# GDP and well-being in Europe over the last twenty years

*Pierre Ralle, Michaël Sicsic**

**Between 1995 and 2007, GDP per capita grew by approximately one third in European countries. After the economic crisis, the majority of countries displayed GDP per capita which was close to that of 2007. However, countries in the South experienced significant declines while Germany was one of the few countries to have exceeded its level of 2007. However, these changes in economic incomes do not necessarily reflect a change in the well-being of households.**

**An assessment of this well-being may be based on what people feel: this is subjective well-being. Between 1995 and 2007, this evolved less positively than GDP per capita. Since the crisis, it has declined or at best stagnated. Three groups of countries can be distinguished: the southern countries in which it has fallen sharply; the Eastern countries where it fell, but more modestly; finally, other countries, including France, where it is stable on average.**

**To enrich the measurements provided by GDP and subjective well-being, theory can be used to assess economic utility for households. This is the approach adopted in this report, with the construction of a utility measurement that takes into account consumption, the effect of household size on sharing the costs of collective consumption, and the valuation of leisure time.**

**Between 1995 and 2007, on average in Europe, utility increased less rapidly than actual consumption and GDP per capita, both because the downward trend in household size gradually reduced economies of scale and because the time available for leisure increased less rapidly than consumption. On the other hand, since 2007, utility has grown faster than GDP per capita. This reflects the less cyclical nature of household consumption and the ongoing rise in leisure time.**

**Utility was better correlated with subjective well-being after the economic crisis. However, since the crisis, the countries of Southern and Eastern Europe have shown that their satisfaction level has risen more slowly than the quantitative indicators (GDP and utility) would suggest. The opposite is true for the other countries.**

## An increase in GDP per capita by one third between 1995 and 2007

In the long run, GDP per capita has risen in most countries in this study[1] *(fig 1)*. The average increase was by a third between 1995 and 2007. To compare the levels of GDP per country, we use the concept of GDP in purchasing power parity terms *(box 1)*. France saw its GDP per capita increase less rapidly than that of its partners. While in the 1970s and 1980s, French GDP per capita was on average 5% higher than that in the OECD of 26, the gap closed to zero in the mid-1990s. In 2013, French GDP per capita was 5% lower than the OECD average. French GDP per capita increased less quickly than that of less developed countries (including in Eastern Europe) that were in an economic catch-up phase in relation to the richer countries, and also than the GDP per capita of wealthier countries such as the United States and certain countries in Northern Europe. Several breakdown exercises based on growth

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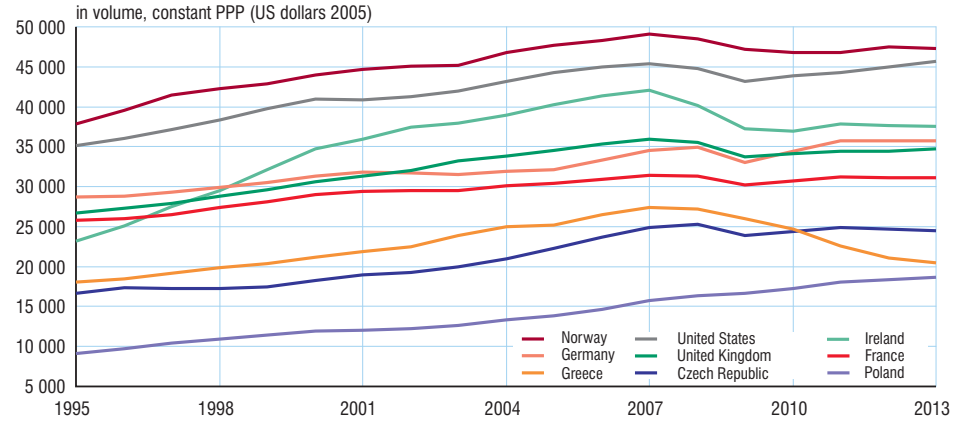
1. In this study, we look at around twenty European countries. The United States and Japan are sometimes added for comparison purposes. The choice of periods studied results from the availability of data.

## 1. GDP per capita since 1995




Note: to obtain a full serie, annual growth rates in volume of GDP (coming from national accounts) are applied to estimations of GDP per capita expressed in purchasing power parities (PPP) for year 2005.
*Source: OECD.*

*Box 1*

### Purchasing power parity

To make a comparison between the productions and the productivities of countries with different currencies, it is necessary to convert the data into a common unit. A simple solution would be to use "current" exchange rates observed at every moment on the markets. However, such a method is not satisfactory because the current exchange rates are not determined solely by the price differences between countries and there are significant price differences between countries sharing a common currency (for example in the Eurozone).

That is why we use "purchasing power parity" (PPP) exchange rates which allow a comparison of the relative prices between countries. For a particular good (or service), the PPP between two countries is the exchange rate that makes the prices of this good or service identical between the two countries. To build the aggregate PPP exchange rate between two countries, the PPP exchange rates of a set of goods and services are then weighted, and these goods or services can at the same time be considered identical in both countries and representative of their consumption structure.

What happens when we want to compare countries over the long term? For example, two approaches can be used to compare the level of GDP in France and in the United States in 1995 and 2012.

The first consists of applying the PPP exchange rate between the two countries in both years (1995 and 2012). To compare GDP levels, we then apply these current PPPs to GDP measurements in national currency expressed at current prices. We thus obtain GDPs at "international current prices". Whereas comparisons between the two countries for each year (1995 and 2012) do not cause any problems since the volumes are all expressed using the same price structure, comparisons over time are influenced by relative price variations between countries (and, potentially, methodological changes to measurements).

A second approach is to choose a base year (1995 or 2012 in the example) and then to extrapolate the PPPs for other years using the series of annual growth rates in GDP volume provided by the national accounts. The result of this calculation will be a series of indices of GDP in volume at constant prices and PPPs. This time series has a strong property which is very useful in making international comparisons: in each country, GDP measured in PPP terms shows the same variations as the GDP in volume in the national currency. But as the OECD notes, this does not avoid the common drawback of all the indices using a fixed base year : the method leads to structural changes over time being ignored. We use this second approach.

accounting have been conducted (see Thubin, 2014, and Blanchet et al., 2007) and show that this growth deficit stems from less dynamic employment rates and demographic effects.[2]

Between the mid-1990s and 2007, it was the least developed countries which showed the greatest growth. This catch-up effect mainly stemmed from the recovery of hourly productivity *(box 2)*. This was particularly the case for Ireland and Eastern European countries like Poland and the Czech Republic.

Since the 2008 crisis, growth on average has been much weaker. In 2013, while the United States, Germany and Poland exceeded their pre-crisis level of GDP per capita, this was not the case for the other countries.

## GDP does not necessarily reflect well-being

GDP per capita, commonly used in international comparisons, measures the income generated by the production of goods and services in a country. As such, it is not an indicator of well-being, partly because it does not say whether this income *ultimately* benefits the agents residing in the country under consideration or non-resident agents, and because it is not focused on households. From this point of view, per capita consumption is a more relevant indicator for assessing the current well-being of populations. Nevertheless, consumption itself has certain limitations in an analysis of well-being. Some parts of the economy are not included, such as domestic activities[3] or voluntary work, and free time. Moreover, well-being is not only economic and macroeconomic indicators do not capture the dispersion of individual situations or inequalities. Finally, they do not provide information on the sustainability of economic activity, which, in addition to other information, requires information on inventories to be completed (natural resources, physical capital, assets, infrastructures). The Stiglitz-Sen-Fitoussi Commission made several recommendations on the subject : place the emphasis on households, take inventories and inequalities into account, and the highlight additional quality of life indicators (see Stiglitz et al, 2009, Blanchet et al., 2007 and 2010).

The concept of quality of life includes a number of factors affecting what is important in life, and is not limited to purely material aspects. To measure the quality of life beyond the strictly monetary aspects, it is necessary to take into account various dimensions of well-being that can be captured via objective indicators. The Stiglitz report cites eight dimensions to be considered: material living conditions, health, education, personal activities (including work), participation in political and civic life, social connections, environmental conditions and insecurity (personal and economic). In this respect, several projects on the measurement of well-being beyond GDP have been launched by international organisations ("Beyond GDP" for the European Commission, "Better Life Initiative" for the OECD) and national organisations (e.g. the European Benchmark Indicators of the MNP agency of the Netherlands).

