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Sustainability: the road not (yet) taken beyond GDP?

By **Caterina Cruciani**, Fondazione Eni Enrico Mattei

Elisa Lanzi, Fondazione Eni Enrico Mattei and Organization for Economic Cooperation and Development

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Fondazione Eni Enrico Mattei
Corso Magenta 63, Milano – Italia
Tel. +39 02.520.36934
Fax. +39.02.520.36946
E-mail: letter@feem.it
www.feem.it

ABSTRACT

The gross domestic product (GDP) is probably the best known and widespread measure of the wealth of nations. It is a simple and straightforward measure, easy to understand and to compare across countries, even when they differ dramatically in their economic development. The appealing nature of GDP - expressed as a single and simple number - hides limitations, which have been recently exposed by a new strand of literature identified as "beyond GDP".

Going beyond GDP implies shifting the focus from a purely economic perspective to a more holistic one, able to incorporate information relevant to social progress and to provide a dynamic and sustainable measure of development. Besides working to define a more effective version of GDP, the path "beyond GDP" offers many insights into the definition of other indicators and indices, but the road to substituting GDP with alternative indicators is "long and winding".

This Policy Brief addresses the theoretical and practical implications of walking down the "beyond GDP" path. After discussing the theoretical limitations of GDP, we detail why GDP alone is not able to inform policy-making and assist it in achieving a sustainable development. Then, we discuss recent examples of more complex indicators that try to do so. We review the theoretical and methodological issues that challenge the credibility and applicability of more complex measures such as sustainability indices. In particular, we focus on the FEEM Sustainability Index (FEEM SI), whose ability to work as a simulation environment demonstrates the potential of more sophisticated indices in supporting policy makers to understand the complex relations across the different components of sustainability and devise better and more effective policies.

Introduction

Until very recently the interest in moving forward from the Gross Domestic Product (GDP) for well-being analysis was not mainstreamed in international policy, despite more than 30 years of research in alternative definitions of development. In 2009, research efforts and much political commitment have introduced a new paradigm of development into the international policy dialogue, making the beyond-GDP path a priority.

Dissatisfaction with the ability of the GDP in providing a proper assessment of well-being is not new. Since its inception, GDP was aimed at measuring the total market value of goods and services produced in a country in a given time frame, but soon became a proxy for societal well-being - a goal beyond its scope but a natural development, given the relation between market value, employment and individual well-being.

The efforts aimed at creating a beyond-GDP pathway to development inevitably tap into existing research in development concepts, especially as important synergies can be created between these literatures. In particular, the concept of sustainable development represents a very important input in defining a beyond-GDP society, because it offers both a dynamic perspective on development that the GDP lacks completely, and a focus on societal and environmental aspects that are not fully measured by GDP. Moreover, qualifying the reasons besides the dissatisfaction with GDP implies an underlying alternative concept of what well-being means. In this Policy Brief we will try to clarify the motivations for moving towards a beyond-GDP analysis and explore the potentials of the sustainable development concept in achieving this goal. We also propose a new instrument, the FEEM SI, which bridges the needs for an operational tool to support decision -making with those for an index that goes beyond GDP in considering well-being based on sustainable development.

Policy Challenge

The recent financial crisis has shown the limits of a growth paradigm centered on economic wealth, making the provision of a tractable definition of development and well-being more important than ever. The sustainability literature is able to offer substantial inputs into the shift towards a beyond-GDP society. The debate around sustainable development is certainly not the newcomer of international policy. Political agendas both at national and international level have featured proposals related to the achievement of sustainable development for more than a decade, yet no agreement exists even on how it should be measured. Measures to identify strengths and weaknesses, to support best practices and to evaluate the sustainability of countries are needed to aid policy-making and pave the way to sustainable development. However, this process faces substantial methodological and political issues. For this reason no real alternative to the use of GDP is yet available and there are still open questions that are at the centre of debate. What indicators should be chosen to represent the various dimensions of sustainability? Should these indicators be incorporated in a unique measure of sustainability? How can such a measure be constructed in order to better support decision-making, identify and compare policy options?

Why beyond GDP?

