
Research article

The Debate on GDP. Where we are at. Or, how to run to its aid with contempt of danger and hope to get out unharmed.

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Abstract: The debate on the gross domestic product (GDP) and whether or not it is appropriate to measure countries’ or people’s well-being has been going on for approximately 30 years. It was reinvigorated in the wake of the document drawn up by the Sarkozy-Stiglitz Commission and then weakened from 2020 onward until almost disappearing. In our opinion, it is worth returning to the issue, as many aspects have not been well specified and approached. In this paper, we discuss the state of the art, examining and showing how some points are inappropriately posed, misunderstood, or even wrong. The basic misunderstanding is that GDP can be an indicator of well-being. This is not the case, as underlined by the Commission and confirmed by the analysis that we conducted here. It is somewhat commonly agreed among many authors and in the *Beyond GDP* initiative that GDP should be set aside and replaced by some alternative indices. We show that GDP cannot be replaced or transformed into a sustainable indicator that includes both production and natural resources depletion, environment, and social capital; instead, it would be useful to combine it with some alternative indicators to obtain more complete information. Furthermore, we show that it is not a good idea to oppose sustainable economic growth.

Keywords: GDP; debate; Sarkozy-Stiglitz Commission; sustainability; well-being; Green GDP; well-being indicators

JEL Codes: E01, E1, I3

1. Introduction

The debate on the use of the gross domestic product (GDP) as an indicator of well-being has spanned the last 30 years. Everything suggests that the debate storm has passed, and now is the time to get back to reflect on it.

The discussion over GDP inadequacy has described it as a distorted tool, a kind of danger for economic analysis, almost an old iron to be scrapped without any regret—even described by an eminent economist as “akin to a religious war” (Heys et al., 2019). This should have been corrected right away. On the one hand, it is important to recognize the increased need to take well-being into account with an appropriate indicator. On the other hand, there is also the essential need to measure economic growth and, therefore, the use of GDP as an indicator of such growth.

If the question had been posed in these terms right from the beginning, without erroneously claiming that GDP was an indicator of countries’ or people’s well-being—therefore confusing economic growth with welfare—attributing to it meanings that it cannot have, and asking it what it cannot answer, the whole debate would not even have developed. Only correct criticisms—on its incompleteness and difficulties of its estimation—would have remained and could have been duly approached and resolved.

First of all, one must ask whether it is worth returning to the subject or whether there are no new elements of interest. We believe there are reasons for further deepening the subject and for a global framing of the debated issues—which, if nothing else, have had the indisputable merit of having stimulated the interest in the construction of ad hoc well-being indicators. Such reasons will be shown in the historical-systematic critical analysis conducted ahead.

In Section 2, we will return to the concept of GDP and the boundaries within it must be interpreted, as well as to the problems of its estimation. We will also show how, far from being an old and inadequate tool, GDP responds to the needs for which it was designed and, if adequately amended in the two mentioned shortcomings, can aspire to become a crucial tool for the evaluation of the state of health/growth of an economic system. Section 3 describes the debate and retraces the path followed by it, conducting a historical-systematic analysis of the many opinions involved, the reasons why it is ill-posed, and the usefulness of the GDP for the uses for which it was conceived. We will conclude the section with an illustration of indicators suggested as alternatives to GDP such as the Green GDP (GGDP). The conclusions drawn in Section 4 will help us to pull the strings of the whole question.

2. The concept underlying the modern GDP, its structure, and its meaning

It was William Petty, in 1665, who produced the first estimate of national income, which can be identified as the forerunner of GDP. In 1688, Gregory King estimated the yearly income per family, and François Quesnay, with the *Tableau économique*, illustrated for the first time the circular flow of national income. Both reinforced the concept of income product, which then found its coagulation in the work of Simon Kuznets, a Russian-born economist. At the request of the America’s Congress of 1932, Kuznets estimated national income from 1929 to 1932. Kuznets (1934) also elaborated on the

modern concept of GDP, which was later adopted as the main measure of a country's economy at the Bretton Woods conference in 1944. Since then, GDP has been the most commonly used measure of economic activity; thanks to Richard Stone and James Meade, it became one of the cornerstones of the National Accounts system, developed as a quantitative accounting translation of Keynesian macroeconomic theory.

Subsequent and rapid was the diffusion of the GDP as an indicator of production and economic growth or even as an indicator of production capacity in wartime, as occurred during World War II by the Allied Forces. None of the above scholars ever intended it as an indicator of well-being.

As such, GDP was born with well-defined purposes of a purely economic nature; not social nor even less humanitarian. To stay well aware of this, it will not be superfluous to remember its identity card, i.e., the circular flow of income. Its graphic representation of a closed system is well known but reproducing it here will help us to better develop and defend our arguments (Figure 1).