In recent years, following the Stiglitz-Sen-Fitoussi report, additional statistical indicators clarifying various aspects of the well-being of households have been produced and disseminated, based on both objective and subjective approaches to well-being. This methodology is not, however, without its limits: these approaches are often difficult to track over time and do not provide a direct measurement of well-being in a country, because they do not quantify the relative significance, for the well-being of the agents, of the indicators composing them. Another approach is to seek to aggregate the different dimensions of well-being. There are two

2. The demographic dynamism of France, potentially favourable in the long term, may be disadvantageous in the short term.
3. For example, according to a study by INSEE, "homemade" production results in strong additional consumption for households which can be quantified, using certain price assumptions, at nearly 700 billion euros, or an increase of 63% (Poissonnier and Roy, 2013).

*Box 2:*

## A certain convergence of productivities

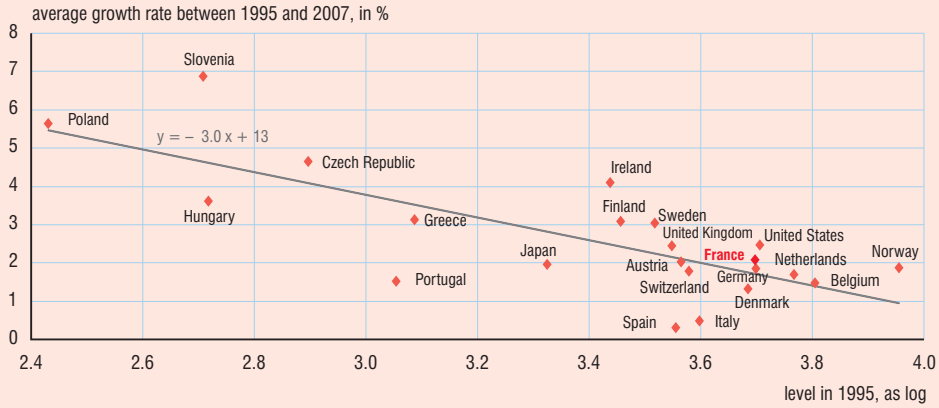
Over the long term, a certain convergence of productivities has been observed between developed countries. To document this, twenty or so developed countries were analysed in the period between 1995 and 2007. The choice of selecting a relatively long period was justified by the decision to take into account wealth accumulation phenomena which have structural effects. We start the analysis in 1995 in order to observe the countries of Eastern Europe once they have gone through the early years of the transition period. The analysis was finally stopped in 2007 in order to prevent the economic crisis from interfering with these trend results.

Overall, the average annual hourly productivity growth rate between 1995 and 2007 is higher when the level (measured in purchasing power parity) at the beginning of the period was low (*graph in the Box*). The countries with the highest growth in hourly productivity are those which started with the lowest level: Eastern European countries (Poland, Slovenia, Hungary, Czech Republic), Portugal and Greece. In contrast, overall, the most developed countries had lower growth. This is the case for France and Germany for example.

These two phenomena indicate that a certain convergence occurred during the period. It may be explained by a technological factor: the presence of diminishing returns on capital in production. When an economy is undeveloped, it has a low level of capital per capita and it is relatively easy to develop profitable activities. When it develops, its capital per capita will rise and it will be relatively difficult to produce in greater quantities. This effect was first formalised by Solow (1956). One of the stylised facts generated by this model is that the initial level of labour productivity negatively influences the growth of this productivity in the long term. This is what is summarised by the regression line shown in the graph. According to this equation, a country A which in 1995 had a level of hourly productivity 10% lower than country B, had an average annual growth rate which was nearly 0.3 points higher over the period 1995-2007.

However, some countries experienced higher growth in GDP per capita than the model predicted for them. This is because growth cannot be explained solely by the technological factor of convergence. It is also dependent on more endogenous and institutional factors: innovation, research, education, the role of the financial or oil sector (in the case of Norway). These factors may explain why some countries (e.g. Spain, Italy or Portugal) performed less well than was expected in the econometric model.

### Evolution of hourly productivity between 1995 and 2007




Note: prices are constant, with constant purchasing power parities. Base year is 2005.
*Source: OECD.*

method types : composite indices with ad hoc weighting of the different indicators, including those which do not have a monetary dimension, and synthetic indices which add together indicators converted into a monetary equivalent *(Box 3)*.

*Box 3:*

### Alternative indicators to GDP

To address the problem of reading dashboards, aggregate indicators have been constructed from the dimensions of well-being. Overall, there are two main types of indicators: indicators aggregating heterogeneous indices in a non-monetary manner by weighting them in a more or less ad hoc way (composite indices), and indicators obtained by adding to or subtracting from GDP (or consumption) the monetary equivalents of various factors of well-being, in the style of the national accounts (synthetic indices).

**For the first type of indicator**, various weighting choices can be made.

The simplest and most commonly used choice is to keep the same weights for all the components of the synthetic indicator. This is the choice used, for example, by the Human Development Index (HDI of the UNDP)[1] which is an equally weighted mean (arithmetic, then geometric since 2010) with three values. Similarly, the OECD has calculated a composite index which has aggregated 9 indicators since 1820[2] (OECD, 2014). Another example is the indicator of economic well-being (IEWB) of Osberg and Sharpe (2002) which aggregates four dimensions: adjusted consumption, productive wealth, inequality and economic insecurity.[3]

Another approach is to consider individual preferences to make the weightings. The more individuals are considered to attach importance to a well-being factor, the greater the weight it will have in the composite indicator. A dimension which is considered to be little related to the well-being of individuals has almost no weight for these indicators. Thus Godfrey and Lollivier (2014) created a composite index using weightings corresponding to the regression of satisfaction for each dimension of well-being for France. This is also the method used by Fleurbaey, Schokkaert and Decancq (2009) for Russia between 1995 and 2003.

Finally, a way of being certain to take into account individual preferences is to ask the people themselves to choose the weightings. This is the method used by the OECD for its "Better Life Index" on the website of the OECD.[4] Each person can create their own index by weighting the 11 dimensions proposed as they wish and seeing the change in the ranking of countries. For example, with criteria all of equal importance, France is ranked 18th, while if a maximum weight is given to housing and income, France ranks 10th, and 26th if maximum weight is given to education and personal security. The other feature of the OECD indicator is that it aggregates objective as well as subjective data such as life satisfaction.

Beyond the choice of the dimensions and weightings used, various difficulties persist with these composite indicators: should different weightings be used for each country?[5] Which level of aggregation should be chosen (at an individual or aggregated level)? Which processing method should be used for indicators (rate, level logarithm, standardisation)?

**A second approach** is to correct GDP, income or consumption to approximate a concept of well-being by adding or subtracting monetary factors.

For the Measurement of Economic Welfare (MEW) of Nordhaus and Tobin (1973) and the Index of Sustainable Economic Welfare (ISEW), consumption is the basis of the calculation. The "Genuine Progress Indicator", GPI, subtracts from GDP the estimated value of lost natural resources (environmental damage, destruction of non-renewable resources, etc.) and social damage (unemployment, crime, accidents, inequalities, etc.) and adds to GDP the estimated

1. United Nations Development Programme.
2. Aggregated by equally weighted arithmetic average. An alternative aggregation is made by a factor model with latent variables giving different weights to each dimension.
3. Note that the Index of Economic Well-being (IEWB) is built in part by the second approach because the first two dimensions are constructed by monetisation.
4. http://www.oecdbetterlifeindex.org/
5. For international comparisons, the weights are identical for all countries while they should theoretically be different to illustrate the preferences of different countries.

*Box3 (cont'd)*

value of non-monetary economic activities (domestic work and voluntary work). The so-called "equivalent income" indicator of Fleurbaey and Gaulier (2009) corrects net domestic income per capita for a number of dimensions not taken into account in GDP.