Despite more than 20 years of research in sustainability assessment, none of the indicator sets or indices developed has so far managed to match the success of the GDP as a measure of performance. Initially developed in the 1930s as an indicator of macro-economic activity and soon become a proxy of societal progress in broader terms, GDP still has an unparalleled diffusion across different countries compared to any other well-being indicator.

Starting in 2009, economic policy in the European Union underwent a change of emphasis, shifting the focus from a GDP-centered economic assessment to a much broader beyond-GDP society.

In its policy paper **GDP and beyond: Measuring progress in a changing world** released in August 2009, the European Commission spelled out its strategy to pursue the shift away from GDP as an exhaustive measure of progress. Stemming from the work of the 2007 Beyond GDP Conference, organized by the European Commission, the European Parliament, the Club of Rome, the WWF and the OECD, this policy paper identifies **five key objectives** for a beyond-GDP society (Figure 1).

The five objectives defined by the European Beyond-GDP strategy echo the concerns that underlie another important landmark in this literature, **the Report of the Commission on the Measurement of Economic Performance and Social Progress** (CMEPSP) organized by French President Nicolas Sarkozy and published at the end of 2009. The work of this Commission, also known as the Stiglitz-Sen-Fitoussi Commission, starts from the very same considerations that motivate the policy objectives of the European Union. There seems to be "an increasing gap between the information contained in aggregate GDP data and what counts for common people's well-being", which requires to develop complementary measures able to address sustainability as well as people's concerns and well-being. Thus, international effort must be directed to the identification of limits of GDP as an indicator of economic performance and social progress, including the problems with its measurement.

Figure 1 European Commission's 5 key elements for a beyond GDP society

1. Complementing GDP with additional concise metrics of environmental and societal well-being;

2. Achieving a timely availability of data, with near real-time reporting of environmental and societal indicators in particular;

3. Obtain a more accurate reporting on distribution and inequality in order to bridge the gap between statistical assessment and individuals' perception of societal issues;

4. Developing a European Sustainable Development Scoreboard;

5. Extending National Accounts to environmental and social issues.

Sustainable development as a way beyond GDP

Given the shortcomings of GDP in assessing societal well-being, sustainable development emerges as the guiding principle that could lead research down the beyond-GDP path. Attention to the achievement of a sustainable development has been increasing since its definition by the World Commission on Environment and Development in 1987 as a development "which meets the needs of the present without compromising the ability of future generations to meet their own needs". International organizations have engaged to obtain quantifiable measures of sustainability by collecting extensive databases and constructing sets of indicators able to describe the underlying complexity behind this concept. Many different definitions, as well as various indicator sets have been created, most notably by the United Nations Commission for Sustainable Development, created in December 1992 to implement Agenda 21, the comprehensive plan of action to achieve sustainable development defined at the Rio Conference on Environment and Development earlier that year.

The European Union has led the way in trying to translate theory into practice by drafting a Sustainable Development Strategy in 2001 and adopting an indicator set that has since been monitored by Eurostat, the statistical agency of the Union. The EU Sustainable Development Strategy has been revised in 2005 and 2009, when it has explicitly addressed the need to extend its growth paradigm moving beyond the gross national product (GDP) and including social and environmental indicators.

Sustainability indicators represent the main instrument of sustainability theory across the different conceptual frameworks and have seen a flourishing of initiatives at policy level in the last twenty years. For instance, Parris and Kates (2003) review more than 500 projects devoted to design quantitative indicators for sustainable development, which are also increasingly recognized as a useful tool for policy-making and public communication (Singh et al. 2009). Within the beyond-GDP literature, sustainability indicators are grouped into three macro categories: indicators adjusting GDP, indicators replacing GDP or indicators that aim at supplementing GDP (Goossens et al., 2007). In the first category famous examples are the Genuine Progress Indicator (GPI) or the Index of Sustainable Economic Welfare (ISEW) developed in the late 1980's by Daly and Cobb (Daly and Cobb, 1989). Among the initiatives replacing GDP the Human Development Index (HDI) (UNDP, 1990) and the Ecological Footprint (Wackernagel, Rees, 1995) stand out in particular. One common feature of this category is that it is mostly characterized by aggregate indices that allow comparison through a single numerical figure. Lastly, but not less importantly, significant indicator list initiatives are part of the

supplementing GDP category: the European Sustainable Development strategy is only one notable example in which the information included in the GDP of Member States is complemented by other information collected in a complex set of other economic, social, environmental and institutional indicators.

