

GOING BEYOND GDP – BUT HOW FAR?

Although economists have long stressed the limitations of using GDP to evaluate standards of living, the debate was recently reignited by the publication of the Stiglitz report. In 2006, the CEPII proposed an indicator incorporating certain social data items, in terms of equivalent incomes, such as leisure time, poverty associated with unemployment, longevity and size of households; this indicator takes also account of inequalities, exhaustion of natural resources, deterioration of the environment and consumption of fixed capital. In this Letter, we propose to update this indicator and above all to extend it to cover the major emerging countries. Our calculations reveal significant corrections. Generally speaking, however, aside from the fact that the size of families is now taken into account, the various corrections applied make hardly any difference to the country rankings. Overall, the same countries still suffer from low income per inhabitant, serious inequalities, a high death rate and a lack of time devoted to leisure activities.

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■ Gross domestic product and well-being

Gross domestic product (GDP) is an overall measurement of economic activity the trend of which at constant prices illustrates real growth. Measured against the number of inhabitants and corrected to take account of price differentials between countries, this measure is often interpreted as an indicator of the standard of living. Despite its numerous limitations, it is by far the most frequently used indicator for comparing the economic performances of Nations. This indicator's success lies in its consistent nature, derived from national accounting principles, and in its great availability. Using GDP per inhabitant as an indicator of well-being is however somewhat overstated. The Commission's report on measuring economic performances and social progress, published in 2009 and more commonly known as the Stiglitz Report, relaunched the debate¹. This report outlines twelve proposals for incorporating elements of economic and social

life that are not sufficiently taken into consideration by national accounting. Without renouncing the use of a global indicator that takes account of these different aspects², the authors begin by separating out the long-term sustainability and growth indicators from the indicators of well-being. These are in fact two issues of a different nature. Sustainability of long-term growth (based on the concept of sustainable growth) presupposes that among other things the economic impact of global warming and the exhaustion of natural resources will be taken into consideration, which means that complex models need to be designed in order to simulate different growth profiles for the world economy over the long term and to evaluate their implications. Knowing how to compare levels of well-being between one country and another at a given time is another matter entirely. It is this question that we propose to address here.

1. For an overview of the research, on the initiative of the European Commission, see "Beyond GDP" <http://www.beyond-gdp.eu/>. Also see M. Fleurbaey (2009), "Beyond GDP: The Quest for a Measure of Social Welfare", *Journal of Economic Literature*, 47(4) or Ch. Jones & P. Klenow (2010), "Beyond GDP? Welfare Across Countries and Time", *NBER Working Paper*, no. 16352.

2. One of the solutions proposed by Amartya Sen in the 1970s was the human development indicator, which is a composite indicator, i.e. an indicator of indicators that aggregates very heterogeneous data items by means of simple averages. Calculated and updated by the United Nations Development Program(UNDP).

■ Devising an indicator for well-being

The first work carried out by CEPII on well-being indicators dates from 2006³. The idea is basically to take account of non-monetary components of well-being; generally speaking, the corrections made comply pretty well with the recommendations in the Stiglitz Report.

One initial correction, which is easy to implement, involves taking the GDP per inhabitant (at purchasing power parity) and adding the net balance of foreign incomes originating from production factors (incomes from migrant workers and incomes from investments to or from abroad) to obtain the Gross National Income (GNI). This initial correction typically has little effect (in the range of $\pm 2\%$ of GDP), except for some small countries that host numerous multinational companies that transfer a large part of their profits back to the country in which they were founded, particularly in times of crisis. Thus, in 2009, the GNI of Luxembourg, Ireland and Iceland was 28%, 18% and 10% lower than their GDP respectively.

The other corrections incorporate certain non-monetary components that have a significant impact on well-being. Our problem is how to attach a value to these components. To this end, our method converts non-monetary indicators into equivalent incomes and distinguishes between global indices, such as the human development indicator, which combine several indices arbitrarily without giving any indication of their respective weightings in the final indicator.

Four corrections involve what are commonly called equivalent incomes⁴:

◆ Taking account of free time. The underlying idea is that people are not prepared to sacrifice all of their free time just for an increase in their income. The trade-off between these two options is dictated by people's respective preferences, which can be estimated based on the choices observed. To this end, we will calculate individual working time over an entire working life for the various countries in the sample, then we will estimate the average working time, which will be used as a standard, and will calculate how much each country diverges from this standard, which will then be given a value in terms of that country's average salary.