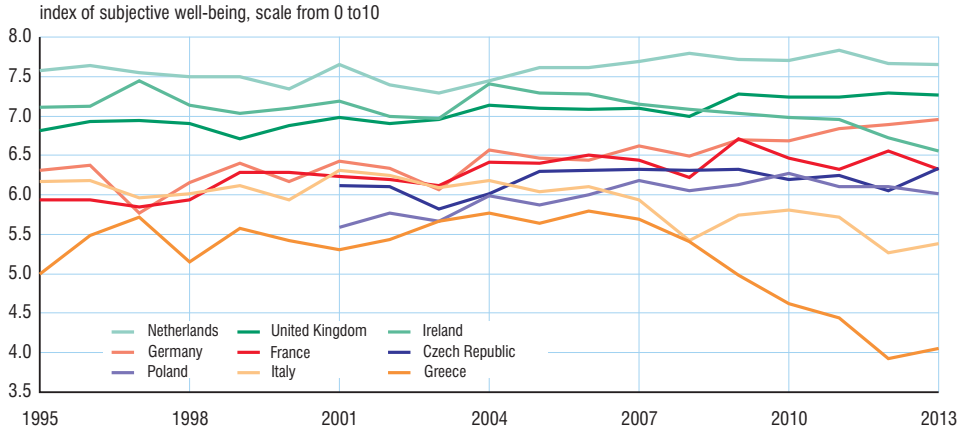
Finally, many indicators address other issues such as those related to inventories, sustainability and social aspects. These include the "Inclusive Wealth Indicator" of the UN and the "Genuine Savings Indicator" of the World Bank for the inventory aspect; the ecological footprint or performance or environmental sustainability indices on strictly environmental aspects; the Social Health Index SHI or Barometer of Inequalities and Poverty in France (BIP 40) on social issues. For specific information on these issues, see Blanchet et al (2010) and Gadrey and Jany-Catrice (2012).

## No sharp increase in subjective well-being over the long term

There is another type of indicator highlighted in the Stiglitz report, which measures the well-being of populations. This is subjective well-being, i.e. as felt by people. Several surveys provide data of this kind, for different countries and different periods. The principle is simple: in surveys, people are asked for their assessment of various factors, such as their satisfaction with life for example *(Box 4)*. Overall, from the available indicators it appears that satisfaction with life changed little in Europe until 2007 *(fig 2)*. It is relatively greater in the countries of Northern Europe: the Netherlands, Ireland and the United Kingdom. It is lower in the southern European countries (Greece and Italy) and to a lesser extent in the Eastern European countries (Poland and Czech Republic). France and Germany had a slightly increasing profile between 1995 and 2007 and a degree of satisfaction with life close to 6.5 / 10 in 2007. There was however no overall significant variation in Europe until 2007.

Since 2007, well-being as measured by the life satisfaction indicator has fallen sharply in the countries particularly affected by the economic crisis. This has been the case in Ireland and Italy, but especially in Greece, where the decline has been particularly dramatic: nearly two points. In Germany however, the level of satisfaction has increased.

### 2. Life satisfaction since 1995




Note: in France in 2013, the average level of satisfaction is scored at 6.3 on a scale from 0 to 10. The question asked is: "Generally, are you very satisfied/satisfied/rather non satisfied/totally not satisfied with yhe life you are having" Initially scored from 1 to 4, data have been converted to a score from 0 to 10.
*Source: World database of happiness, Erasmus University, Rotterdam.*

*Box 4:*

## Subjective well-being data

Several surveys ask subjective questions on well-being, including about happiness or life satisfaction felt by individuals. Subjective well-being data are the self-reported assessments of individuals with regard to their level of life satisfaction and happiness on a scale of 3, 4, 7 or 10 points depending on the survey. These questions are increasingly used in social science surveys. Their success lies in the fact that they are easy to include in a questionnaire and in the simplicity of the questions, leading to a very low non-response rate.

Many subjective data are available on well-being. These are taken from international surveys (Eurobarometer, World Value Survey, Gallup World Poll, Eurofound, European Social Survey (ESS), EU-SILC, etc.), and also national panel data (BHPS in the UK, GSOEP in Germany, GSS in the United States, RLMS in Russia, etc.).

We mainly use Eurobarometer data in this study because they have the longest history. The Eurobarometer is managed by the European Commission and benefitted from the involvement of researchers at its beginnings. We use the version provided in the World Database of Happiness of R. Veenhoven[1] which converts the initial scale of 4 points to 10 points in order to compare it with results from other surveys. The EU-SILC surveys or European Social Survey are more recent (since the year 2000), but have more questions on broader issues and may change every year. In Europe, the Foundation for the Improvement of Living and Working Conditions (Eurofound, tripartite agency of the European Union) launched three rounds of the Quality of Life survey in 2002, 2007 and 2012.

Significant differences exist between surveys. Subjective well-being declined most between 2007 and 2012 and stood at a lower level in 2012 in Southern European countries according to the Eurobarometer survey than according to Eurofound and the ESS *(figure)*. The correlation coefficients between the four available indicators (in the 2012/2007 variation) are relatively low: 56% between the Eurobarometer and the ESS, 39% between the ESS and Eurofound and the correlation is even negative (-18%) between the Eurobarometer and Eurofound. These differences between surveys illustrate the limitations of this type of indicator, which is sensitive to survey protocol, sampling errors, particular prevailing circumstances during the survey, etc.

**Responses in 2012 to the question on life satisfaction or happiness depending on the survey**

| | 2012 | | | | Variations between 2007 and 2012 (in points) | | | |
|---|---|---|---|---|---|---|---|---|
| | Eurofound | | ESS | Eurobarometer | Eurofound | | ESS | Eurobarometer |
| | Happiness | Satisfaction | Happiness | Satisfaction | Happiness | Satisfaction | Happiness | Satisfaction |
| Austria | 7.7 | 7.7 | ... | 6.6 | 0.4 | 0.8 | ... | 0.0 |
| Belgium | 7.6 | 7.4 | 7.7 | 7.0 | – 0.2 | – 0.1 | 0.1 | – 0.1 |
| Czech Republic | 7.1 | 6.4 | 6.7 | 6.1 | – 0.4 | – 0.2 | – 0.2 | – 0.3 |
| Denmark | 8.2 | 8.4 | 8.4 | 8.4 | – 0.1 | – 0.1 | 0.0 | 0.1 |
| Estonia | 6.8 | 6.3 | 6.9 | 5.8 | – 0.6 | – 0.4 | 0.1 | – 0.3 |
| Finland | 8.1 | 8.1 | 8.1 | 7.2 | – 0.2 | – 0.1 | 0.1 | – 0.1 |
| **France** | **7.4** | **7.2** | **7.3** | **6.6** | **– 0.4** | **– 0.1** | **0.0** | **0.1** |
| Germany | 7.4 | 7.2 | 7.7 | 6.9 | – 0.1 | 0.0 | 0.7 | 0.3 |
| Greece | 6.5 | 6.2 | 6.0 | 3.9 | – 0.8 | – 0.4 | – 0.8 | – 1.8 |
| Ireland | 7.7 | 7.4 | 7.2 | 6.7 | – 0.3 | – 0.2 | – 0.6 | – 0.4 |
| Italy | 7.1 | 6.9 | 7.0 | 5.3 | 0.1 | 0.3 | 0.6 | – 0.7 |
| Netherlands | 7.7 | 7.7 | 8.0 | 7.7 | – 0.3 | – 0.2 | 0.3 | 0.0 |
| Poland | 7.3 | 7.1 | 7.3 | 6.1 | – 0.1 | 0.2 | 0.3 | – 0.1 |
| Portugal | 7.2 | 6.8 | 6.5 | 4.1 | 0.3 | 0.6 | – 0.2 | – 1.1 |
| Slovakia | 6.9 | 6.4 | 6.8 | 5.8 | – 0.6 | – 0.3 | 0.3 | – 0.1 |
| Spain | 7.8 | 7.5 | 7.6 | 5.9 | 0.2 | 0.2 | 0.0 | – 0.8 |
| Sweden | 7.8 | 8.0 | 7.8 | 7.8 | – 0.4 | – 0.3 | – 0.1 | 0.1 |
| United Kingdom | 7.6 | 7.3 | 7.6 | 7.3 | – 0.2 | 0.0 | 0.0 | 0.2 |

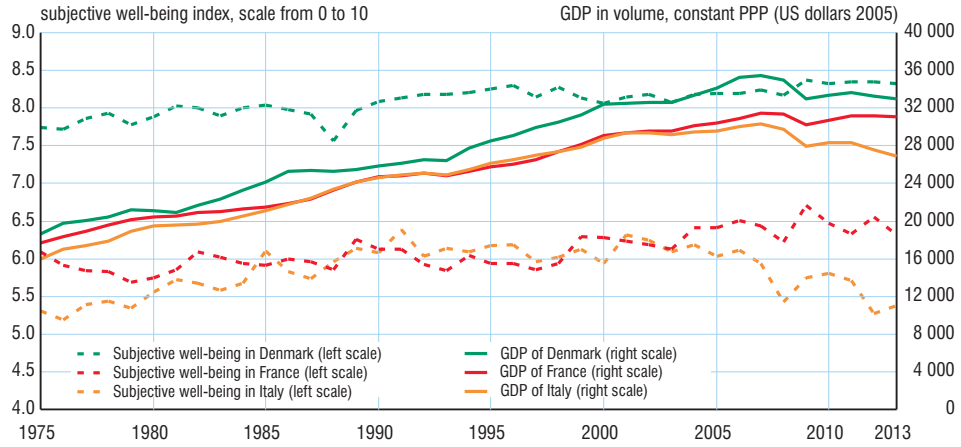
*Sources: Eurofound; ESS; Eurobarometer; Erasmus University Rotterdam, World database of happiness.*

1. Erasmus University, Rotterdam. Can be consulted at: http://worlddatabaseofhappiness.eur.nl. This database completes information on the countries not covered by the Eurobarometer (like the United States or Japan), through national surveys.