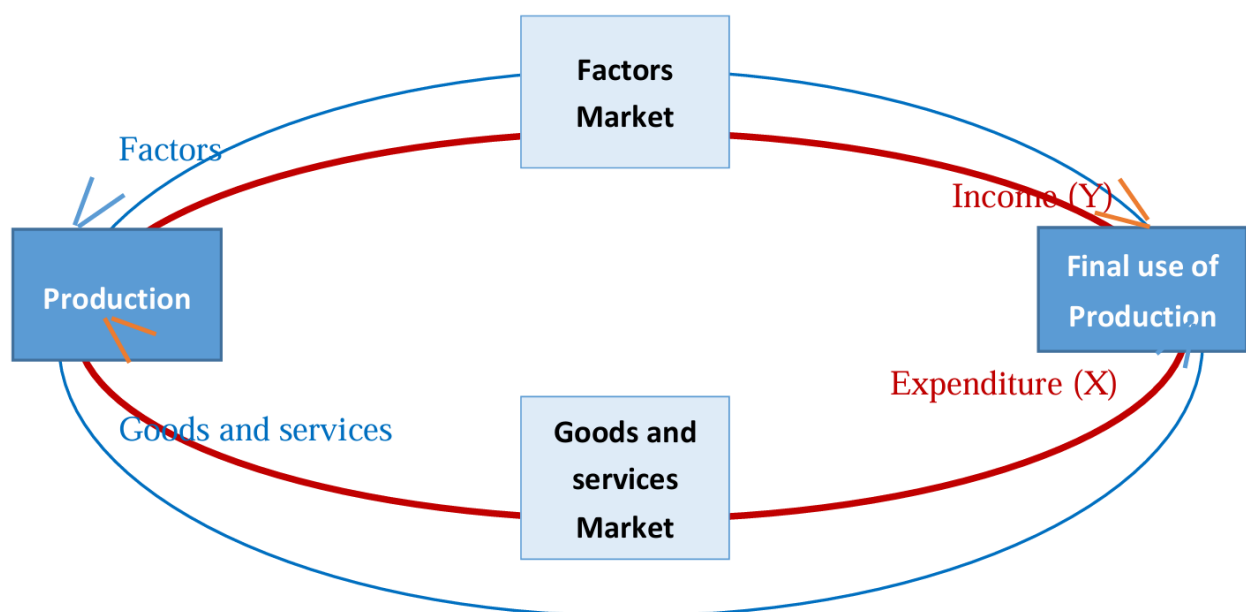


Figure 1. Circular flow of income.

Income is labor plus capital, meaning salaries and wages, interests, rents, profits, dividends, and anything but the gross value added (GVA), which, after indirect taxes and production subsidies (net indirect taxes), becomes GDP.

In terms of a response matrix, assuming that producers (firms) and users (households) do not carry out transactions with themselves:

$$\begin{bmatrix} 0 & X \\ Y & 0 \end{bmatrix} \quad (1)$$

This is equivalent to saying that the generating model $X = a + bY$ is such that the constant term is equal to zero and that the proportionality coefficient is equal to 1. In other words, the model that generated that response matrix is characterized by the conditions of no government, closed economy, and all income spent.

Consequently, GDP measures the increase in the value of production, that is, what has been added to the goods and services existing at the beginning of the reference period, through the production

process of physical, temporal, or spatial transformation, modified by public intervention implemented through net indirect taxes.

It is entirely justified, then, Samuelson and Nordhaus's (1992) advocacy that, "while the GDP and the rest of the national income accounts may seem to be arcane concepts, they are truly among the great inventions of the 20th century", with the comparison of GDP's overall picture of the economy state to that of a space satellite that surveys the weather across an entire continent. Landefeld (2000) agreed with this statement, saying that it is an indicator that cannot disappear.

Landefeld et al. (2009) stated the need for expanded or supplementary measures for the national accounts, highlighting what such estimates might reveal relative to the conventional statistics presented by GDP and other aggregate statistics from the accounts. Later on, Landefeld et al. (2020), argued that GDP and the broader system of national accounts are the world's most comprehensive measures of economic activity, highlighting that virtually all nations around the globe produce and rely upon estimates of GDP and GDP per capita.

Some cracks in this firm vision were caused by the arguments of Coyle (2014), who revealed GDP strengths and weaknesses and explained why even small changes can decide elections, influence major political decisions, and determine whether countries can keep borrowing or be thrown into recession. Coyle advocated that GDP was a good measure for the 20th century but was increasingly becoming inappropriate for a 21st century economy driven by innovation, services, and intangible goods.

Additionally, Heys et al. (2019) argued that "in a world where material consumption was the most significant driver of human well-being, GDP rapidly fell into being used as a short-hand for this term", marking the creation of a habit that expanded its boundaries, up to include social meaning.

This cannot stay misunderstood: GDP has never pretended to be a moral measure nor a proxy for well-being. It was conceived following a specific request to combat the Great Depression of the 1930s, and from the very beginning, economists and policymakers were aware of its "structural" shortcomings. The fact that they also felt the need to broaden the vision, all centered on productive aspects, therefore concerning firms, to the welfare aspects concerning the life of households, does not affect the nature of GDP at all, which remains that of an indicator of production. Thus, its interpretation as an index of well-being is incorrect.

Instead, around the modern conceptualization of GDP, reflections, far from resolved, have centered on its incompleteness. First, it does not take into account sustainability and the social cost of nonrenewable raw materials (the so-called natural capital; typically, but not limited to, oil and coal)—a simultaneously ethical, geological, and economic question, which concerns first of all future generations. Indeed, fossil fuels are major contributors to climate change, environmental degradation, and biodiversity loss. It does not even take into account the underground, informal (including those undertaken by households for their own final use), illegal, and other activities, omitted due to deficiencies in the basic data collection program, the so-defined non-observed economy (NOE) by Eurostat. This estimation problem has now been overcome with the various exhaustive estimation methods that have been proposed.

That GDP is not a complete indicator of production is also confirmed by the fact that it does not include directly—but only sometimes and to a certain extent, indirectly—productions such as Facebook, YouTube, and related information called big data. This is also a problem generated both by the peculiar characteristics of economic systems and by economic growth, which continually proposes

new economic activities, largely linked to what is called artificial intelligence (AI), machine learning (ML), or neural networks (NN), which should be estimated and included in the GDP (Xu and Li, 2022).

3. The origins, development, and outcome of the debate

3.1. *The origin*

In February 2008, the President of the French Republic, Nicholas Sarkozy, unsatisfied with the present state of statistical information about the economy and the society, asked Joseph Stiglitz, Amartya Sen, and Jean-Paul Fitoussi to create the Commission on the Measurement of Economic Performance and Social Progress (CMEPSP). The Commission's aim was to identify the limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement; to consider what additional information might be required for the production of more relevant indicators of social progress; to assess the feasibility of alternative measurement tools; and to discuss how to present statistical information in an appropriate way (Stiglitz et al., 2009). They produced a document called the Sarkozy-Stiglitz report (from now on, simply the Report).

