the lagging country. We argue that, based on our results, this may occur not just because of differences in factor marginal productivities, but also due to the psychological lever of the desire to bridge the gap with the leading country in order to reduce the dissatisfaction originated by cross country living standard comparisons.

2. Database

Our source of data containing information on individual characteristics and self-declared happiness, is the Eurobarometer Survey on Western European countries from 1973 to 2002 (except 1974 and 1996). The database is available until 2009, also for new EU members and for candidate countries. However, after 2002 personal income has not been recorded anymore. For this reason, we prefer to rely only on data for Western European countries and for the time window mentioned above. We also have some country year gaps since data for Norway is available from 1990 to 1996, for Finland from 1993 onwards, for Sweden and Austria from 1994. Table 1 provides a detailed description of the variables used.

Data for our dependent variable, self-declared life satisfaction, is drawn from the question "*On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the life you lead?*". The original values have been rescaled from ascending to descending order of life satisfaction intensity in order to have more intuitive results (very satisfied=4, up to not at all satisfied=1). Personal information about respondents includes gender, age, education, civil and employment status, and personal income. This latter variable is not reported in local currency, but rather in relative terms at the country-year level and recorded from 1 to 13.

[5] For later works see, among others, Mundell (1957), Borjas (1989 and 1995) and Venables, (1999). These papers document that, beyond the gap in economic wellbeing, a number of other variables can influence migratory flows such as quality of life, differences in political stability, human rights situations, and the general rule of law which may be considered as a proxy for the level of individually perceived insecurity.

To allow for a deeper insight on the role exerted by inter-personal income comparisons we created two additional variables: (i) average income level of the reference group by age, education level, gender, year and *country* of interview and (ii) average income level of the reference group by age, education level, gender, year and *region*.[6] The number of observations for these two latter variables is higher than that of the personal income because, even if the respondent did not declare her wealth, it is possible to obtain the two measures mentioned above, if she provided all the information required to identify her reference group.

Table 2a provides summary statistics for the micro regressors used in the econometric analysis. The database on Western EU countries over the period 1973-2002 is composed by almost one and a half million people, 980.000 of whom provided a self-evaluation of their happiness level. Life satisfaction ranges from one to four with a mean of three and a standard deviation of 0.77, which ensures a good variability of the dependent variable in the regressions. 47 percent of individuals in the sample are males, 21 percent of them have a university degree and 56 percent are married. Six percent of individuals are unemployed.

Macroeconomic controls include unemployment, inflation (growth rate of consumer prices), GDP growth rate and gross national disposable income (GDI) per capita in purchasing power standards to allow for a better comparability among countries. Following the standard literature on happiness, macroeconomic data are either annual or extracted as three year moving-averages centered in *t-1* in order to reduce possible measurement errors (see, among others, Di Tella et al., 2001 and 2003). Unemployment rates come from the OECD Center for Economic Performance dataset, inflation rates from the World Bank's World Development Indicators and GDP growth rates and GDI per capita from Ameco, the annual macro-economic database of the European Commission's Directorate General for Economic and Financial Affairs (DG ECFIN)[7].

In order to obtain coefficients of easier interpretation in the regressions, the GDI per capita has been divided by 1,000. According to the OECD, this variable "may be derived from gross national income by adding all current transfers in cash or in kind receivable by resident institutional units from non-resident units and subtracting all current transfers in cash or in kind payable by resident institutional units to non-resident units"[8]. Due to these characteristics, we regard GDI as better suited than GDP for representing the flow of economic resources which circulates in a geographical area and therefore a proxy for the standard of living.

Since the main target of the paper is to analyze the impact of inter-country income comparisons on happiness, we create two variables which measure the distance between the average domestic and (i) the maximum or (ii) the average Western European gross domestic income per capita. More in detail, for every year we calculate the maximum and the average GDI of all Western European countries. We then build two different variables. The first, which measures the distance of country *j* at time *t* from the richest country, is defined as follows:

[6] More specifically, the sample has been divided into thirteen age classes (17-21, 22-26, 27-31, 32-36, 37-41, 42-46, 47-51, 52-56, 57-61, 62-66, 66-71, 72-76, more than 76) while the education level can be low (less than 15 years of schooling), medium (15-18 years) or high (more than 18). When calculating the second variable, we considered 175 European regions.
[7] We used the GDP instead of GDI growth rate because this is the economic growth indicator usually reported by the media which is expected to influence people's expectation over the future development of the domestic economy.
[8] http://stats.oecd.org/glossary/detail.asp?ID=1175.