## The Easterlin paradox

The "Easterlin paradox" is the term used to describe the fact that, over the long term, subjective well-being has increased much less than GDP per capita. The work of Easterlin (1974, then 1995 and especially 2005) found no significant correlation between variations in income and variations in well-being as perceived in a country: the proportion of individuals declaring satisfaction with life is much the same during a long period of growth. Initially observed between 1947 and 1970 in the United States, this finding has been extended to many countries (including Japan and Europe, and also China). Thus, between 1970 and 2000 in these countries, subjective well-being remained broadly constant or increased only slightly, while GDP per capita more than doubled *(fig 3)*.

### 3. GDP and subjective well-being on long term




Note: in France in 1975, the level of life satisfaction is valued at 6.1 on a scale from 0 to 10 (left scale) while GDP per capita is 17 700 dollars PPP (right scale).
*Sources: Insee; OECD; World database of happiness, Erasmus University Rotterdam.*

Many arguments have been advanced to explain the disconnection between well-being and GDP per capita. The inherent limitations of GDP (already presented) and subjective indicators (see below) can certainly explain that the relationship between the two is not very strong, but appear insufficient to warrant a complete disconnection. Also the main theories to explain this paradox are those of social comparison and adaptation (Clark, Frijters and Shields, 2008): individuals are sensitive to their relative situation with regard to those around them or their past, rather than to their situation in absolute terms *(box 5)*.

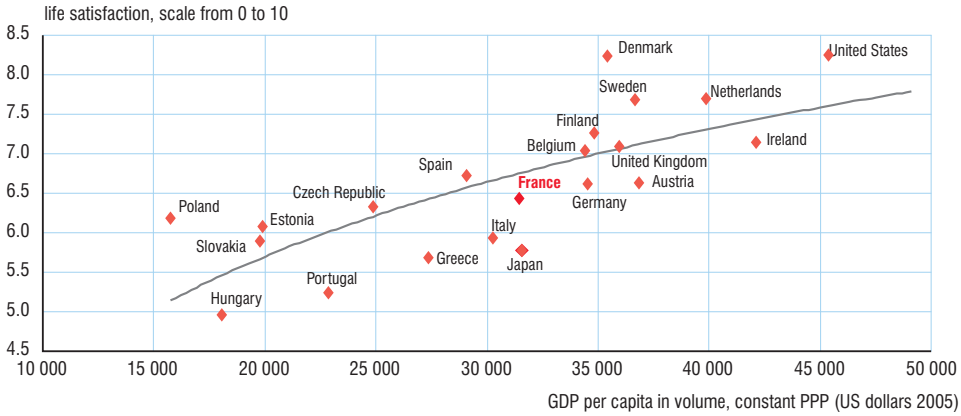
Nevertheless, the disconnection between well-being and income is far from being complete. On a micro-economic level, there is generally a positive and significant relationship between satisfaction and income. Thus, within a country, the richest individuals have a higher satisfaction than the less wealthy individuals. Panel data studies further indicate that this relationship is causal: income is a determinant of satisfaction and not the reverse.

On a macro-economic level, we observe similarly that on a given date, countries with higher GDP per capita have greater subjective well-being. *Figure 4* illustrates this finding. The countries where life satisfaction is highest are on average those where GDP per capita is highest. In international comparisons, the relationship between GDP per capita and

subjective well-being thus increases, but it is non-linear, as Deaton (2008) and Stevenson and Wolfers (2008) also found. The relationship is not automatic however, partly because cultural factors may play a role: the United States and Denmark have higher satisfaction than predicted by the regression while Japan and, to a lesser extent, France, have lower satisfaction. According to Stevenson and Wolfers, well-being depends more on absolute income than relative income within a country.[4]

Finally, in the time dimension, several studies highlight a link between well-being and economic cycle (as approximated by the output gap or inventory prices). Even in the long term,[5] where the link seems little perceptible, recent publications have managed to detect a link between happiness and growth in many countries (Hagerty and Veenhoven 2006, Wolfers and Stevenson 2008). Moreover, according to Wolfers and Stevenson, in some countries, the lack of connection between happiness and growth can be explained by technical problems (changes in questions about happiness in Japan and a population sampling problem in China).

**4. PIB per capita and life satisfaction in 2007 for European Union countries, United States and Japan**




*Sources: Insee; OECD; Erasmus University Rotterdam, World database of happiness.*

## The limits of subjective well-being

Use of subjective well-being data raises many questions relating to the nature of such data. First, they are sensitive to the psychology of people, which may influence the results, in particular via social comparison and adaptation phenomena *(box 5)*.

Moreover, the scale of questions on subjective well-being is bounded, unlike the scale of variable objectives, such as GDP or consumption for example. This makes it difficult to make comparisons between subjective and objective data.

4. If well-being depended only on relative incomes within a country as predicted by comparison and adaptation phenomena, there should not be any relationship in international comparisons between the aggregated subjective happiness of a country and GDP per capita. The existence of this relationship may nevertheless be consistent with the phenomenon of social comparison in the world (and not in a country) under the assumption that individuals make global comparisons *(Box 4)*.

5. Time concepts are themselves approximate: for example it is questionable whether clearly significant relationships observed in developing or transitional countries are short or long-term changes.

*Box 5:*

**Psychological and behavioural determinants of subjective well-being**

Behavioural factors of social comparison and adaptation to income explain changes in subjective well-being and the Easterlin paradox (according to Easterlin himself). Individuals assess their situation in relation to a reference level and not in absolute terms, be it in relation to other persons, past or future aspirations. Comparison phenomena have been the subject of much literature (Senik, 2014).

First, anyone can compare his situation to that of others, and individual expectations are thus influenced by the income of those in close contact (eg. colleagues, family, neighbours). Many studies have shown, especially in the most developed countries, that there was a negative relationship between well-being as perceived by individuals and the level of income of the reference group to which they compare themselves.

At first sight, the influence of relative income seems difficult to reconcile with the fact that the richest countries have a higher level of perceived well-being *(fig 4)*. However, we can combine the two facts if we take information and signal effects into account ("tunnel" effect[1]). By informing households about future prospects of increased income, income comparisons play positively on well-being and dominate the negative effects of envy (especially in the Eastern European countries in the 1990s). The phenomenon of social comparison could also come into play on a world scale, under the assumption that individuals make global comparisons. Although the latter assumption seems plausible, few studies have confirmed it.

On the other hand, the process of adaptation (termed hedonic adaptation in the literature) to a new situation could also provide an explanation for the paradox. The well-being perceived by individuals depends on the difference between reality and their aspirations. If this is the case, as income increases, aspirations rise and well-being may remain unchanged.

In contrast, De Neve *et al.* (2014) showed that the negative impact of the economic crisis was generally much stronger on subjective well-being that the positive impact of improved market conditions. This can be explained by psychological phenomena of loss aversion. Many behavioural economics studies have highlighted a preference for increasing income profiles, failing which there is frustration (see Senik, 2014).

1. In a context of little visibility (like in a tunnel), observation of the lives of others (in the queue next to me that is moving forward while mine is stationary) has an information content which is so positive (my queue should soon move forward) that it dominates the negative sentiments of comparison and envy (my queue is not moving forward while the other is).