◆ Insecurity associated with unemployment. Its cost is calculated based on the unemployment rate recorded and the pay-out from unemployment insurance, increased by 20% to reflect the social stigma associated with being unemployed.

◆ Longevity. The impact of this factor is calculated with Japan as the reference, which has an average life expectancy of 82.5 years. The difference between Japan and other countries is given a value determined by the price to be paid to extend one's lifespan, as calculated for the United States⁵.

◆ The size of households is one of the most important factors when measuring the well-being index. A household's spending does not increase in proportion to the number of people living in it: economies of scale operate for considerations such as accommodation, domestic equipment and heating, for example. The scale for equivalent incomes adopted is the scale used by the OECD⁶. This scale involves comparing household incomes against the square root of their size. Thus, a given total income would give the same purchasing power per individual for a four-person household as for two single individuals.

Four other corrections are taken into account which have their own logic.

◆ Domestic inequalities: supposing that individuals are opposed to inequalities, individual situations are amalgamated by attaching less value to each euro earned by a rich person than to each euro earned by a poor person (Kolm-Atkinson index). In practice, we will consider that a situation in which a poor individual receives one euro is equivalent to a situation in which an individual twice as rich receives three euros. The data on incomes distribution per decile were obtained from the World Bank.

◆ The exhaustion of non-renewable natural resources is measured by the primary energy consumption per inhabitant for each country, regardless whatever the source⁷. Moreover, greenhouse gas emissions are attributed a value of \$41.50 per tonne-equivalent of CO₂⁸.

◆ Capital depreciation. We take account the obsolescence of physical capital, deducting fixed capital consumption from the gross national income (data from national accounting).

3. M. Fleurbaey & G. Gaulier (2006), "Les champions du PIB par tête et ceux du niveau de vie", *La Lettre du CEPII*, no. 260, October. M. Fleurbaey & G. Gaulier (2009), "International comparisons of living standards by equivalent incomes", *Scandinavian Journal of Economics*, n° 111(3), p. 597-624. M. Fleurbaey & G. Gaulier (2010), "Mesurer et comparer les niveaux de vie", and Chapter 7, "L'économie mondiale 2011", *CEPII*, Collection Repères no. 561, La Découverte.

4. The equivalent-income-based approach refers to a basic concept in the economy of well-being: compensatory variations. The concept is that there is a balancing act between the different components, monetary and non-monetary, of the standard of living, and that a variation in one of these components can be compensated for by a variation in another. Equivalent incomes are the variations in income that would compensate, for any given population, for a given variation in a non-monetary component of their well-being (leisure, health, etc.). The income that would place a population in a situation equivalent to its actual situation if the non-monetary aspects (working time, health, etc.) were, however, raised to their reference levels. At a constant level of observed income, for example, a lower life expectancy will correspond to a lower equivalent income.

5. See G. Becker, T. Philipson & R. Soares (2005), "The quantity and quality of life and the evolution of world inequality", *American Economic Review*, 95(1), 277-291.

6. OECD (2008), *Growing Unequal? Income Distribution and Poverty in OECD Countries*, Paris.

7. Rather than share out the withdrawal from the reserves according to the each country's production (the method adopted by the World Bank), we have chosen to attribute it to the various countries according to their consumption.

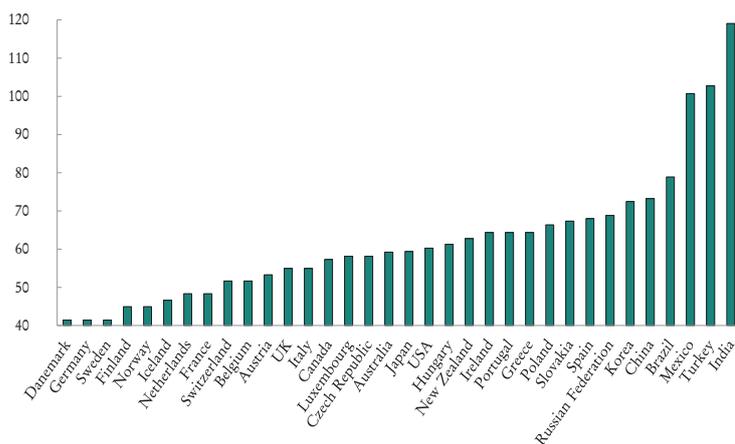
8. "La valeur tutélaire du carbone", page 87, Rapports et documents no. 16, La Documentation Française, 2009.

