

# A Critical Review of the Most Relevant Welfare Indicators from an Environmental Perspective

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## Abstract

*Measuring a country's welfare and subsequently ranking it with respect to other states is becoming increasingly popular and also useful. In spite of the diversified portfolio of indicators available to assess a country's welfare, not all of them look towards the community, a sustainable future and the environment. An interesting question arises: to what extent do the most important welfare indicators account for the environmental component? This study aims to critically analyse the most important welfare indicators from an environmental perspective so as to identify appropriate tools for measuring the sustainable welfare of a country.*

**Key words:** welfare, environment, sustainable development, welfare indicators, GDP

**J.E.L. classification:** D60, E01, O11, Q01, Q56.

## 1. Introduction

It is widely recognized by the specialized literature the importance of measuring the welfare of a country, irrespective of whether that recognition is done by members of the academic circles, policy makers, public officers or the media. More than that, it is very useful in judging the position of a country's economy over time or relative to that of other countries. This interesting fact is accompanied by a diversification of the indicators designed to quantify a state's 'welfare'. If several decades ago there was almost a common ground in that the real GDP per capita was the only indicator able to fully measure the standard of living within a country (some economists even substitute the GDP with the phrase 'standard of living'), nowadays we have at our disposal a diversified portfolio of indicators, different in structure, methods of computation or manner of application (proof of their political importance in the decision making process). The new generation of welfare indicators that does not cease to appear as the boundaries of knowledge are continuously pushed forward, comes as an alternative to the old ones (excessively focused on the GDP) that do not fully gauge a country's welfare (and it's various dimensions related to the economy, society and the environment) and aren't representative or conclusive enough to capture all the relevant aspects.

Furthermore, a country's welfare cannot be measured in static terms, by disconnecting it from the surrounding environment (from which it draws its resources) or from the reverberations upon the future generations (on which current decisions and actions will take effect). Thus, a welfare indicator must also look towards the community, a sustainable future and the environment. The growth in GDP of a country may imply that social and environmental wastes are produced in the economic system, and excluding them from the indicator can distort the welfare value of that country. In this context, an obvious question arises: to what extent the current most important welfare indicators account for the environmental component when assessing a country's welfare?

The aim of the study is to critically analyse the most important welfare indicators from an environmental perspective so as to recommend the most appropriate instruments for measuring the sustainable welfare of a country. There are various different types of indicators used in measuring a

state's welfare; nonetheless, the paper focuses, on the one hand, on the most widely used traditional indicators and, on the other hand, on the new generation of "green" indicators, able to cover the environmental dimension of a state's welfare. The paper wishes to identify those environmentally relevant welfare indicators which could be further used in more in-depth studies on a country's welfare.

The rest of the paper is structured as follows: part 2 briefly captures the current state of the specialized literature on the topic, part 3 critically presents the most important welfare indicators, while part 4 is dedicated to discussions of and conclusions on the most appropriate environmentally relevant welfare indicators for measuring the welfare of a country.

## **2. Measuring a county's welfare**

One can notice that in the last decades, there was an increasing interest in analysing welfare indicators. Numerous studies have ranked countries according to various welfare metrics. There are studies that focus on monetary indicators (by looking directly in the national accounts of an economy as a whole or at households, or by capturing the monetary influence of other components of well-being, like leisure time and income distribution) as there are studies which adopt non-monetary indices (like indicators of social conditions and environmental quality, indicators referring to happiness and life-satisfaction). Given the limited space available, we cannot mention all the contributions in the specialized literature referring to welfare metrics; nevertheless, some of the most relevant ones consider (*apud* Hussain, 2016, pp. 1-3): the relation between a state's welfare and poverty (Kangas and Ritakallio, 2007, pp. 119-123), the interlinkages to deprivation (Whelan and Maitre, 2005, pp. 423-425), the quality of life and social well-being (Glatzer, 2012, pp. 381-398), social progress as a measure for worldwide social development (Estes, 2010, p. 363), inequalities as factors that affect welfare on a social, political and cultural level (Lancee and van de Werfhorst, 2012, pp. 1166-1178), human development and its connexions with the social capital (Christoforou, 2010, pp. 191-193), etc.

Some of the most relevant papers just describe the main welfare indicators available on the market. Others analyse the main welfare indicators in a more critical manner. Analysing the alternatives to GDP as measures of social welfare/progress van den Bergh and Antal (2014, p. 10) concluded that the Index of Sustainable Economic Welfare (ISEW) seems to be the best choice instead of GDP. They argued that the constant interest and suggestions for improving the ISEW approach are the evidences of the desire for turning it in the number one welfare indicator. Boarini et al. (2006, pp. 6-7) studying the alternative measures of well-being have found that welfare cannot be measured just in terms of money. They summarize that GDP or other traditional monetary welfare indicator should be complemented with indicators pertaining to social and environmental conditions.