Bridging the research-policy gap: theoretical hurdles

Currently, besides the quoted initiatives, there are hundreds of indicators used in various sustainable development strategies, several indicator sets prepared by national and international institutions, not counting initiatives focusing on aggregate indices. Despite the partial overlap across indicator sets, a single definition of sustainable development has not yet been agreed upon at political level. This confusion regarding the elements that should make up the definition of sustainable development is partly causing the little integration between the concept of sustainability and decision-making at policy level. Moreover, the complex and long lists of indicators provide somewhat conflicting information, so that it is almost impossible to summarize them to inform policy makers effectively. The attempts at summarizing the information included in the different indicator sets into a single figure are fraught with theoretical complexities and sometimes not easy to understand. Therefore, most policy decisions are still based on the predicted impacts on wealth measures, making little way beyond GDP.

The need to define sustainable development as based on more than the single economic dimension has found political recognition in the various strategies prepared at international level, but, in order to make a difference in policy making, sustainable development needs a measure that lends itself to informing policy making more than an indicator list. The attractiveness of a single, composite measure of sustainable development encounters the methodological complexities underlying the aggregation of different indicators (Figure 2), but remains the main option for an easy and operative monitoring of sustainability across time and geographical areas. In particular, combining the different aspects of sustainability in a single measure faces the problem of what methodology to use to aggregate the various indicators, a topic that is still source of debate between policy makers and statisticians. Nevertheless, the success story of examples like the HDI or the Ecological Footprint testifies the enormous potential of aggregate indices.

Figure 2. Issues in choosing an aggregation methodology

There exist several techniques that allow to summarize the information behind multi-faceted issues like sustainability, through various kinds of means. Each one implies a different degree of substitutability among indicators.
The more two indicators are substitutable, the more similar their weights will be
It is useful to think of the **properties** we wish an aggregation operator to have when dealing with sustainability:

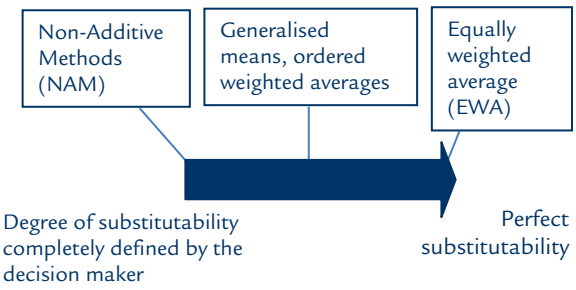
- easily parameterized and tuned by the decision maker
- do not assume compensability
- have strong mathematical foundations that make it reliable instruments to deal with such problems.

Non-Additive Methods (NAM) satisfy all these properties, for example

- Non additivity: a suitable weight is assigned to every possible coalition of the state of the criteria, and not only to a single criterion; this allows to model **synergic** and **redundancy interactions** among the criteria
- can represent **pessimistic or optimistic behaviour** (do we want all indicators to show progress or some are more important than others?)

but have a notable **drawback**

- the analysis becomes **exponentially more complex** as the number of parameters increases.



The numerous attempts to combine different nature–society dimensions in a single measure mostly rely on the Equally Weighted Average (EWA) methodology for the aggregation, missing out on the synergies and interactions between indicators and assuming perfect substitutability. This is the case for the HDI and the Ecological Footprint as well as other aggregate indices including the Environmental Sustainability Index and the Environmental Performance Index (Columbia and Yale University, 2010).

The FEEM SI

As an attempt to overcome the methodological difficulties we propose a new measure of sustainability, the FEEM Sustainability Index (FEEM SI) that can support policy-making in a more operative way.

The **FEEM SI** (Figure 3) is based **on three pillars of sustainability** (economic, social and environmental) and is characterized by selected indicators starting from the most renowned indicator sets (EU Sustainable Development Strategy, Commission on Sustainable Development of the United Nations, World Development Indicators, and European Environment Agency core set of indicators).