$$GDI.\max.dist_{jt} = \frac{(GDI.\max_t - GDI_{jt})}{GDI_{jt}} \quad (1)$$

The second, which captures the distance from the average GDI of the countries in the sample in a certain year, is constructed in the following way:

$$GDI.mean.dist_{jt} = \frac{(GDI.mean_t - GDI_{jt})}{GDI_{jt}} \quad (2)$$

Next, we create two slope dummy variables which are equal to zero before 1990 and to the two variables described in (1) and (2) above after this year. Table 2b provides summary statistics for the GDI per capita and the related variables. The GDI per capita of the richest country is 80 percent higher than that of the average sample (GDI distance from max), the maximum gap being a huge 191 percent. When looking at the distance from the average GDI of the sample (GDI distance from average), the gap ranges from -48 percent to +73 percent: differences among countries can be very big.

3. Econometric analysis

3.1 One stage regressions

We start our empirical analysis by running one-stage regressions of the self-declared life satisfaction over country and year dummy variables and the set of standard controls listed in Table 1. Given the discrete nature of the dependent variable (life satisfaction ranges from 1 to 4), we adopt a methodology similar to Di Tella and MacCulloch (2003) and run ordered Logit regressions with errors adjusted for clusters at the country-year level (see Table 3). This is a severe but very important robustness check, especially when testing macro-economic variables which do not vary at individual level. France, 1975, Low Education, Single and Self-employed are the omitted benchmarks chosen to avoid the dummy variable trap.

Since our main goal is to control for the effect of inter-country comparisons, we first run regressions without macroeconomic variables (column 1), then add annual inflation and unemployment (column 2), the annual GDP growth (column 3) and the GDI per capita (column 4). The last two columns are the most important since we add, as further regressors, the distance from the *highest* GDI per capita in Western Europe, the slope dummy variable to control whether this variable displays a stronger effect from 1990 onwards, and the two relative income variables calculated at the country (column 5) and regional (column 6) level.

Looking at column 1, coefficients of microeconomic variables are in line with the standard approach followed in the happiness literature. Negative coefficients are associated with male gender, being separated, widowed, unemployed and employed. Positive coefficients are associated with higher education, being married, student, and having a high income, while age is U-shaped. Subsequent regressions include standard macroeconomic controls like GDP growth rate, inflation and unemployment whose coefficients, due to the clustered standard errors at the country-year level, turn out to be unstable or weakly significant. More specifically, the unemployment rate is negative and

significant only in the simpler specification which includes unemployment and inflation as the only macroeconomic regressors.

Estimates of main interest to the purpose of our inquiry are those from column 4 onwards where we add the GDI per capita, the slope dummy variables (to control for the time discontinuity after 1990) and the two measures of relative income. GDI per capita is positive and significant in the fourth regression, but becomes insignificant when further macro variables are added. Looking at the fifth and sixth columns, the distance between the GDI per capita of the country of residence and that of the richest Western European country in the year considered (see equation 1 in paragraph 2) is significant only after 1990 (*GDI dist from max* is not significant, while *GDI dist from max* after 1990 is significant at 1 percent level). These findings document that countries, and not just neighbors, are reference groups.

In order to give an idea of the economic magnitude of the variables under scrutiny, we report in Table 4 the marginal fixed effects of the fifth regression in Table 3 (only statistically significant variables are reported). Moving from one income class to the next increases the probability to declare oneself very happy by 1.89 percent, while being one class behind the own reference group (computed by gender, age, education, year and country) reduces it by 0.95 percent. If we compare these last two magnitudes we find that relative comparisons dampen the effect of an increase in absolute income but do not offset it completely. Having a high education level increases the same probability by 6.28 percent, being married by 3.57 percent and student by 6.21 percent. On the contrary, being separated, widowed and unemployed reduces it respectively by 6.56 percent, 4.66 percent and 13.11 percent. Not surprisingly and consistently with general findings from this literature, the unemployment status has the most dramatic effect on people's lives.