Starting from the consideration that, often, statistical concepts may be correct, but the measurement may be imperfect, they noted that when there is a change in income distribution, GDP per capita may not provide an accurate assessment of the situation in which most people find themselves. Average GDP per capita may increase, but if inequality increases more, most people will be worse off despite the increase in GDP. Similarly, GDP may increase due to the increased consumption of gasoline caused by traffic jams, but the quality of life will not be any better. Similarly, GDP ignores air pollution, but as citizens are increasingly concerned about air quality, it will provide an inaccurate estimation of what is happening to citizens' well-being. Hence, GDP is perhaps the most striking case of a statistical indicator not capturing some phenomena that have an increasing impact on the well-being of citizens.

The Report also focused on how statistics are reported or used. This remark has no relevance to the inability of an indicator to capture certain phenomena, but we underline it because the distorted use is precisely the heart of the comments and counter-arguments that we will make: GDP is not wrong in its nature, but wrongly used.

The Report agreed that the time had come to move beyond GDP but looked at this need in the broader context of adapting "our system of measurement of economic activity to better reflect the structural changes which have characterized the evolution of modern economies", an issue that is considered a priority. It does not take into consideration the possibility of setting GDP aside.

We will show that, if it is necessary to proceed with the adaptation of indicators, it is neither possible nor necessary to dismiss GDP. Instead, it is useful to pursue the objective of maintaining it—hopefully amended of its incompleteness and adapted to the new challenges posed by the turbulent economic growth determined by new information technologies—and, in parallel, continue on the path of building well-being indices. Their construction, according to the indications of the Report, with a radical change of perspective, will have to prevail in a context of sustainability over measuring economic production. This is a strong option, which we do not share completely.

However, there is a clear awareness that changing emphasis from production to well-being does not mean dismissing GDP and production measures. Indeed, they emerged from concerns about market production and employment, and they continue to provide answers to many important questions such

as monitoring economic activity. Emphasizing well-being is important because there appears to be an increasing gap between the information contained in aggregate GDP data and what counts for common people's well-being. This means working toward the development of a statistical system that complements measures of economic activity with measures centered on people's well-being and others that capture sustainability. It is also noted that "while GDP may not be dismissed, it would seemingly be replaced by a welfare metric as the preferred 'headline' measure of aggregate economic activity." Another option that we do not totally agree with.

From this Report, which is very clear and precise and does not seem to offer any possibility of unequivocal interpretations or misunderstandings, a debate has arisen. Such debate has instead been directed in contrast with the spirit of the Report, reaching in many cases conclusions that have generated misunderstandings that could cause severe damage to policies and activities of the statistical offices and stakeholders' beliefs.

3.2. The development

As we have stressed in the Introduction, it seems that the debate on the inadequacy of GDP to be a good tool for measuring well-being has calmed down. Perhaps, contenders have reached a stage of ideal compromise, distracted by new economic developments and issues, namely the powerful strengthening of the internet and the development of new information technologies and artificial intelligence, which have opened new frontiers, pushing old diatribes into the background. Perhaps, the GDP detractors simply realized that it was a poorly posed question that needed to be regarded and approached in the right light. Probably, the time for GDP to "hear the footprint of the ruthless steps" like Renato in Verdi's "Un Ballo in Maschera", has not arrived yet.

Even though the fire has smoldered under the ashes, two articles from 2016 (The Economist, 2016a, 2016b) stated that the GDP is a poor measure of prosperity and not even a reliable gauge of production, and that it is troublesome to make living standard comparisons using GDP, somehow reviving interest in the topic.

Previously, the Forum for Alternatives: 8 Ways for Other Indicators of Wealth (FAIR, 2009) applauded the fact that the "Commission officially recognizes the limitations of GDP as an indicator of economic performance and social progress, and which tell us nothing about inequality, environmental pressure, common goods or, in short, the well-being of all, within a sustainable and shared environment." FAIR's criticism of GDP regarding its limitations as an indicator of social progress and well-being is misguided: GDP simply cannot provide guidance in this direction as it is designed for another purpose. In this regard, it will be useful to recall the words of Stiglitz himself: "GDP was originally created as a measure of economic activity but has increasingly become used as a measure of societal well-being. It wasn't designed for that and it doesn't measure that."

More cautious seems to be the reaction of the Secretary General of the OECD, Angel Gurría. He emphasized that economic resources are not all that matter in people's lives and claims the need for better measures of people's expectations and levels of satisfaction, of how they spend their time, and, ultimately, of everything we consider important to sustain our well-being; however, he still avoided making comments on GDP.

Long before the debate began, Nordhaus and Tobin (1973) had drawn attention to the inadequacy of GDP, wondering "how good are measures of output currently used for evaluating the growth of economic welfare" and "whether the growth process inevitably waste our natural resources". They

then noted that “GNP is not a measure of economic welfare”, since “an obvious shortcoming of GNP is that it is an index of production, not consumption.”

Fleurbaey and Blanchet (2013) noted that, “in spite of recurrent criticism and an impressive production of alternative indicators by scholars and NGOs, GDP remains the central indicator of countries’ success.” They revisited four alternatives to GDP and claimed that the problem is that GDP focuses on a narrow set of aspects of individual lives, rather than on the fact that it is a monetary measurement. They advocated for the construction of a more comprehensive monetary indicator that takes income and adds or subtracts positive (education or human capital and health care) or negative (air and water pollution) non-market aspects of individual lives.

The Report and the awareness of the environmental damage caused by production have led to the idea of Green GDP (GGDP). However, according to Fleurbaey and Blanchet (2013), “greening GDP and relative indicators is not the proper way to incorporate sustainability concerns, which involves predicting possible future paths.”

In the same direction as Nordhaus and Tobin (1973), Jones and Klenow (2016) shared the opinion that GDP is a flawed measure of economic welfare. Leisure, inequality, mortality, morbidity, crime, and the natural environment are just some of the major factors affecting living standards within a country that are incorporated imperfectly, if at all, in GDP. Though there are significant conceptual and empirical hurdles to including some of these factors in a welfare measure, standard economic analysis is arguably well-equipped to deal with several of them. They proposed a simple summary statistic for the welfare of a country’s population, measured as a consumption equivalent, and computed its level and growth rate for a diverse set of countries. This welfare measure combines data on consumption, leisure, inequality, and mortality using the standard economics of expected utility.