The adaptation phenomenon can also lead to a change in the way individuals respond to questions about their feelings, and particularly their interpretation of the levels of responses to questions about subjective well-being. Individuals may take an increasingly demanding view of the scale of happiness as they become happier. Thus, the interpretation of the scale may change over time due to changes either in the preferences of individuals or their environment.

Finally, there are significant differences between the different surveys *(box 4)*. These may be caused by their samples (which are usually small in size), the wording of questions (which may vary from one survey to the other) or survey dates.

Therefore, even if these subjective data have gained recognition in the academic world, with many studies showing their interest (see Senik 2014 for a summary), they also have many limitations.

## A measurement of utility

To complete the measurements provided by GDP and subjective well-being, it is possible to rely on economic theory to enrich consumption measurements and approach a measurement of the economic utility of households in a relatively simple way.

This utility is constructed from a small number of components, and can be measured over twenty or so countries since 1995.

We will base ourselves on the arguments to be included in an "instantaneous" utility function without considering inventories. The inclusion of inventories (natural resources, physical capital, heritage and infrastructures) in a flow indicator that is homogeneous with GDP indeed poses significant methodological problems (Gadrey and Jany-Catrice, 2012). Health indicator variables are not included either because the available data are subjective for the great majority and may be difficult to integrate into an objective indicator. Finally, inequalities are not taken into account because many inverse effects can come into play in the relationship between income inequality and well-being. On one hand, inequality aversion and fear of being relegated among the less well-off in a very unequal society tend towards a negative relationship between variations in inequalities and in well-being (eg. in Europe in the 1970s/1980s according to Alesina, Di Tella and Maclloch, 2004). On the other hand, signal and opportunity effects can give great hopes for social promotion and thus increase well-being (especially in English-speaking countries or Central and Eastern Europe in the 1990s, see Senik, 2014). Finally, other variables such as the environmental dimension or confidence (Algan and Cahuc, 2013) have not been included mainly due to the lack of comparable data for the whole period.

A utility measurement is thus constructed which takes into account certain factors of well-being. This utility is constructed using three variables: actual household consumption, household size (to take account of economies of scale) and leisure time *(box 6)*.

The taking into consideration of consumption rather than GDP allows the focus to be placed on households, as recommended in the Stiglitz-Sen-Fitoussi report. GDP and household consumption per capita do not evolve in quite the same way, with the differences between them being related to changes in income and household savings rates, as well as to foreign income streams which can play a significant role in some countries (see Blanchet et al., 2007 for the analysis of the differences between GDP, income and consumption). In the most restrictive definition of consumption, GDP and consumption may also evolve differently due to shared expenses (health, education, etc.). Here we choose to include the latter; the comparison between countries is therefore not affected for accounting purposes by the share of household expenditure which is covered by the public sector. Therefore, the consumption indicator which we have chosen is actual household consumption, which is broader than strict household consumption expenditure.

Moreover, economies of scale within households play an important role in well-being. Thus, certain expenses (such as those related to capital goods in the home, for example) do not increase in proportion to the size of households. However, the average number of people per household tends to decrease in most countries, increasing fixed costs and weighing negatively on the purchasing power of individuals. Therefore, rather than per capita consumption, consumption per consumption unit (c.u.) is taken as the indicator.[6]

Leisure, which is also an important component of well-being, is used in other studies (Fleurbaey and Gaulier, 2009, Boarini et al 2006). Leisure is understood here as the leisure time of the active population; the labour force non-participation rate is calculated by applying rates observed in men alone to the entire population. Thus the rise in female employment rates over the last twenty years does not induce a reduction in leisure. This implicitly means considering that it leads to increased well-being through consumption.[7] Other alternative scenarios are presented in box 6 following assumptions about the links between domestic activity and well-being.

6. Determining the ratio between total consumption and the average number of consumption units is an approximation of household consumption per average c.u.. The approximation is not too great if the size and structure of households are relatively independent of the level of income and household consumption. This enables consumption per c.u. to be calculated for countries without having the information at the micro-economic level.

7. Ricroch (2012) indicates that the increase in female employment has been accompanied by a decline in the hours spent on domestic tasks, without this being replaced by market-sector substitutes, at least in France. The additional consumption linked to domestic activity can then be treated as additional consumer spending, rather than the substitution of domestic work by payment for equivalent services.

*Box 6:*

## Utility measurement

**The model**

Consider a household consisting of *n* individuals indexed by *i*, all identical. There are two goods, A for which consumption is individualised and B for which consumption is collective (eg. housing). $C_{Ai}$ is the consumption by individual i of good A, $C_A$ household consumption of good A and $C_B$ the consumption by each individual in the household of good B. $q_A$ is the price of good A, $q_B$ the price of good B. Each individual has an amount of time in units which he can use to work (working time is noted $l_i$) or for leisure activities.

The preferences of individual i are represented by (1).

(1) $U_i = C_{Ai}^{\ a}\ C_B^{\ b}\ (1-l_i)^{1-a-b}$

a represents the weight of consumption of the individualised good,

b the weight of consumption of the collective good,

1-a-b the weight of leisure.

a, b and 1-a-b are between 0 and 1

As the individuals are identical, optimally they all consume the same amount of good A and they all spend the same amount of time working. We have:

(2) $C_{Ai} = C_A/n$

and (3) $l_i = l$

The household budget constraint is written (w is payment for work and R is the income of the entire household):

(4) $q_A C_A + q_B C_B = R = nwl$

We write C the amount:

(5) $C = C_A^{\ a/(a+b)}\ C_B^{\ b/(a+b)}$

We obtain the utility level of an individual:

(6) $U = (C/n)^{a+b}\ n^b\ (1-l)^{1-a-b}$

Utility is a weighted average of per capita consumption, of the number of people in the household and of leisure; the weight of these three factors is dependent on the preferences of individuals. The effect of the number of people comes from the existence of the collective good. For a given consumption per capita, the larger the household, the greater the extent to which the collective consumption expenses are shared and utility is high. In the extreme case where there is no collective good, this effect does not come into play: b=0 and the $n^b$ factor disappears from the equation (6).

We now consider that the economy is composed of m households, all identical. We note C* as the consumption of the whole economy and p as its population.

We have:

(7) $C^* = mC$

and

(8) $p = mn$

Equation (6) represents the utility of an individual which is also written:

(9) $U = (C^*/p)^{a+b}\ (p/m)^b\ (1-l)^{1-a-b}$

Utility therefore depends on per capita consumption, the number of people per household p/m (this last factor is not applicable if b=0) and the time devoted to leisure (1-l).

**Two limits of this model**

This highly stylised model has two main limitations. It does not take into account the inter-temporal dimension of household choices or domestic activities (which are included within leisure).

The first limitation results from the use of an "instantaneous" utility function to skip the inter-temporal dimension. Thus the individual is not saving and his only income comes from work. Rejecting this assumption would lead to giving a role to savings (to build up a stock of capital, a guarantee of future consumption). This option has not been used here so as not to make the model too complex.

By not taking domestic work explicitly into account, we are making the implicit assumption that it has an influence on well-being exclusively through leisure. Thus for example, according to our

1. This work done for France by Poissonnier and Roy (2012) does not exist in most countries.

assumption, time spent on DIY or listening to music procures the same well-being, despite the fact that the former is a domestic activity which could be counted as working time, leading to domestic production. It is the practical difficulty of measuring this production which leads us to make this assumption.[1] However, this assumption is difficult to transpose to the particular case of the rise in female employment: considering that the domestic activity of women in the home is entirely leisure would not enable us to understand the increase in female employment; it would represent a fall in well-being as the disutility of time worked offsets the increase in well-being linked to consumption. We choose a central assumption that the domestic work of those not in the labour force procures the same disutility as paid work. The sensitivity of the results to this assumption was tested in variants (see below).

**Empirical construction**

This equation is used to construct a utility measurement which is broader than per capita consumption C*/p. We have per capita consumption C*/p and the number of people per household p/m, for several OECD countries and over several years.