Using a selection of the common indicators between these sets, it responds to the need to find agreement on the measurement of sustainability.

Figure 3. The FEEM Sustainability Index

Creation year: 2009

Indicators: 18 indicators selected from common indicators between the most well-known international indicator sets

Main components: economic, social and environmental sustainability

Indicator normalization: based on policy targets

Aggreagtion: non-linear and non-additive, i.e. Synergies and conflicts between indicators are considered

Data framework: ICES, dynamic Computable General Equilibrium model

Projections: 2010-2020 under different policy scenarios

Indicators are derived from a dynamic Computable General Equilibrium (CGE) model, ICES-SI, an extended version of the Intertemporal Computable Equilibrium System (ICES) developed at FEEM. This allows projecting the indicators over a 20-year time horizon in the future under different scenarios for 40 world regions, leading to comparisons across countries, over time, and between different policy assumptions. The possibility to project indicators in the future and across different policy scenarios makes the FEEM SI an operative tool to support policy-making.

The indicators are normalized to a 0-1 scale following a target-based methodology founded on a review of the main policy targets of international organizations and agencies. This ensures that all indicators are brought to a common scale keeping into account how sustainable the performance of each country already is. Finally, the indicators are combined in a single measure using a non-additive, non-linear aggregation procedure which gives a unique measure of sustainability comparable across countries and over time. This methodology takes into consideration synergies and conflicts between indicators by giving a weight not only to the single indicators but also to each combination of indicators at the various stages of aggregation of the FEEM SI. The methodology incorporates the idea of balance that also underlies the concept of sustainable development, by awarding a higher score to countries that do not improve one component of sustainable development at the expense of another one (non-compensability).

Figure 4. Comparisons FEEM SI-HDI-EPI

The FEEM SI results are consistent with historical data as comparisons with existing 2002-2009 data show (Figure 4). Moreover, comparison with other aggregate indices shows strong similarities between the components of the FEEM SI and other sectoral indices. This

confirms that the FEEMSI is able to provide a dynamic description of sustainability that is coherent with other well-established sectoral indices, such as the Human Development Index (HDI) or the Environmental Performance Index (EPI) (Figure 5), while incorporating the three main components of sustainability in a single measure.

How can the FEEM SI support a beyond-GDP society?

The FEEM SI sustainability score is meant to illustrate how the growth path of different countries leads to the more or less sustainable use of capital, human and natural resources over time and in response to specific policy scenarios. Thus, it could play a very important role in measuring the costs of the transition from a GDP-based to a beyond-GDP society. Furthermore, given the particular aggregation methodology that underlines the non-compensability between the various dimensions of sustainability, a region that over-exploits natural and human resources will be given a relatively low score even if it performs very well in the economic area - consistently with the concept of sustainability that informs the beyond-GDP path.

Despite being rooted in sustainability theory, the FEEM SI represents an instance of GDP adjustment; in fact, not only is GDP featured in the indicator list, but all the indicators are of a strictly quantitative nature and targeted to measure flows – like the aspects measured by GDP. The choice of having quantitative flow indicators comes from the restriction implied by the use of a CGE model, in which only this type of values is recorded. Nevertheless, the dynamic possibilities that the use of such model allows, extend the power of the FEEM SI beyond current examples of GDP-adjustment indices to the evaluation of sustainability ex ante (through the projections) and under different economic and political assumptions (comparative static analysis of different scenarios).

The methodology chosen for the construction of the FEEM SI is aimed at creating a credible and reliable measure of sustainability that is also easy to use for policy comparisons and studies. Such a measure can be used in support of decision-making by studying the direct effect of policies on sustainability, by creating different scenarios implementing alternative policy options and evaluating the sustainability scores of countries under each of them. For an example of the power of the FEEM Sustainability Index in comparative static analysis of policy scenarios, please refer to the Policy Brief *"The hidden trade-off between climate policy and sustainability: an obstacle or a source of incentives to achieve an agreement?"* The FEEM SI - like the GDP - meets the need of policy makers for a tool to evaluate well-being across scenarios, countries and over time, while - going beyond GDP - it considers a more holistic concept of well-being based on sustainable development.

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