Following the two articles in the *Economist*, Hoekstra (2019) complained that GDP, after becoming the world’s most influential indicator, still remains the primary measure of societal progress despite being widely criticized for not considering well-being or sustainability. Indeed, in his view, the many beyond-GDP alternatives did not manage to effectively challenge GDP’s dominance. The answer that he gave is that the success of GDP lies in the fact that the macro-economic community emerged “in the aftermath of the great depression and WWII and therefore formalized their ‘language’ in the System of National Accounts (SNA), which provided the global terminology with which to communicate”. “The failure of the beyond-GDP alternatives, on the contrary, depends on the fact that beyond-GDP is a heterogeneous community that speaks in many dialects, accents and languages”. To overcome the impasse, he proposed a multidisciplinary Wellbeing and Sustainability Science (WSS) with the System of Global and National Accounts (SGNA) as a common language. In his eyes, the project failed because he looked at it as one that should have dismissed GDP and replaced it with an index that incorporates it, and not as a project that, as we advocate, would not replace but rather complement GDP, which, of course, in addition to socio-environmental aspects such as health, behavior, tastes, education, and environment, also includes income.

Our view is that this would be as useless as impossible: useless because there is no reason to dismiss it and impossible because the paradigms that underlie the circular flow of income and macroeconomic accounting do not allow it, as this would substantially change the meaning and structure of the resulting index. With these paradigms, it is not possible to build an indicator that combines production and well-being. In fact, the activity of overcoming the GDP has been directed toward the construction of indices external to these paradigms.

Dasgupta (2021), reviewing the sustainability of our economic development, demonstrated that nations should modify their systems of economic accounts to focus on wealth, which includes natural capital as an asset. The practice of using GDP to judge economic performance is based on a faulty application of economics as GDP does not include the degradation of the natural environment. As a measure of economic activity, GDP is indispensable in short-run macroeconomic analysis and management, but it was not intended by Kuznets to be used for appraising investment projects and identifying sustainable development. He advocated that, in recent decades, eroding natural capital has been the means the world economy has deployed for attaining economic growth.

At the twilight of the debate, Hulten and Nakamura (2022) stressed that Real GDP falls short in quantifying the economic well-being of a nation. They discussed how far one can expand it to include new well-being impacts like the rise of the Internet and climate change and stressed that not all of well-being is quantifiable. GDP is a closely watched indicator of the current health of the economy and an important tool of economic policy. It has been called one of the great inventions of the 20th century. It is not, however, a persuasive indicator of individual well-being or economic progress. There have been calls to refocus or replace GDP with a metric that better reflects the welfare dimension. In response, the U.S. agency responsible for the GDP accounts recently launched the GDP and Beyond program.

Schreyer (2022) distinguished between the production sphere, the well-being sphere, and the asset sphere. While GDP remains a cornerstone of the production sphere, it is not suited to capture people's well-being or the sustainability of produced and natural assets. Aiming at going beyond GDP, searching for a single aggregate should be shifted to the choice for a set of indicators.

Overall, it seems that the discussion has focused on finding indicators to measure a not well-defined social well-being, motivated by the observation that GDP is not a suitable indicator for this purpose, as an alternative and also as a replacement for it. While the purpose is shareable, even if not sufficiently supported by a precise definition of well-being and its contours, the reason from which it derives is wrong: GDP is not an indicator of well-being, therefore it makes no sense to look for a tool that can replace it.

Indeed, all the above alternatives are based on a concept of well-being that is far from obvious. The Cambridge Dictionary defines well-being as the state of feeling healthy and happy. The United Nations (UN) defined well-being to encompass quality of life and the ability of people and societies to contribute to the world with a sense of meaning and purpose. The World Health Organization (WHO) advocated the five dimensions of health and well-being: physical, mental, emotional, spiritual, and social.

There is a fairly common agreement among scholars to consider well-being as a set deriving from economic growth, represented by employment, income, and capital, that is, from everything that comes from production (material well-being) and social development, represented by health, education, and environment (immaterial well-being). Immaterial well-being, above all in its environmental dimension, implies sustainability. Using more specifically addressed terminology, we can think of it as a positive outcome that is meaningful for people and many sectors of society, because it tells us that people perceive that their lives are going well. Good living conditions (e.g., housing and employment) are fundamental to well-being. As can be seen, a definition that is not at all univocal.

As we have shown, even assuming that a common basis for the definition of well-being can be found, it would be impossible from a macroeconomic point of view to find an index that measures production and well-being together. The only way of proceeding seems to be to combine, according to some rule, both income (production) and health, human capital, natural capital, environment, and all the rest of the society, including culture, transport, leisure, income distribution, habits, behaviors, tastes,

expectations, etc. In essence, all factors that characterize the “quality of life”. As a matter of fact, this is what the Beyond-GDP initiative, which we are discussing below, implies.

3.3. *The Beyond-GDP initiative*

In 2009, the European Commission issued the Communication “GDP and beyond. Measuring progress in a changing world”. It was stressed that the starting point in the work was the view that GDP alone was no longer the best way to measure a country’s progress and needed to be complemented by environmental and social indicators. In particular, the focus was on finding ways of measuring the quality of life of a nation alongside its raw economic growth. However, “as is widely known, well-being and happiness are not exactly easy to measure” (EU, 2009). This report was subsequently shared by the European Parliament Committee on the Environment, Public Health and Food Safety (EU, 2011) and reiterated by the European Commission itself in a Staff Working Document. OECD (2013) and UNSC (2024) agreed to launch the initiative.

The Beyond-GDP initiative aims at developing a more comprehensive approach to measuring prosperity and well-being. Adequate indicators are needed to address global challenges such as climate change, poverty, resource depletion, health, and quality of life and to ensure that the development and use of new indicators are integrated into decision-making processes at the national and EU levels.