Others have also criticized the GDP being used as a proxy of social welfare. Criticism has come since the 1960s from some of the most respected economists of the 20th century, including various Nobel laureates (as stated by van den Bergh and Antal (2014, p. 2) who provide a list of 20 important economist who criticized the excessive use of GDP as a measure of welfare). Some of the arguments provided fall into one of the following categories (van den Bergh, 2009, pp. 2-3): principles of proper accounting, intertemporal considerations, lexicographic preferences, empirical studies of happiness, income distribution, relative income and rivalry for status, formal versus informal economy, environmental externalities and depletion of natural resources. Yet again, one can see the importance of the environment and its absence from the current form of the GDP, as it, the GDP, does not capture natural capital depreciation, including environmental change and depletion of resource supplies.

## **3. The most relevant social welfare indicators**

### ***GDP per capita***

The real Gross Domestic Product (GDP) per capita still plays a central role in ranking countries in accordance with their economic development. Even if GDP was never intended to be a welfare indicator (Nordhaus and Tobin, 1972, p. 4), it continues to be a crude measure of welfare (Hussain, 2016, p. 3). As mentioned by the OECD (2015, p. 3), the real GDP per capita is a basic indicator of the economic performance and is commonly used to measure the average standard of living or economic well-being. In these conditions the GDP is frequently identified with welfare. It's

needless to say that often in literature the GDP is even considered synonymous with the concept of welfare. This is illustrated clearly by substituting common phrase “standard of living”.

The growth of the level of production of goods and services is a key factor in determining how the economy works. The real GDP per capita growth rate pretends to indicate the increase of income of every citizen of a state. As a single composite indicator, real GDP per capita is a powerful summary indicator of economic development. As Hussain (2016, p. 3) mentions, this indicator could be useful in measuring the general level of welfare but within an average analysis.

Given the fact that an important problem of this type of analysis is that it doesn't take into consideration the distribution within the society, the accuracy of the GDP per capita as a welfare indicator is debatable. Although it is a very important instrument used to capture the economic component of sustainable development, GDP doesn't directly and fully gauge a country's sustainable development. Moreover, it doesn't distinguish between sustainable and unsustainable activities or even between beneficial and harmful economic activities. For example, natural disasters, as earthquakes, tsunami or hurricanes, have a positive impact on the GDP growth. The same trend was identified in the cases of crime increases or even the depletion of natural resources.

Moreover, GDP is not able to capture the depreciation of the natural capital nor doesn't it adequately reflect the negative externalities such as pollution and natural capital depreciation associated with environmental changes (e.g. deforestation) – pointing to some countries that are more prosperous than they would be in reality.

Starting with the '60s, welfare became a multidimensional concept, thus paving the way for a new generation of indicators called to replace the GDP and to better capture this continuously changeable notion. As stated by the OECD, GDP “remains the most important measure of total economic activity, but other measures may better reflect other aspects of the economy” (OECD, 2015, p. 3).

### ***The Index of Sustainable Economic Welfare and Genuine Progress Indicator***

This category of indicators represents a possible solution to some of the most important deficiencies of the traditional GDP. The Index of Sustainable Economic Welfare (ISEW) is one of the most recognizable welfare indicator and was designed by Daly and Cobb (1989, pp. 1-15). The core of the ISEW is represented by the private consumption; it is common knowledge that the GDP has the same philosophy of construction.

According to Stockhammer et al. (1997, p. 23), distribution is a part of welfare itself. They emphasized that welfare exists only if the entire society takes part in its construction. The components that increase the economic welfare are considered to be positive, while the components that reduce the economic welfare are considered negative. For example, some positive benefits are the services arising from the work of domestic / household, durable goods and transport networks, while negative elements are the costs of health and education (because they are considered defensive expenses), the cost of durable goods, the commuting and traffic accidents. There are several other costs related to the environmental dimension that ISEW captures, like air and water pollution, deforestation, loss of farmland or waste of non-renewable resources. The latter is a cost that will be deducted from the estimates of the current generation but will be assumed by the future generations (Pulselli et al., 2006, p. 276).

The Genuine Progress Indicator (GPI) differs from ISEW just by the types of corrections or adjustments that are included in the main formula. Other important issues captured by the GPI are voluntary work, criminality, divorce, leisure, unemployment and deterioration of the ozone layer (van den Bergh and Antal, 2014, p. 4).

Nevertheless, the ISEW is not as available as the GDP. ISEW was in fact estimated just for a limited number of countries (Lawn, 2003, p. 110). But just using the available data, one could see that while the GDP is growing, ISEW follows another path: it seems to be constant or even decreasing after a certain time. Some of the reasons for the decoupling of ISEW from the GDP refer to the replacing of the informal production of household services market (e.g. childcare), increasing inequality, depleting of the natural resources and emerging global environmental problems (global warming, deforestation, acid rain, air and water pollution, loss of biodiversity etc.).

Even so, ISEW is not a perfect indicator of social welfare. This indicator has been criticized for a series of disadvantages such as the arbitrary selection of the variables to be included or excluded from the indicator, the calculation method and the presumption that GDP is not an indicator of economic welfare, but rather an indicator of aggregate economic output (Neumayer, 1999, p. 95, 2000, p. 350).

He also has drawn attention to the inconsistencies in the methodology for calculating this indicator.