These corrections are applied to 34 countries, 10 of which are large emerging countries, and the indicators have been calculated up to 2009⁹.

■ The two main corrections: Households size and inequalities

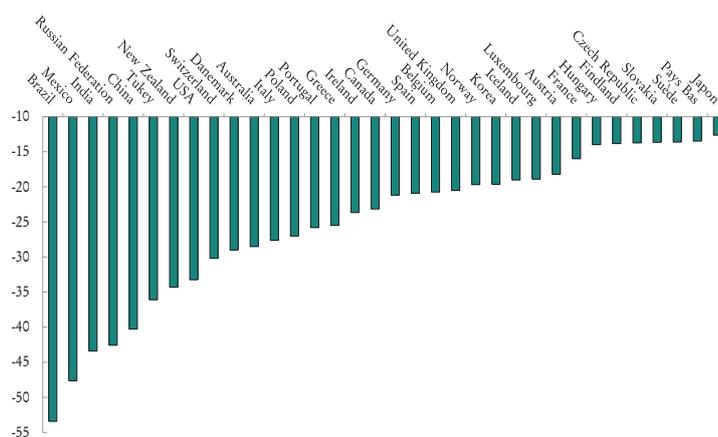
The main correction – relatively simple to implement – is to take account of the size of households. Unsurprisingly, we can see (Figure 1) that it is the poorest countries that have the largest families and for which the correction is the greatest: it can even reach more than 100% of GNI/inhabitant. This relationship between GDP/inhabitant and the size of families is not a linear one: for example, although Turkey has a GDP per inhabitant around four times larger than India, the average size of Turkish families is close to that of Indian families. This correction tends to considerably reduce the level of inequalities between countries. However, we can also see a rapid reduction in the size of households in emerging countries. In China, the size of the average family went from 4.8 in 1973 to 3.1 in 2009, and the average size of Indian families went from 5.3 in the 1980s to 4.5 in 2009. In developed countries, households are obviously much smaller. The countries of Northern Europe, including France, have the smallest households, whereas the Anglo-Saxon countries (UK, USA, Australia, Canada, New Zealand and Ireland) remain in the middle position.

Figure 1 – Correction of income per capita by size of family (in % of GNI/inhab.)



Source: OCDE Family database, Eurostat and national sources. Authors' calculations.

Figure 2 – Correction of income per capita by an inequality factor (as a % of GNI/inhab.)



Source: World Bank. Authors' calculations.

The second most important correction takes account of internal inequalities. By virtue of its very construction, this correction is negative for all countries. It is especially pronounced for highly unequal emerging countries: Brazil (correction equivalent to -53% of GNI/inhab.), Mexico (-48%), India (-43%)¹⁰, the Russian Federation (-43%) and China (-40%). It also has a negative effect on Anglo-Saxon countries, particularly the US (-33%). At the other end of the scale, the thirteen countries with corrections under 20% include Japan (-13%), France (-16%) the Czech Republic, Slovakia and the Scandinavian countries.

The other corrections are considerably less important.

- ◆ Greenhouse gas emissions introduce a cost equivalent to only 1.6% of GNI on average for all countries considered. Of course, if we adopted a higher carbon value, the picture would be different. Account should also be taken of other forms of environmental deterioration, although these are typically difficult to evaluate; here too, probably, corrections would be larger in emerging countries than in developed countries.

- ◆ The exhaustion of natural resources results in an average drop of 3.5% of GNI.

- ◆ Taking account of unemployment (over and above the loss of production taken into account in the GDP) represents 5% of GNI at the most.

- ◆ Fixed capital consumption changes little between countries, averaging out at 14.9% of GNI. Emerging countries such as India and China typically have more recent capital, whereas the countries of Central Europe and Japan have significant stocks of ageing capital.

9. There might be a temptation to use the well-being indicator to assess the impact of the crisis, but it should be noted that most of the corrections considered (size of families, longevity, etc.) demonstrate remarkable inertia. Therefore, it is above all incomes that have reacted to the crisis. Three countries have registered significant additional losses: Iceland (-30%), Luxembourg (-19%) and Switzerland (-14%), to which we should add Spain (-10%) due to unemployment which shot up from 8% to more than 18% in 2009.