Last, but not least, if after 1990 the gross domestic disposable income per capita is half that of the richest Western European country, the probability to declare the maximum level of life satisfaction decreases by 5.46 percent. Inter-country income comparisons have therefore not only a statically but also an economically significant effect on human well-being.

3.2 Robustness checks

In order to test the robustness of our results, we adopt five additional econometric strategies: (i) one stage regressions where the macro variables are three-year moving averages; (ii) one stage regressions where the variable of interest is the distance of the domestic GDI per capita from that of the average of Western EU countries, rather than from its peak; (iii) two-stage regressions similar to Di Tella et al. (2001); (iv) two-stage regressions a la Donald and Lang (2007); (v) DF-beta test to control whether the results are driven by one or more specific countries.

The use of three-year moving averages and difference from the mean European GDI per capita provides similar results (omitted for reasons of space and are available upon request). The third robustness check consists in running two-stage regressions similar to Di Tella, MacCulloch and Oswald (2001): in the first stage the happiness level is regressed on a standard set of microeconomic controls, while in the second we regress the average country-year *error term* (the "unexplained" component of the first stage regression) on the macroeconomic variables of interest.

The reason for exploring the fourth procedure proposed by Donald and Lang (2007) is well explained by the authors in their paper. In panel datasets in which the dependent variable differs across individuals, but at least some explanatory variables (in our case the macroeconomic ones) are constant among all members of a group, standard asymptotics provides poor estimation to the final sample distribution[9]. Following the approach set forth by the authors, the happiness level is regressed on a standard set of microeconomic controls and a set of country-year dummy variables. In the second stage the *coefficients* of the joint country-year dummy variables obtained in the first stage (308 coefficients) are regressed on the macroeconomic variables of interest.[10]

Table 5 illustrates findings from these two methodologies: on the left hand side (columns 1 and 2) we show the results of the second stage where the dependent variable is the average error term of the first stage (a la Di Tella et al., 2001), while, on the right hand side (columns 3 and 4), the results of the second stage where the dependent variable is the coefficient of the country-year dummy variables of the first stage (a la Donald and Lang, 2007). Results are consistent with those in Table 3. After having run a two-stage regression with the full sample (1973-2002, not shown in the table), we repeat as a robustness check the procedure (i) by dropping one year each time starting from 1973 (columns 1 and 3), thereby reducing at every iteration the size of the sample which becomes progressively more concentrated around the final year (2002), and (ii) by considering 5 year moving windows from 1975-1979 until 1995-1999 (columns 2 and 4). Both procedures allow to verify the evolution over time of the weight people attach to the difference between domestic and neighboring countries' GDI per capita. However, with the latter procedure we have a similar number of observations in each regression.

For reasons of space, results in Table 5 are summarized for a subset of iterations and exclude overlapping time windows. The first two columns show the coefficient of GDI distance from the richest country over time obtained in the second stage with the average error term as a dependent variable. In the first column the coefficient is always statistically significant, but its size grows constantly over time, while in the second column the coefficient becomes significant only in the 5 year time windows in the '90s. A similar path is observed in the third and fourth columns with the Donald and Lang (2007) methodology. Results are consistent with those in Table 3: individuals have become more sensitive to the comparison between their GDI per capita and that of neighboring countries.

Our final robustness check (Table 6) is the DF-beta test performed over regression 5 in Table 3 following the approach adopted by Frei and Stutzer (2000). The rationale for this check is that we have a limited number of countries and we want to control whether our results are sensitive to the inclusion/exclusion of one of them.

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[9] "Under standard restrictions, the efficient estimator can be implemented by a simple two-step procedure, and the resulting *t*-statistic may have, under restrictions on the distribution of the group-level error, an asymptotic *t*-distribution as the number of observations per group goes to infinity. In addition, under more restrictive assumptions, when the same procedure is used in finite samples, the *t*-statistics have a *t*-distribution", Donald and Lang (2007), p. 221.

[10] With the two latter methodologies both the first and second stage are implemented with an OLS procedure without need of country-year clustering. In fact, in Di Tella et al. (2001) the coefficients of the first stage are irrelevant since the object of interest is the average error term. This latter variable is regressed in the second stage on a set of macroeconomic variables: this methodology provides one data for every country-year observation, therefore clusterization at the country-year level is useless. Similarly, in Donald and Lang (2007) the target of the first stage are the coefficients of the country-year dummy variables, which are regressed in the second stage on a set of macroeconomic variables whose data are available for every country-year. Again, clusterization does not change second stage estimates.