To distribute time between work and leisure, we have the number of annual hours worked per occupied active person, taken from the national accounts.[2] The following assumptions are made:

- It is assumed that every individual aged 25 to 65 has a "useful" time of 9 hours per day and that the remaining 15 hours cannot be used either for work or leisure. Every week, there is therefore a useful time of 63 hours (for the record, the average working time of a self-employed worker in France is about 52 hours per week) and of 3,285 hours every year (9 x 365) which he shares between work and leisure.
- All people aged 25 to 65 years who are not in the labour force, have a working time equal to 0 and a leisure time equal to 3,285 annual hours.
- Among people aged 25 to 65, it is considered that women have the same labour force participation rate as men so as not to take into account the increase in the female labour force participation rate (like Blanchet and Toutlemonde, 2008).
- Among workers in the labour force aged 25 to 65, it is considered that on average the unemployed have the same working hours as the occupied labour force (Fleurbaey and Gaulier 2009 make an equivalent assumption). This is to make the assumption that unemployment is not the result of a preference for leisure and that the unemployed are seeking work during a time equivalent to that of a job.
- People aged under 25 or over 65 are not included in the calculation. It is considered that these are people for whom the question of trade-offs between leisure and work does not arise.

Once the three variables are defined, parameters a and b just need to be determined to calculate utility.

For the choice of a and b, we can show that optimally:

(10) $l = a+b$

Working time is equal to the weight of consumption in preferences. This relationship can therefore be used to attach a value to a + b: a + b is estimated as the share of working time on average in the countries studied throughout the period.

We thus obtain that a+b = 0.45 (weight of work) and 1-a-b=0.55 (weight of leisure).

The equation (6) is now rewritten. We obtain:

(11) $U = (C/x)^{a+b} (1-l)^{1-a-b}$

where it was noted:

(12) $x = n^{a/(a+b)}$

In this form, it appears that quantity x is a number of "consumption units" within the usual micro-economic meaning, which allows us to take account of the way in which the standard of living varies depending on household size. But according to the OECD,[3] a satisfactory approximation of the number of consumption units for macroeconomic studies is:

(13) $x= n^{1/2}$

We therefore choose a and b in such a way that:

(14) $a = b = (a+b)/2$

2. Except for Belgium, Ireland and Portugal where they are taken from the European Labour Force Survey.
3. http://www.oecd.org/eco/growth/OECD-Note-EquivalenceScales.pdf

This choice is consistent with that adopted by Fleurbaey and Gaulier (2009).

Finally we obtain a = b = 0.225.

In the body of the text we call utility the utility level obtained with the parameter specification and values presented above.

**Robustness tests**

To measure the robustness of the results, several sensitivity tests were conducted on the model parameters.

First, these consisted in varying the weights of leisure and consumption on the one hand. In the scenario presented in this study, the weight of consumption, a+b, is 0.45 (and the weight of leisure 0.55). In an alternative exercise, a value of 0.40 was taken (a=b=0.2). This is the result that would be obtained when considering that "useful" time (available for work and leisure) is 10 hours a day (versus 9 hours in the reference scenario). This change altered the median variation in utility very little (-0.04 points between 1995 and 2007 and 0.01 point between 2007 and 2012) with virtually no variations observed in France. The main changes concerned Portugal between 1995 and 2007 (-0.1 points) and Estonia and Ireland between 2007 and 2012 (-0.1 points).

Tests were then carried out with regard to working and activity time.

Firstly, due to a lack of available data, the working hours of the entire population were used, but the labour force participation rate for men only; ideally, men's working time should also be used. To test this approximation, it was considered that in all countries and years, men's working time was approximately 8% higher than the working time of the whole population, with this figure corresponding approximately to what we observed in France in 2011. This produced a parameter a+b of 0.48. Taking into account this new setting and 8% longer working time, utility in France varied very slightly (+0.06 points) between 1995 and 2007 and practically not between 2007 and 2012.

Secondly, we conducted an exercise to assume that the extra working time allocated to women (when it is assumed that the male labour force participation rate applies to women) is domestic work and leads to an increase in consumption (depending on the labour force participation rate and working time). In this case we see that the results are generally little changed. In terms of level, countries where the employment rate is low (particularly Greece and Spain) saw their consumption and welfare slightly increase. In variation, the increase in female employment led to a slight reduction in the growth of consumption and therefore well-being (-0.14 points between 1995 and 2007 and -0.04 points between 2007 and 2012 for the median of countries).

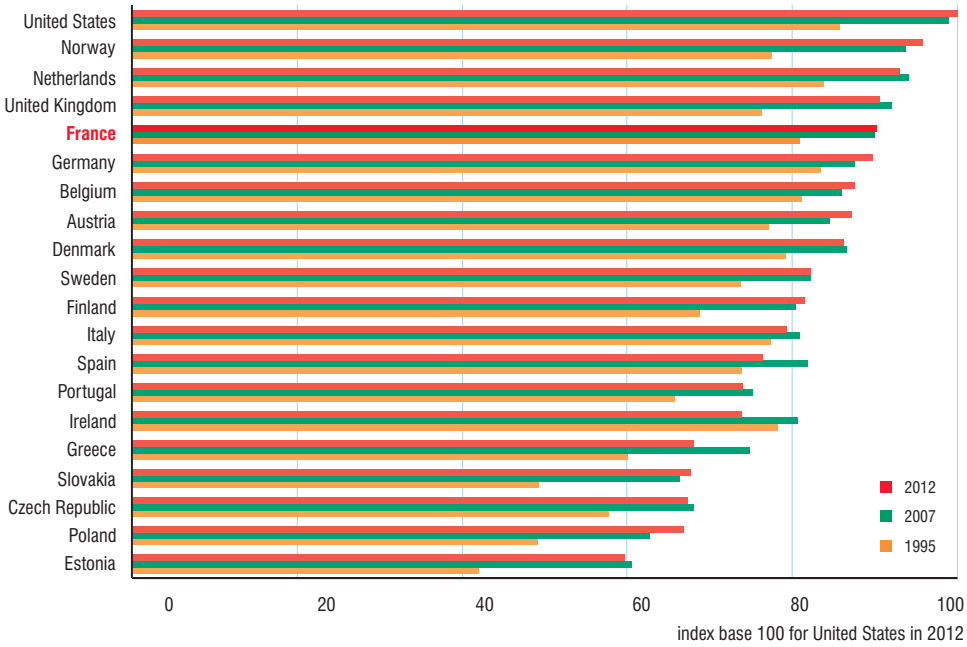
In a final exercise, it was considered that the female labour force participation rate was the one observed (whereas in our reference scenario the labour force participation rate for men was applied to women). In this scenario female unemployment brings well-being through leisure. This gave very similar results to the previous case in which female unemployment brought well-being through domestic consumption.

We now present the variations in the different utility components for 20 countries. 18 are members of the European Union (including four from the South: Spain, Greece, Italy, Portugal) and four from the former Soviet Union (Estonia, Poland, Czech Republic, Slovakia). We also added a country outside the Union (Norway) and the United States. A distinction was made between three different dates: 1995, 2007 and 2012.

In terms of level, the countries with the highest utility in 2012 were the United States, Norway and the Netherlands. Then the UK, France, Germany, Belgium, Austria and Denmark follow with very similar utilities *(fig 5)*. Eastern European countries had significantly lower utilities. However, the differences with the United States were lower than for per capita GDP: in the case of France in 2012, 31% for per capita GDP versus 10% for utility. This figure is mainly due to consumption and leisure: on one hand per capita consumption is 31% higher in the United States, on the other hand, leisure is approximately 15% higher in France.[8] Finally, Ireland which has relatively high GDP per capita, is less well placed in this regard.

For each of the variables used in the calculation of utility, we present hereafter the average annual growth rates during both periods: 1995-2007 and 2007-2012. To measure the central growth trend, the median growth rate is used, which does not take the size of the country into account.

**5. Utility in 1995, 2007 and 2012**




*Sources: Insee; OECD.*

8. Household size contributes very little to the difference between France and the United States.

## Utility in a period of growth (1995-2007)

Between 1995 and 2007, the median annual consumption per capita growth rate[9] was 2.3%. The lowest growth was observed in Ireland and Germany *(fig 6)*. France was a little below average. Among the countries where consumption grew most strongly were countries in the East but also Norway and the UK.

The median variation in household size was -0.4% per year.[10] The sharpest decline occurred in three southern European countries (Italy, Spain and Portugal) and Estonia; it was a little above the median in France (falling from 2.58 persons in 1995 to 2.43 in 2007), Germany, the Czech Republic and Ireland. It increased in Greece (between 1995 and 1999).