10. In the cases of China and India, the World Bank's data concerns the distribution of expenditures on consumption and not that, more unequal, of incomes. Therefore we have corrected the Indian inequality indicator by data from "Notes on Inequality and Poverty" by Surjit S. Bhalla prepared for the NBER conference from the 10th to 13th January 2009, and for China from Sutherland and Yao, "Income inequality in China over 30 Years of reforms", *Cambridge Journal of Regions*, 1st of February 2011.

◆ Health, addressed from the perspective of life expectancy, operates favourably in respect of Japan, used as the reference here, and of Northern European countries. It operates very unfavourably in respect of emerging countries, particularly Russia, which is beset by serious public health issues.

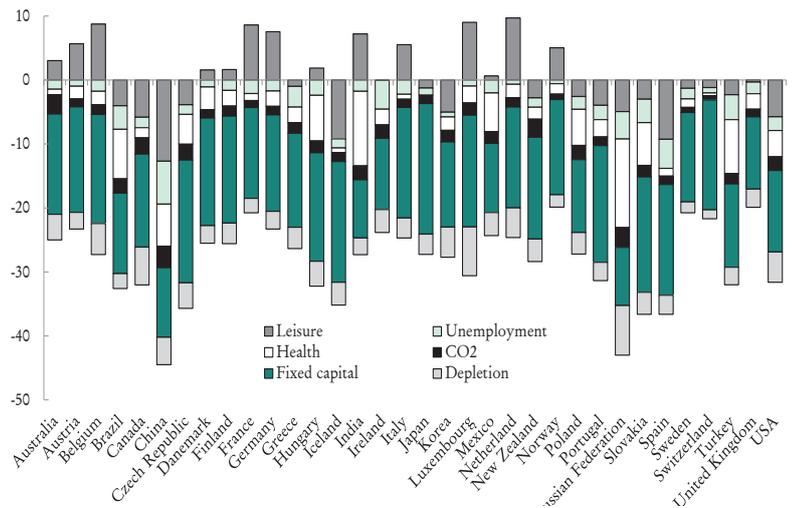
◆ Leisure activities give a considerable advantage to Northern European countries, whereas Anglo-Saxon countries and emerging countries have much less free time on average.

Conclusion

Incorporating social data items in the form of equivalent incomes and environmental data considerably modifies the image of standard of living portrayed by GDP per inhabitant. Generally speaking, however, aside from the fact that the size of families is now taken into account, the various corrections applied make hardly any difference to the country rankings¹¹. Overall, the same countries still suffer from low income per inhabitant, significant inequalities, a high death rate and a lack of time devoted to leisure activities. We have put forward several corrections in this Letter to the method of measuring GDP in order to arrive at a better understanding of the average degree of well-being at a national level. Needless to say, these corrections make no claim to being exhaustive, and numerous improvements could yet be made:

◆ The reliability of the data involved is very variable, particularly between developed countries and emerging countries. On two occasions at least, we chose to correct official data (measurements of inequalities in India and China and of unemployment in China) relying on good-quality academic sources, but these corrections would certainly not be accepted by the statisticians in the countries concerned.

Figure 3 – Effects of greenhouse gas emissions, exhaustion of natural resources, unemployment, fixed capital consumption and leisure time on well-being (as a % of GNI/inhab.)



Source: World Bank. Authors' calculations.

◆ We only gathered data for 34 countries. By restricting our corrections to three variables (inequalities, mortality and leisure time) in the same way as Jones and Klenow (*op. cit.*), for example, we could extend the sample to 134 countries.

◆ On the other hand, it would be entirely possible to broaden our indicator to include other data, particularly domestic work, demographics, the quality of social relations or security; or even to seek to improve the data that we have used (for example by substituting life expectancy in good health with average life expectancy), but the sample of countries used would be even smaller.

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11. Moreover, we have not set out any particular classification for the countries. Some countries are too close together, such as Western European countries, for their individual classification to be meaningful, taking account of measurement errors for the various indicators. Detailed information is however available from the CEPII website (http://www.cepii.fr/francgraph/bdd/bien_etre.htm).

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