More in detail, in the first step we estimate our fully augmented model with country-year dummies but without macroeconomic variables. In the second step we build a dependent variable represented by coefficients of country dummies from the previous estimate and then regress it on variables of our base estimate (Table 3, column 5) which vary at country-year level. We then repeat this estimate by excluding any time one of the sample countries. For each repeated estimate the coefficient of interest (GDI distance from max after 1990) is subtracted from the one obtained in the regression with all countries and divided by the estimated standard error. The obtained ratio has a t-distribution and, if bigger than 1.96 in absolute terms, means that the country excluded from the second regression drives the result of the first one with the full sample (the null of independence of our result from a country outlier is rejected).

Table 6 reports in the first column the coefficients of the variable of interest obtained by excluding a certain country while, in the second, the DF-beta test, which is always well below the critical value of 1.96. These findings give us confidence on the fact that our results are not driven by one or more countries. All the five proposed methodologies confirm that countries, and not just neighbors, can be reference groups and that these inter-country income comparisons became more relevant from the '90s.

4. Conclusions

Our paper contributes to the literature on the relationship between life satisfaction and relative comparisons by showing that individuals are becoming increasingly influenced by differences between country wellbeing indicators. More specifically, we document that the difference between own and top country gross disposable income has a significant effect, net of the impact of traditional relative income measures in which the reference group is built by looking at age, education level, gender, year and *region*.

Since our main variable of interest varies only at country-year level we provide several robustness checks such as two stage procedures usually adopted in this case and tests to verify whether our results are robust to the inclusion/exclusion of individual countries.

We think that our findings open the way to several interesting considerations and potential directions of further research by showing that reference groups may be nations, that the relevance of comparisons is not time invariant and grows significantly over time and that individuals do not look just at averages but also at distances from top (country average) wellbeing levels. By linking our results to the stylized facts in the empirical analysis of migratory flows and conditional convergence in GDP growth paths we are led to think that dissatisfaction arising from country wellbeing gaps may be one of the hidden forces which pushes individuals to migrate to other countries or to contribute to domestic convergence processes, if they remain in their home country.

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Table 1: Description of the variables used

Name	Source	Variable
Life satisfaction	Eurobarometer	Self-declared life-satisfaction level from 1 (not at all satisfied) to 4 (very satisfied)
Unemployed	Eurobarometer	DV (Dummy Variable) which takes value 1 if the respondent is unemployed, 0 otherwise
Selfemployed	Eurobarometer	DV which takes value 1 if the respondent is self-employed, 0 otherwise
Retired	Eurobarometer	DV which takes value 1 if the respondent is retired, 0 otherwise
Student	Eurobarometer	DV which takes value 1 if the respondent is student, 0 otherwise
Home	Eurobarometer	DV which takes value 1 if the respondent is responsible for home and not working, 0 otherwise
Male	Eurobarometer	DV which takes value 1 if the respondent is male, 0 otherwise
Age	Eurobarometer	Age of the respondent in years
Age squared	Eurobarometer	Square of the respondent's age in years
Middle education	Eurobarometer	DV which takes value 1 if the respondent has 15-18 years of education, 0 otherwise
High education	Eurobarometer	DV which takes value 1 if the respondent has more than 18 years of education, 0 otherwise
Married	Eurobarometer	DV which takes value 1 if the respondent is married, 0 otherwise
Divorced	Eurobarometer	DV which takes value 1 if the respondent is divorced, 0 otherwise
Separated	Eurobarometer	DV which takes value 1 if the respondent is separated, 0 otherwise
Widowed	Eurobarometer	DV which takes value 1 if the respondent is widowed, 0 otherwise
Income	Eurobarometer	Income ranging from 1 (min) to 13 (max)
Relative income 1	Eurobarometer	Distance between own income and average income of the reference group by gender, age, education, year and country
Relative income 2	Eurobarometer	Distance between own income and average income of the reference group by gender, age, education, year and region
GDP growth	Ameco	GDP per capita growth rate (in %) in constant 2000 terms
Unemployment	OECD	Unemployment rate (in %)
Inflation	World Bank	Inflation rate (in %)
GDI per capita	Ameco	Gross national disposable income per capita in PPS/1,000
GDI dist. from max	Ameco	Distance between the GDI of the respondent's country and that of the richest one (by year)
GDI dist. from max after 1990	Ameco	Slope DV equal to zero if the year is > 1990
GDI dist. from average	Ameco	Distance between the GDI of the respondent's country and that of the average (by year)
GDI dist. from average after 1990	Ameco	Slope DV equal to zero if the year is > 1990