The median variation in leisure time was 0.2% per year. The sharpest increase was observed in Portugal (0.6%) and France (0.5%), while a slight decrease occurred in Estonia and Belgium. In France, it was the significant drop in annual working hours per occupied person in the labour force (-0.6% per year)[11] which was at the origin of the increase in leisure time, as the labour force participation rate decreased only slightly. In Germany, the variation in working hours per occupied person in the labour force was similar to that observed in France,[12] but the labour force participation rate increased (by 0.4% on average), resulting in a decrease in leisure time.

### 6. Variations in utility component variables between 1995 and 2007

annual average evolution rate, in %

| | Household consumption | Household size | Leisure | Utility |
|---|---|---|---|---|
| Parameters used in the calculation of utility | a+b=0.45 | a=b=0.225 | 1–a–b=0.55 | /// |
| Autria | 1.6 | -0.4 | 0.2 | 0.8 |
| Belgium | 1.2 | -0.2 | -0.1 | 0.5 |
| Czech Republic | 3.0 | -0.5 | 0.3 | 1.4 |
| Denmark | 1.7 | -0.1 | 0.0 | 0.7 |
| Estonia | 7.9 | -1.2 | -0.2 | 3.1 |
| Finland | 2.8 | -0.4 | 0.3 | 1.3 |
| **France** | **1.7** | **-0.5** | **0.5** | **0.9** |
| Germany | 1.0 | -0.5 | 0.1 | 0.4 |
| Greece | 3.5 | 0.5 | 0.3 | 1.8 |
| Ireland | 0.2 | -0.5 | 0.4 | 0.2 |
| Italy | 1.3 | -1.2 | 0.1 | 0.4 |
| Netherlands | 2.2 | -0.4 | 0.1 | 1.0 |
| Norway | 3.3 | -0.1 | 0.3 | 1.6 |
| Poland | 4.3 | 0.0 | 0.3 | 2.1 |
| Portugal | 2.1 | -0.8 | 0.6 | 1.1 |
| Slovakia | 5.6 | -0.4 | 0.2 | 2.5 |
| Spain | 2.4 | -1.4 | 0.2 | 0.9 |
| Sweden | 2.1 | -0.2 | 0.1 | 0.9 |
| United Kingdom | 3.2 | 0.1 | 0.2 | 1.6 |
| United States | 2.5 | -0.3 | 0.3 | 1.2 |
| **Médian** | **2.3** | **-0.4** | **0.2** | **1.0** |

Reading: Per capita consumption in France increased by 1.7% between 1995 and 2007. Taking into account the other components and their weightings (0.45 for consumption), a variation in utility of 0.9% is obtained.
*Source: OECD, authors.*

9. Household actual final consumption data for Spain has been unavailable since 1995: it was assumed that the ratio between actual consumption and private consumption remained constant, identical to that observed before 1995.
10. Household size was imputed in 1995, using 1994 or 1996 data for the Czech Republic, France, Greece and the UK and using the 2004-2011 trend for Austria, Belgium, Estonia, Ireland, Portugal, Slovakia and Spain. In 2012, data were imputed from 2011.
11. The number of work hours in 1995 was imputed using the 2000-2007 trend for Estonia, Ireland and Poland.
12. This average number of hours worked was taken from the national accounts. The similarity between France and Germany however, masks a decline in full-time hours worked in France and an increase in the share of part-time salaried jobs in Germany (see Costes, Rambert, Saillard, 2015).

Utility is a weighted average of the three variables presented previously (consumption per capita, household size and leisure time). The weightings used were those presented in *Box 6*. The median utility growth rate calculated in this way was 1.0% per year. The lowest growth was in Ireland, Italy and Germany (0.2% to 0.4%). France (0.9%) was below the median. Eastern European countries, and to a lesser extent the UK, Norway and Greece, had the strongest growth in utility.

## Utility during a period of economic crisis (2007-2012)

Between 2007 and 2012, the median per capita consumption growth rate was slightly negative: -0.1%. France (+0.3%) was above the median, due particularly to the rise in individualised government spending during the crisis (while private per capita consumption fell by 0.1%). The largest fall was observed in Southern European countries (Greece, Italy, Spain), Estonia and Ireland. Despite the economic crisis, nine countries nevertheless had positive growth, with growth highest in Poland, Germany and Norway *(fig 7)*.

The median household size decreased by 0.3% a year. This decline was particularly significant in Spain (-1.4%) and Portugal (-1.0%). It was 0.3% in France. Household size remained stable in Poland and Sweden.

Median leisure time increased by 0.2% per year. The largest rise was observed in Estonia and Ireland; the largest decrease in Sweden (-0.4%).

Overall, the median utility growth rate was stable. Growth was highest in Poland, Germany and Austria. In France, the variation was zero. The largest decreases in utility were observed in Greece, Spain and Ireland.

### 7. Variations in utility component variables between 2007 and 2012

annual average evolution rate, in %

| | Household consumption | Household size | Leisure | Utility |
|---|---|---|---|---|
| Parameters used in the calculation of utility | a+b=0.45 | a=b=0.225 | 1-a-b =0.55 | /// |
| Austria | 0.6 | -0.5 | 0.7 | 0.6 |
| Belgium | 0.5 | -0.2 | 0.3 | 0.3 |
| Czech Republic | 0.0 | -0.6 | -0.2 | -0.2 |
| Denmark | -0.3 | -0.1 | 0.1 | -0.1 |
| Estonia | -2.2 | -0.6 | 1.5 | -0.3 |
| Finland | 0.6 | -0.4 | 0.2 | 0.3 |
| **France** | 0.3 | **-0.3** | **0.0** | **0.0** |
| Germany | 1.1 | -0.6 | 0.2 | 0.5 |
| Greece | -4.5 | -0.7 | 0.7 | -1.8 |
| Ireland | -5.0 | -0.7 | 1.3 | -1.7 |
| Italy | -1.5 | -0.3 | 0.6 | -0.4 |
| Netherlands | -0.2 | -0.4 | -0.1 | -0.2 |
| Norway | 0.8 | -0.2 | 0.1 | 0.4 |
| Poland | 2.7 | 0.0 | 0.0 | 1.2 |
| Portugal | -1.4 | -1.0 | 0.9 | -0.3 |
| Slovakia | 0.9 | -0.3 | 0.0 | 0.4 |
| Spain | -2.5 | -1.4 | -0.1 | -1.4 |
| Sweden | 0.5 | 0.0 | -0.4 | 0.0 |
| United Kingdom | -0.8 | -0.1 | 0.1 | -0.3 |
| United States | -0.1 | -0.2 | 0.5 | 0.2 |
| **Médian** | **-0.1** | **-0.3** | **0.2** | **0.0** |

Reading: Per capita consumption in France increased by 0.3% between 2007 and 2012. Taking into account the other components and their weightings (0.45 for consumption), a variation in utility of 0.0% is obtained.
*Source: OECD, authors.*

## Structural determinants and components sensitive to the economic crisis

Comparing the two sub-periods illustrates how the variation in utility depends on structural factors (household size, leisure time) and on one highly crisis-sensitive factor (per capita consumption). *Figure 8* compares the median variations in utility, its components and GDP per capita for the twenty countries surveyed.

In the 1995-2007 growth period, the median utility growth rate was 1.0% per year, which represented approximately half of the median GDP growth rate (2.4%). On the one hand, consumption grew at a pace equivalent to that of GDP, which promoted the growth of utility. But on the other hand, growth in actual consumption contributed only 45% to the variation in utility. This also depended 55% on leisure. Moreover, the downward trend in the size of households slowed utility by limiting economies of scale within households.

During the economic crisis period, utility stagnated (-0.1% per year) while GDP per capita decreased more sharply (-0.6%). This reflects the less cyclical nature of household consumption (-0.1%). Continuing undoubling contributed to a decline in utility. Conversely, the continued improvement in leisure time (+ 0.2%) contributed positively to utility.

Overall, between the two periods, leisure time and household size varied little. The time devoted to leisure increased by 0.2% per year during both periods, the size of households decreased by 0.4% annually during the first period, by 0.3% in the second. These two variables helped make utility less cycle sensitive than GDP.