In 2020, the Bureau of Economic Analysis (BEA, 2020) laid out its rationale for and intention to develop a series of indicators concerning economic well-being, such as income distribution, access to health care, human capital, and sustainability, named “GDP and Beyond: Priorities and Plans”.

3.4. *Alternatives to GDP*

As noted above, to be sustainable, GDP should take into account the use of natural resources and environmental pollution (UN, 2023). This is the idea underlying the environmentally adjusted GDP: the GGDP.

The concept of GGDP was proposed by the System of Environmental-Economic Accounts (SEEA) in 1993 (UN, 1993). Then, SEEA-2003 (UN et al., 2003) referred to the adjustment of natural resource consumption, environmental degradation, and environmental protection expenditure of economic aggregate as GGDP accounting. In 2021, the UN Statistical Commission (UNSC) formally adopted the SEEA.

According to Zheng and Chen (2024), GGDP measures a country’s well-being. One can agree only if indirect and partly people’s well-being is intended, as confirmed by the considerations on the concept of people’s well-being made just above.

Several countries, among which the United States and China, stopped the elaboration of GGDP, because deducing the cost depletion of natural resources from GDP results in a figure that is lower than conventional GDP (UN, 2024). In China, a GGDP lower than GDP caused resistance from some local and regional governments, which led to the demise of GGDP (Li and Lang 2010).

However, it should be emphasized that the GGDP construction project in China was only about promoting a more comprehensive and realistic accounting of economic development and of GDP growth, ascertaining the extent to which environment-related costs of economic activity reduce actual GDP. The natural resource depletion was not expected.

Estimating GGDP is not an easy task, due to the difficulties in sourcing resource and environmental data and monetizing. Alfsen et al. (2006) underlined that the non-market valuation techniques used to value environmental degradation and natural resources depletion are too experimental and inconsistent, and the notion of GGDP as a single, corrected measure of the value added in an economy, while attractive as a theoretical concept, is too complex and uncertain in practice.

There are several examples of works on GGDP estimates. Among those preceding the Report, those of some interest consist of the direct modification of GDP: since it is a flow aggregate, this can be defined as a flow adjustment approach. In a capital stock approach, that consists of combining natural capital with physical and human capital to calculate the total capital stock for sustainable development.

In the works following the Report, the approach changed and aimed at modifying the GDP by subtracting and, depending on the case, adding the items that pertain to natural resources depletion and the environment. Thus, Wiedmann et al. (2018) used an approach consisting of decomposing economic activities into different industries and evaluating the environmental and social impacts of these industries. The value of GGDP was obtained by summing these impacts. Yu et al. (2019) calculated and mapped the spatial distribution of the GGDP by summing the ecosystem service value (ESV) and GDP for China from 1990 to 2015. The pattern of land use change simulated by a CA-Markov model was used in the process of ESV prediction. Zhu (2023) conducted a recent and very interesting estimate of the GGDP in the accounting system based on the SEEA-2012, by using a BP neural network model, which includes natural resources and environment and establishes the accounting index of GGDP. The accounting equation of GGDP was expressed as:

$$GGDP = GDP - C_e - C_r \quad (2)$$

where C_e is the cost of environmental degradation, and C_r is the cost of resource depletion.

This seems like an interesting and promising way, since it uses an innovative methodology, that of neural networks, for the direct modification of GDP, subtracting from it the natural resources depletion and the environmental degradation, which would be even more complete if the benefit of resource and environment improvement were added.

A line of research that has developed in recent years in China aims to analyze the impact of the use of GGDP on economic growth, climate, and population. Among all studies, it is worth mentioning Wang et al. (2023), who made an in-depth study on the impact of using an GGDP accounting model on the subsequent national development of China. Again, Yue and Hou (2024) selected multiple dataset indicators for the evaluation of the impact of using GGDP on climate mitigation, utilizing the k-means clustering algorithm to classify 16 countries into three categories for analysis. Finally, Mao et al. (2023) developed machine learning models to investigate the global impact of using GGDP on climate, population, and other factors, and examined sustainable human development and the relationship between population, economic, and environmental changes in the United States.

Besides GGDP, various governments, countries, and organizations have proposed alternative GDP measures that can provide a more global view (Intheblack, 2024). The UN Human Development Index (HDI) has been used by the UN since 1993 (UN, 2024) to evaluate the quality of life of a country's members. It is one assessment of economic growth that can be considered alongside GDP to get a more robust picture of the quality of life of a country's citizens. HDI is a summary measure of average achievement in key dimensions of human development: (i) long and healthy life, (ii) knowledge, and (iii) a decent standard of living. It is the geometric mean of normalized indices for each of the three

dimensions, namely life expectancy index, education index, and gross national income (GNI) per capita (PPP\$) index. The schematic representation of the index is shown in Figure 2.

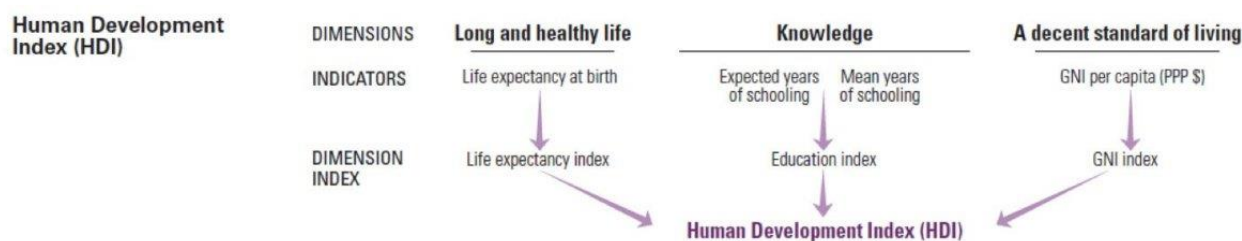


Figure 2. Schematic representation of the Human Development Index.