Table 2a: Summary statistics of micro variables

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Life satisfaction	980,611	3.00	0.77	1	4
Male	1,465,630	0.47	0.50	0	1
Age	1,404,878	44.31	18.07	15	99
Middle education	1,334,011	0.37	0.48	0	1
High education	1,334,011	0.21	0.41	0	1
Married	1,332,110	0.56	0.50	0	1
Separated	1,332,110	0.06	0.23	0	1
Widowed	1,332,110	0.09	0.28	0	1
Student	1,419,096	0.10	0.29	0	1
Unemployed	1,419,096	0.06	0.24	0	1
Retired	1,419,096	0.21	0.41	0	1
Employed	1,419,096	0.40	0.49	0	1
Housewife	1,419,096	0.14	0.35	0	1
Income	813,226	6.46	3.35	1	13
Relative income 1	1,125,114	6.53	2.05	1	12
Relative income 2	1,435,113	5.59	2.52	1	12

Table 2b: Summary statistics of GDI distance

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
GDI per capita	1,076,370	15.98	6.88	2.15	44.74
GDI dist. from max	1,076,370	0.80	0.40	0.00	1.91
GDI dist. from max after 1990	1,076,370	0.61	0.51	0.00	1.87
GDI dist. from average	1,076,370	0.04	0.20	-0.48	0.73
GDI dist. from average after 1990	1,076,370	0.03	0.16	-0.48	0.52

Table 3: One-stage regressions

Variabile	(i)	(ii)	(iii)	(iv)	(v)	(vi)
Male	-0.097	-0.104	-0.105	-0.105	-0.086	-0.099
	(-9,16)	(-9,6)	(-9,6)	(-9,63)	(-8,16)	(-9,21)
Age	-0.049	-0.051	-0.051	-0.051	-0.045	-0.049
	(-27,68)	(-29)	(-29,02)	(-28,95)	(-21,00)	(-27,02)
Age²	0.001	0.001	0.001	0.001	0.001	0.001
	(31.26)	(32.53)	(32.55)	(32.49)	(22.53)	(29.83)
Middle education	0.111	0.122	0.123	0.123	0.174	0.140
	(8.86)	(9.48)	(9.53)	(9.58)	(10.50)	(10.02)
High education	0.220	0.232	0.233	0.232	0.330	0.263
	(11.89)	(12.60)	(12.67)	(12.67)	(12.84)	(12.42)
Married	0.200	0.210	0.210	0.209	0.200	0.208
	(12.37)	(13.23)	(13.23)	(13.13)	(12.84)	(13.14)
Separated	-0.432	-0.417	-0.417	-0.418	-0.401	-0.414
	(-20,77)	(-19,37)	(-19,36)	(-19,39)	(-18,74)	(-19,34)
Widowed	-0.262	-0.270	-0.270	-0.270	-0.274	-0.271
	(-14,17)	(-13,98)	(-13,97)	(-14)	(-14,32)	(-14,09)
Student	0.278	0.280	0.281	0.281	0.321	0.293
	(10.44)	(9.86)	(9.90)	(9.89)	(10.66)	(10.18)
Unemployed	-0.942	-0.934	-0.934	-0.934	-0.918	-0.932
	(-24,67)	(-23,93)	(-23,95)	(-23,95)	(-23,95)	(-23,92)
Retired	0.000	-0.002	-0.003	-0.002	-0.001	-0.004
	(-0,01)	(-0,1)	(-0,11)	(-0,09)	(-0,06)	(-0,15)
Employed	-0.068	-0.069	-0.070	-0.070	-0.071	-0.071
	(-4,69)	(-4,6)	(-4,6)	(-4,62)	(-4,73)	(-4,65)
Housewife	0.010	-0.003	-0.003	-0.003	0.002	-0.003
	(0.54)	(-0,13)	(-0,15)	(-0,16)	(0.12)	(-0,18)
Income	0.095	0.093	0.093	0.093	0.104	0.099
	(33.28)	(31.87)	(31.63)	(31.82)	(39.54)	(32.72)
Relative income 1					-0.053	
					(-6,95)	
Relative income 2						-0.020
						(-4,61)
GDP growth			0.011	0.009	0.010	0.009
			(1.11)	(0.91)	(1.16)	(0.98)
Unemployment		-0.018	-0.017	-0.013	-0.007	-0.005
		(-2,52)	(-2,36)	(-1,82)	(-0,63)	(-0,44)
Inflation		-0.007	-0.006	-0.008	-0.009	-0.009
		(-1,2)	(-1,03)	(-1,34)	(-1,48)	(-1,44)
GDI per capita				0.017	-0.019	-0.017
				(2.39)	(-1,67)	(-1,35)
GDI dist. from max					-0.308	-0.263
					(-1,43)	(-1,16)
GDI dist. from max after 1990					-0.302	-0.310
					(-3,3)	(-2,99)
N	444,937	413,985	413,985	413,985	413,985	413,985
Pseudo R²	0.093	0.096	0.096	0.097	0.097	0.097