**8. Evolution of medians of components of utility for each period**

annual average evolution rate, in %

| | Parameters for calculation of utility | 1995-2007 | 2007-2012 | Variation between the two periods |
|---|---|---|---|---|
| Actual consumption per capita | 0.45 | 2,3 | -0.1 | -2.4 |
| Household size | 0.225 | -0.4 | -0.3 | -0.1 |
| Leisure | 0.55 | 0.2 | 0.2 | 0.0 |
| Utility | /// | 1.0 | 0.0 | -1.0 |
| GDP per capita | /// | 2.4 | -0.6 | -3.0 |

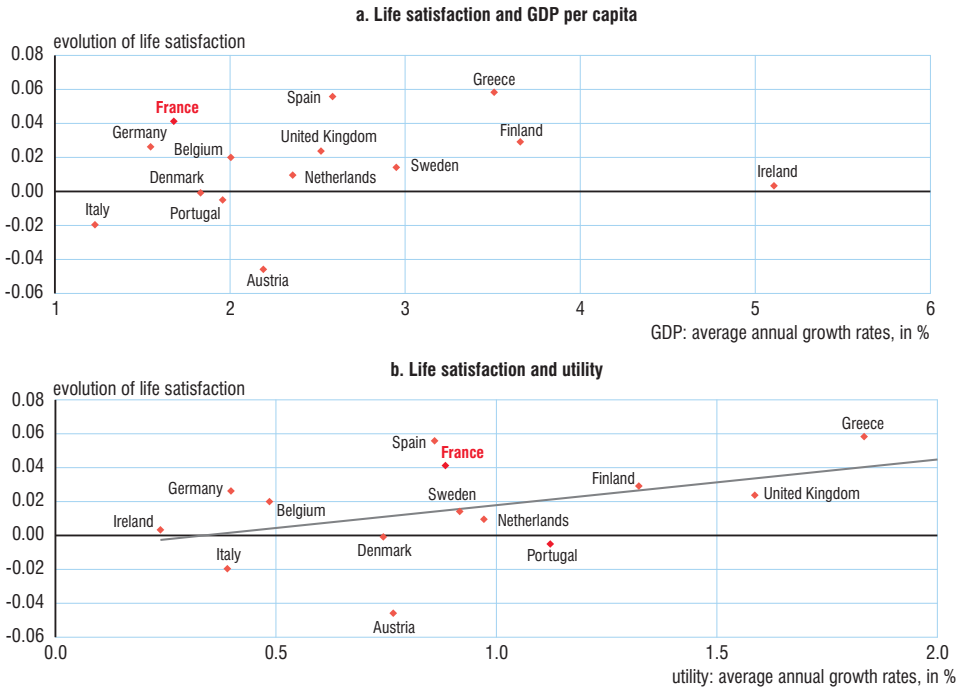
*Sources: Insee; OECD.*

## GDP, utility and subjective well-being before and after the economic crisis

In this section, we compare the variation in subjective well-being in the 18 European countries involved in the study made possible by the Eurobarometer survey.

Between 1995 and 2007, during a period of relatively steady growth, variations in GDP and satisfaction with life seem more consistent with the Easterlin paradox in Europe: satisfaction was practically stable on average, while GDP per capita increased by 2.4% per year. The correlation between the two variables was almost zero *(fig 9)*. If we replace GDP per capita by utility, its correlation with subjective well-being becomes positive and significant (threshold of 10%). Taking account of actual consumption, the size of households and leisure therefore allows us to come closer to the variation in subjective well-being. This improvement is attributable in particular to Ireland, where GDP grew sharply while satisfaction stagnated. In this country, the disposable income of households increased much less than GDP (which enjoyed buoyant growth) due to the weight of foreign investors (who repatriated profits to their country of origin): per capita consumption stagnated as a result.

## 9. GDP per capita, utility and life satisfaction between 1995 and 2007



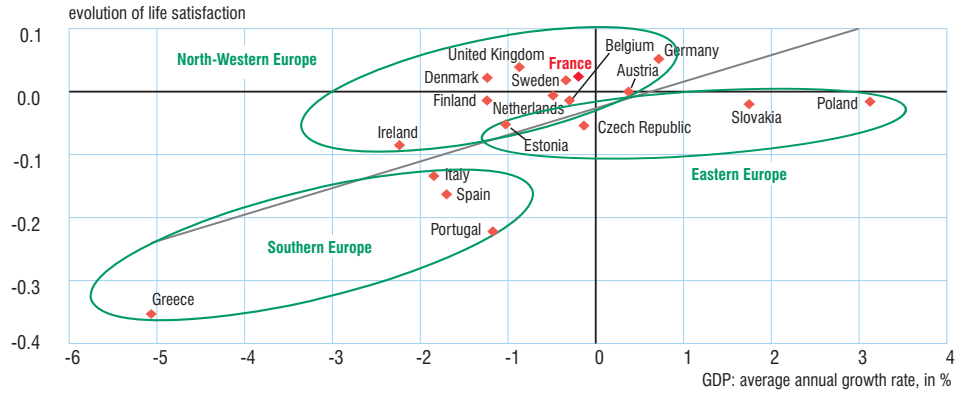

Reading note: satisfaction with life is scored from 0 to 10; variations in this score are given in the y axis of graphs.
*Sources: Insee; OECD; World database of happiness, Erasmus University, Rotterdam.*

These results have changed with the 2008 economic crisis. Within 18 European countries taken as a whole, a clearer relationship appears between subjective well-being and GDP per capita *(fig 10)*. However, this relationship covers a variety of situations. In southern European countries (Greece, Italy, Portugal, Spain), where the fall in GDP per capita was the highest, satisfaction has declined markedly. This decrease was much greater than would be expected given the relationship across all countries (in *figure 10*, the Southern European countries are below the regression line). In the Eastern European countries (Poland, Czech Republic and Slovakia), median GDP per capita grew by 1.7% per year, but satisfaction fell by 0.02 points. As with the previous group, the variation in satisfaction is less notable than the variation suggested by GDP per capita (the countries are below the regression line). Finally, in the other countries (qualified as the "North-west" of Europe), median per capita GDP fell slightly and satisfaction remained stable on average. Its variation was higher than expected, considering the variation in GDP (this group of countries is above the regression line).

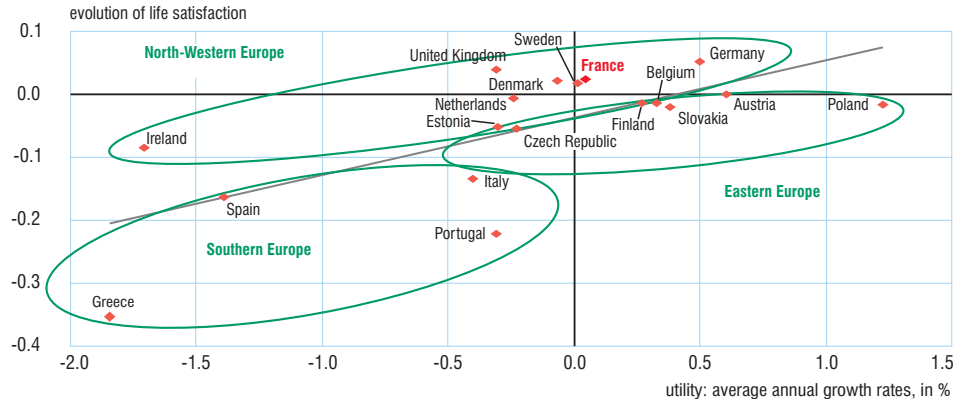
The correlation with life satisfaction is almost equal for utility and for GDP. However, in most countries in Eastern and Southern Europe, the decline in satisfaction remained stronger than predicted by the decline in utility. This was especially the case in Greece, Portugal and Italy, perhaps due to the sharp rise in unemployment between 2007 and 2012. Indeed, utility, as calculated here, takes into account the impact of unemployment only through lower consumption. But some studies have shown that unemployment has a strong negative impact beyond just a loss of income. The rise in unemployment increases the risk of unemployment for all persons in the labour force, which reduces well-being (Fleurbaey and Gaulier, 2009). In addition, there is a negative effect related to social status. Finally, unlike divorce or widowhood, the impact of unemployment would appear to be persistent (Clark, Diener et al., 2008). ■

## 10. GDP per capita, utility and life satisfaction between 2007 and 2012

**a. Life satisfaction and GDP per capita**




**b. Life satisfaction and utility**




Note: life satisfaction is scored from 0 to 10 ; variations in this score are given in the y axis of graphs.
*Sources: Insee; OECD; World database of happiness, Erasmus University Rotterdam.*

## Further reading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