The HDI can be used to question national policy choices, asking how two countries with the same level of GNI per capita can end up with different human development outcomes. These contrasts can stimulate debate about government policy priorities. It simplifies and captures only part of what human development entails. It does not reflect on inequalities, poverty, human security, empowerment, etc.

In 2011, the OECD launched its alternative measure of well-being, which includes 20 different indicators across 11 sectors in its 34 member countries, from life satisfaction to air pollution. It has produced an interactive tool that allows users to change the weight of each sector according to their own view of its importance (OECD, 2011; Boarini et al., 2014)). The result is the Better Life Index (BLI), which is compared to the GDP per capita at PPP. It has been elaborated according to the arguments contained in the Report. Although it is advocated that BLI is not intended as an alternative GDP measure, as a matter of fact it is viewed as such.

Introduced in 1995, the Genuine Progress Indicator (GPI) is a metric used to measure a nation's welfare not only by its economic measures but also by the state of its social, environmental, and human conditions. It is often considered an alternative to the GDP. The formula is:

$$GPI = C_{adj} + G + W - D - S - E - N \quad (3)$$

where C_{adj} = personal consumption with income distribution adjustments, G = capital growth, W = unconventional contributions to welfare, such as volunteerism, D = defensive private spending, S = activities that negatively impact social capital, E = costs associated with the deterioration of the environment, and N = activities that negatively impact natural capital. Assigning monetary values to non-market goods and services and assessing the impact of social and environmental factors involves a degree of subjectivity; therefore, it is possible to have a GPI calculation that differs from another. For this reason, it has been revised in 2012 (Hayes, 2023).

UN argued that to keep track of the sustainability of the economy and well-being of people, we need to move beyond just a flow (GDP) approach to a stock approach to measure wealth, to take the use of natural capital into account, along with human and produced capital. Consequently, they proposed the Inclusive Wealth Index (IWI), which measures the wealth of nations by carrying out a comprehensive analysis of a country's productive base including the assets from which human well-being is derived. Thus, the IWI measures a nation's capacity to create and maintain human well-being over time (UN, 2023).

The IWI calculation is based on estimating stocks of human, natural, and produced (manufactured) capital, which make up the productive base of an economy. Biennial Inclusive Wealth Reports (IWR)

track progress on sustainability across the world for 140 countries. The IWI is the metric used by the UN for measuring intergenerational well-being. Implementing the IWI has been undertaken by many individual countries with UN support.

The Genuine Savings Indicator (GDI) was devised to assess the economy's sustainability. It defines wealth more broadly than orthodox national accounts and recalculates national savings figures based on the value of the net change in the whole range of assets, including produced assets, natural resources, environmental quality, human resources, and foreign assets. Genuine savings figures differ from standard national accounts calculations in that they a) deduct the value of depletion of natural resources (where forests, water, and other assets are unsustainably managed), b) deduct pollution damages, including lost welfare in the form of human sickness and health, c) treat current expenditure on education (on books, teachers' salaries, etc.) as saving rather than as consumption, as it increases countries' human capital, d) deduct net foreign borrowing and add net official transfers, and e) deduct the value of resource depletion (Everett and Wilks, 1999).

The Thriving Places Index (TPI) from the UK is a multi-variate index showing how well local areas in Britain are going against a range of well-being indicators (see Figure 3). It brings together the very best existing data and evidence to help people understand and map the pathways to developing a thriving place where they live or work. Around the UK, local decision-makers and communities are using this data to co-design policies and actions to improve their areas (Higman, 2024).

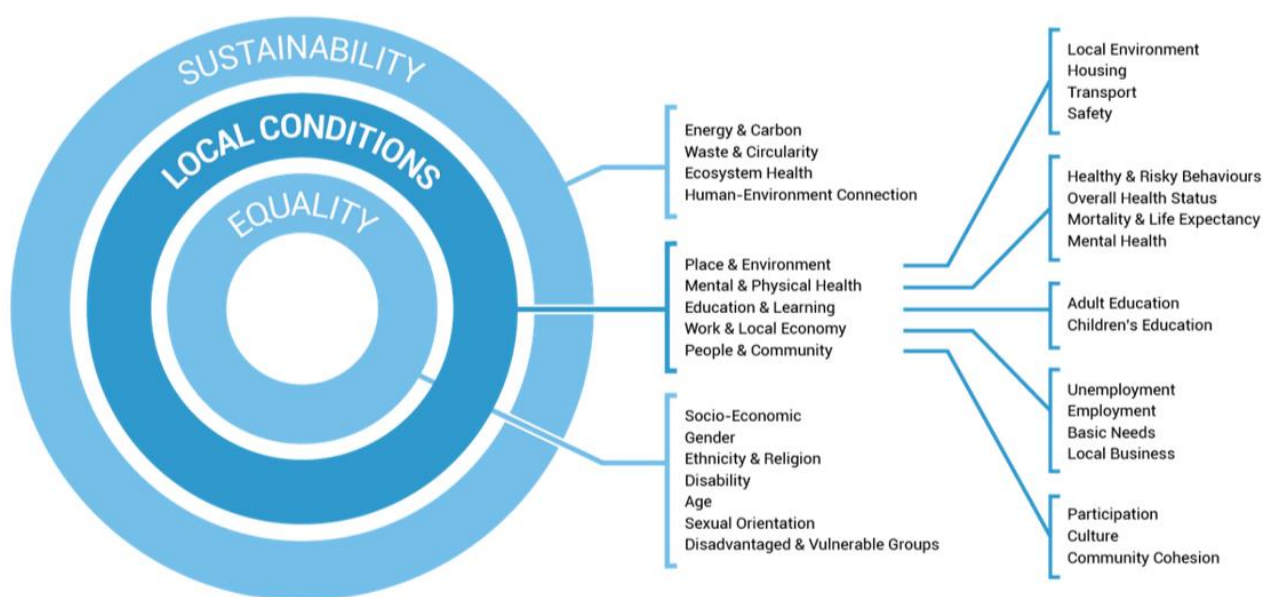


Figure 3. The 2024 TPI domains and factors (Centre for Thriving Places, 2024).