Legend: The dependent variable is life satisfaction which ranges from 1 (not at all satisfied) to 4 (very satisfied). Regressions are ordered Logit with standard errors adjusted for clusters at the country-year level. France, 1975, Low Education, Single and Self-employed are the base to avoid the dummy variable trap. Country and year dummy variables are omitted for reasons of space. T-stats are in brackets.

Table 4: Marginal fixed effects

Variable	dy/dx
Male	-1.55%
Middle education	3.20%
High education	6.28%
Married	3.57%
Separated	-6.56%
Widowed	-4.66%
Student	6.21%
Unemployed	-13.11%
Employed	-1.28%
Income	1.89%
Relative income 1	-0.95%
GDI dist. from max after 1990	-5.46%

Legend: Marginal fixed effects refer to the fifth regression in Table 3 and show the effect of the variables on the probability to declare the maximum level of life satisfaction (very satisfied=4). Only the variables with statistically significant coefficients are reported. All the variables in the table are dummy variables except income (13 classes), relative income 1 (distance from own reference group, from 1 to 12) and GDI distance from max after 1990. For this latter variable the marginal fixed effect refers to a GDI per capita twice as high in the richest country as in the own one.

Table 5: Robustness checks with two-stage procedures

	2nd stage on the error term		2nd stage on the country-year DV coefficient	
	(i)	(ii)	(iii)	(iv)
Y	Years>Y	5y moving windows	Years>Y	5y moving windows
1977	-0.25 (-7.84)	0.16 (0.68)	-0.77 (-7.78)	0.43 (0.59)
1982	-0.25 (-6.88)	0.09 (0.39)	-0.78 (-6.83)	0.22 (0.29)
1987	-0.33 (-5.91)	-0.01 (-0.11)	-1.02 (-5.80)	-0.02 (-0.06)
1992	-0.41 (-5.78)	-0.29 (-1.61)	-1.28 (-5.55)	-1.14 (-2.01)
1997	-0.55 (-6.01)	-0.59 (-3.40)	-1.73 (-5.84)	-1.90 (-3.55)

Legend: Results refer to the second stage and come from OLS regressions. In columns 1 and 3 the sample is restricted by considering only the years after that shown in the first column (Y). In column 2 and 4 the sample is restricted by using 5-year moving windows centered around the year shown in the first column (Y). T-stats are in brackets.

Table 6: DF-beta test

Omitted country	Coefficient of GDI distance from max after 1990	DF-beta
France	-0.29	-0.14
Belgium	-0.33	0.20
Holland	-0.31	0.03
Germany	-0.28	-0.20
Italy	-0.25	-0.57
Luxemburg	-0.36	0.39
Denmark	-0.30	-0.02
Ireland	-0.28	-0.27
Great Britain	-0.33	0.19
Greece	-0.25	-0.42
Spain	-0.31	0.01
Portugal	-0.39	0.64
Finland	-0.30	-0.05
Sweden	-0.31	0.02
Austria	-0.31	0.00

Legend: The second column shows the coefficient of the variable "GDI distance from max after 1990" obtained when dropping from the fifth regression of Table 3 the country listed in the first column. The third column shows the DF-beta test which has a t-distribution.