TPI is as subjective as GPI and more. It may be too radical a departure from the GDP paradigm to be widely accepted by stakeholders.

The Happy Planet Index (HPI) is an index of human well-being and environmental impact that was introduced by the UK's New Economics Foundation in 2006. Each country's HPI value is a function of its average subjective life satisfaction, life expectancy at birth, and ecological footprint per capita. The exact function is a little more complex, but conceptually, it approximates multiplying life

satisfaction and life expectancy and dividing that by the ecological footprint. The index is weighted to give progressively higher scores to nations with lower ecological footprints. The index is designed to challenge GDP.

The concept of Gross National Happiness Index (GNHI) dates back to the 1970s. There are four pillars—good governance, sustainable socio-economic development, preservation and promotion of culture, and environmental conservation—that are elaborated into nine domains (see Figure 4), which articulate the different elements of GNH in detail and form the basis of GNH measurement, indices, and screening tools (GNH Centre Bhutan, 2024; Alkire, 2008).

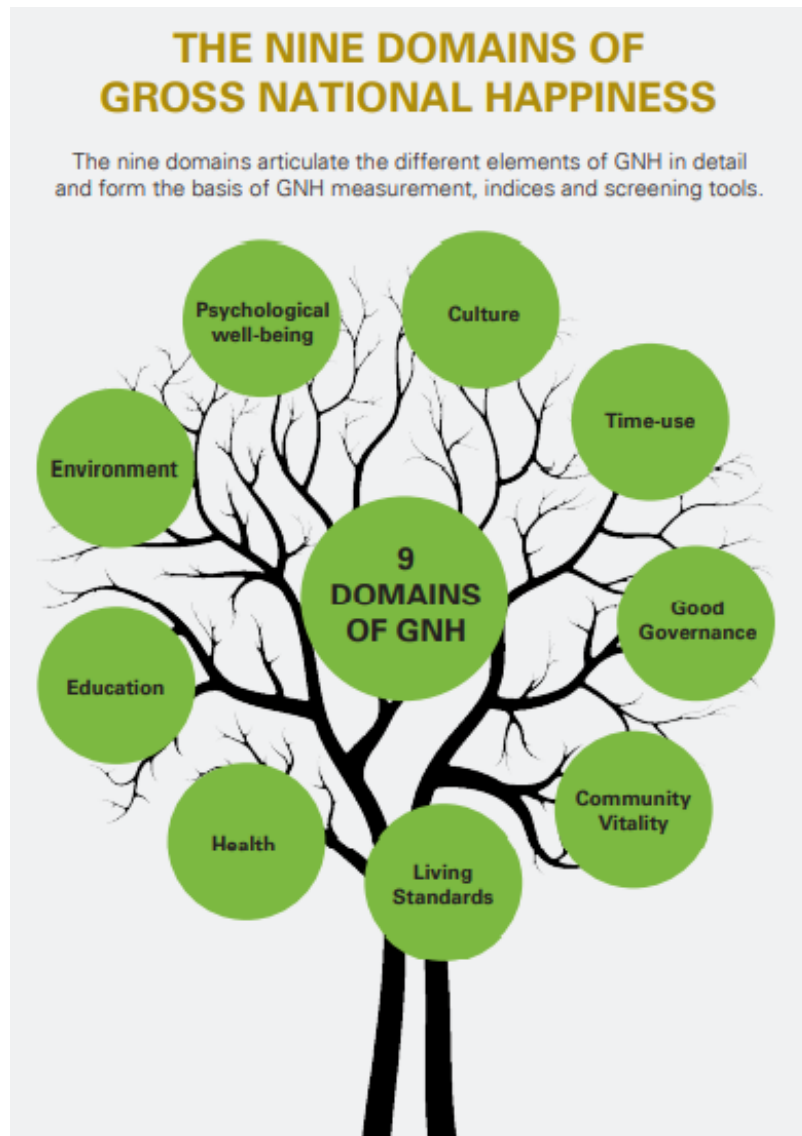


Figure 4. The nine domains of the GNH¹.

The GNH is intended to provide a comprehensive approach toward measuring progress, prioritizing overall well-being and happiness over purely economic pursuits (OECD, 2024). Bhutan calculates the GNH index every five years.

¹ Source from: <https://www.gnhcentrebhutan.org/the-9-domains-of-gnh/>.

Framed in the considerations on the definition of well-being made at the end of section 3.2, we have to admit that some of these indicators fail to measure what people think and feel about their lives, such as the quality of their relationships, their positive emotions and resilience, the realization of their potential, or their overall satisfaction with life, including global judgments of life satisfaction and feelings ranging from depression to joy.

Not all the above indicators have the same object: GGDPs assess the environmental and social impact of production activity, or, in the case of the (currently suspended) Chinese research line, the impact of using GGDP on economic development, climate, and population. Alternative indicators evaluate quality of life, environment, and nation's welfare from the economic, social, environmental, and human points of view, human well-being, sustainability, local well-being, and well-being and happiness.

Not all of them have the same purpose: even if it is not explicitly stated, they are not intended, except one, as replacements for the GDP.

This means that the problem does not have a unique solution shared by all, which poses a problem of choosing which one to use, which can be solved by accepting the idea that each country, or rather group of countries, perhaps formed taking into account geographical, economic, social, demographic characteristics, can use one of those indicators as its own.

5. Conclusions

Having retraced the debate allows us to make some reflections. Indeed, we have reached some established points that we believe can bring some contribution to the discussion.

In the dock there was GDP, due to a fundamental misunderstanding: being interpreted as an index of well-being and not, or not only, because of its characteristics of an incomplete measurement tool, despite being well clarified by its inventor himself. Kuznets created it to answer a specific question—how to measure income—and not how to measure well-being. He himself warned that GDP would not be able to measure the welfare of a nation. An interpretation that, ironically, was soon denied also by those who, albeit unintentionally, sparked the debate: the authors of the Report. Stiglitz and others made it clear that GDP should not be used as an index of well-being.

Indeed, there was already a previous discussion focused on the shortcomings of the GDP, triggered by the SEEA in 1993, concerning its failure to take into account natural resource consumption, environmental degradation, and environmental protection, which was then codified in 2003 by the SEEA itself that gave rise to the GGDP, an index that measures sustainable growth, not well-being.

But the debate is not focused on GDP's shortcomings. It is true that some alternative indicators have been conceived and implemented also on the basis of criticisms concerning GDP as a flow indicator that does not take into account the natural capital and its depletion and therefore ignores future generations, and that social capital and the environment are ignored too. GGDP arose from the awareness that GDP does not take pollution into account. It is above all on the lack of "well-being" of GDP that attention was focused, on its failure to take into account social capital and all the other factors that determine the quality of life, such as leisure, lifestyle habits, culture understood as the enjoyment of museums, theater performances, music, good reading, work, transportation. This is how the indexes that meet this need were born, in particular, the TPI and GNH.

All these indicators present themselves as alternatives to the GDP, with some of them claiming, sometimes explicitly, other times surreptitiously and not that clearly, to substitute it. Some of them,

built taking into account both production, natural and social capital, environment, and quality of life, are more comprehensive and could actually replace GDP, which is thus put in the background and almost disappears from the limelight as if it were a useless tool. Indeed, it is almost considered harmful, because it can mislead scholars and politicians, both when they analyze it or use it as a tool for absolute or comparative decisions.

These indices do not have a theoretical-conceptual background that might represent the paradigm on which they are conceived, but are built by assembling the various domains, subdomains, and indicators, while the GDP has a theory that supports it. This makes them indicators “without theory” and with strong subjective characteristics.

But the point is: why would one want to set GDP aside?

The criticism of its use has no economic-statistical foundation. It can have a political-social implication, only if we frame the issue in the current situation, which however can be changed without costs and with little mental effort. There are, in fact, no obstacles to adopting both points of view and using in a complementary way both the GDP for the purposes of measuring growth and international comparisons and the various alternative indicators for the purposes of global measurement of the flow of production together with well-being. Both indicators are useful because knowing how much more we have produced, and how much better we are, helps us in our decisions, our awareness, and, ultimately, to live better.

There must be a reason why GDP continues to be the main indicator for the economic policies of national governments, the European Union, the United States, China, and major financial institutions, as well as for cross-country and cross-region comparisons aimed at steering political-economic decisions and supporting countries' geopolitical influence, and for establishing countries' financial contribution for the membership to international institutions, bodies, and communities, such as UN and EU, and for economic assistance programs and interventions to member countries and developing, transition and poor countries and regions.

This is also the view of the UN (2024), which says that “basing policies on a single indicator, no matter how well constructed, is not ideal”.

Why criticize someone for focusing on economic growth?

It is fair, as Walz (2017) does, to argue that “as long as standard economic measurements treat the environment as an externality, it is hardly surprising that national leaders also ignore pollution in favor of growth ... development can cost a locality and a government more income than it generates.” But we have to doubt whether this is useful or whether it wouldn't be better to adopt a more pragmatic open-mindedness and avoid that the “cure is worse than the disease”. Let us abandon the idea that growth is necessarily a bad thing and ask ourselves whether this is not too rigid a mental approach, which ignores many considerations that can make it change. If growth is balanced and egalitarian, does not depreciate natural resources, and is respectful of the environment, then it can, far from being opposed, represent a benefit for nations and people and a protection for future generations. This is a position that we find acceptable and persuasive.

It is not true, as some have argued, that we prioritized growth maximization without stopping, just as it is not true that increasing GDP is not good for society, as claimed by Hoekstra (2019). His view is distorted by the fact that he presents the macroeconomic community as something close to malevolent academics, whose sole interest is a continuous increase in GDP. Blaming societies for their focus on economic growth is ignoring human history. For over 1000 years, human civilization has engaged in a quest for power and an increase in wealth (Swart, 2019). That blaming might be true if

one puts oneself in the same perspective as nearly all the authors we have registered for the debate, but it is certainly not true if one considers that, for society, even a purely economic increase may be beneficial. Simply because, for example, an increase in GDP per capita is not necessarily responsible for an increase in inequality. If the increase is not a consequence of the increase in income per capita, then it is a net benefit for society.

Ours is the paradigm of economic growth as it was handed down to us by enlightened economists, Kuznets and the other economists who contributed to the early concept of GDP, who were neither unbridled egoists nor heartless people, insensitive to human and social events. They were men of their time who operated in the social and economic context of that time. It would be profoundly wrong to judge their work with the eyes that our societies are full of social and economic injustices, of which we are increasingly aware. Societies that drive us bitterly think that GDP “counts a bottle of Evian in the supermarket but not the economic impact of a girl in Ethiopia who trudges for miles to fetch water from a well”. Or that “If you’re stuck in traffic for an hour, that contributes to GDP. If you go around to a friend’s house to help out, that doesn’t” (Pilling, 2018).

Those economists never thought that the bigger our banks, the more persuasive our advertisers, the worse our crime and the more expensive our health care, the better our economies are seen to be performing. This was certainly not what they wanted.

“We cannot judge the past with the eyes of today,” warns Friedrich Hayek. Furthermore, as Alessandro Manzoni argues, “what comes after is not always progress.”

We cannot and must not go so far as to share that “only in economics is endless expansion seen as a virtue. In biology, it is called cancer.” Economic progress guided by moral conscience is certainly beneficial for people’s lives.

As a matter of fact, despite the controversy, GDP has remained widely used as an indicator of economic growth, a measure of an economy’s performance. So, much ado about nothing? No, if the ado has given rise to a defense speech that can absolve the GDP from the accusations made, which seek to condemn it to death.

Use of AI tools declaration

The authors declare they have not used Artificial Intelligence (AI) tools in the creation of this article.

Author contributions

All authors contributed to the study’s conception and design, and also read and approved the final manuscript.

Conflict of interest

All authors declare no conflicts of interest in this paper.

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