Another problem of the ISEW index derives from the fact that this does not imply genuinely achieving the proposed goals. From the beginning, environmentalist economists designed and developed the ISEW having in mind the idea of strong sustainability. This is why Neumayer (2000, p. 360) argues that ISEW doesn't recognise the differences between national/human capital and natural capital and also between the different forms of natural capital (renewable and non-renewable resources).

Besides the criticism revealed by Neumayer (2000, pp. 347-364), Philip Lawn emphasizes that the ISEW, as well as GPI, requires more robust monetary evaluation to reach the status of acceptable social welfare indicator (Lawn, 2003, p. 116).

### ***Sustainable or green GDP***

Sustainable or green GDP is an index of economic growth strongly connected with the environmental component. Sustainable GDP, like the previous indicators, starts building on the GDP, but diminishes it with losses in biodiversity, as well as all costs caused by the climate change. This indicator has been designed in order to correct the omissions left out by the GDP, by not taking into account the goods and services that are not on the market. The Green GDP proponents argue that the GDP does not fully reflect the traditional economic welfare and can even transmit misleading information on a country's economic growth (Yang and Poon, 2013, p. 560). This is because the GDP does not adequately reflect negative externalities such as pollution and depreciation of natural capital associated with environmental changes and damages (e.g. deforestation). The green indicator leverages the environmental component to an extent that some countries with higher GDP but with big environmental issues and flaws are outranked by other countries that although have a lower GDP reflect a better situation of the environment.

The green GDP indicator is rooted in the welfare economics. Some of the most important externalities that are taken into consideration within this indicator are: noise, air and water pollution, soil erosion, depletion, the drying of water basins, fragmentation and loss of biodiversity, radioactivity and various toxins that affect health. Recalculation of the GDP in order to incorporate the above mentioned externalities is not very simple, as it involves a different set of prices in the economy. For this reason, up until now there have been just few empirical exercises aimed at estimating the sustainable GDP.

The most popular indicator associated with the green GDP is Huetting's Sustainable National Income (SNI), which was developed for the Netherlands (Gerlagh et al., 2002, pp. 157-174) following the conceptual work of Huetting (1980, pp. 1-257). This can be seen as reflecting the concept of sustainable income with the assumption that individuals are feeling better if surrounding vital functions remain indefinitely available. SNI uses a general equilibrium model in order to calculate the impact on national income caused by imposing sustainability for the most important environmental themes.

Data on the abatement costs associated with these environmental issues are integrated into an existing general equilibrium model and adapted in a specific way. This approach claims that environmental degradation value equals the cost of conservation. El Serafy (2001, p. 193) criticized this method, arguing instead for the user cost method, which would lead to higher sustainable revenue, where the difference will depend on the rate of depletion of natural resources. He emphasizes that a static general equilibrium is required whereas some of the constraints of sustainability related to nine environmental issues are so interrelated that technical measures would not be able to achieve.

Sustainable GDP was often criticized for its gaps. For example, some critics stress out that it is very difficult to quantify in monetary terms the values involved in diminishing the traditional GDP. It lies in the difficulty of valuing certain environmental assets that are not actually traded on the market and have not a value determined on this or they are non-negotiable. If the evaluation is done indirectly, there is a possibility that these calculations to be based on speculation or theoretical assumptions, that could be very far from reality.

### ***Genuine Savings***

An important measurement that targets the intertemporal problems is the Genuine Savings (GS) indicator. GS measures how the total capital stock of a nation changes year by year. The total capital encompasses all those assets from which the population obtains welfare directly or indirectly. GS is made up of produced capital (infrastructure, machines, buildings, etc.), human

capital, social capital and natural capital (Hanley et al., 2015, p. 780). The last component is represented by non-renewable and renewable resources such as coal/oil/natural gas reserves and forests, ecosystems and the global climate system. Some parts of the natural capital values are priced by the market (e.g. oil, timber, salt deposits), while some other parts cannot be fully quantified (e.g. air and landscape quality, biodiversity). This inconvenient is a real challenge for all the indicators that try to incorporate the environmental component.

GS is based on the assumption that all the forms of capital – produced, natural, human and social – can be aggregated in monetary units and are perfectly interchangeable in terms of maintaining welfare over time (Greasley et al., 2014, p. 171). These theoretical postulates support the theory of weak sustainability, unlike the strong sustainability theory that denies the possibility of aggregation of monetized values for all types of capital and the possibility of replacing them indefinitely.

Boos (2015, p. 4176) highlighted that the GS is the most useful indicator in terms of monetary sustainability and therefore could serve as a complement to other economic indicators. Some years ago the Genuine Savings has been adopted by the World Bank as a central indicator under the name “adjusted net savings”. Adjusted net savings may be defined as traditional net savings, but subject to a number of corrections. The World Bank calculated the value of the GS for most of the countries in the world. The results show that, in general, GS is at less than half the value of gross savings made by a country (World Bank, 2006, pp. 163-168).

Although the GS is considered to be by far the most developed indicator for measuring welfare, it is facing a lot of criticisms from the academic as well as professional world. The main disadvantage of the GS indicator is considered the fact that natural capital losses are not considered alarming, as long as they are offset by produced and human capital (weak sustainability). Moreover, a positive value of the GS is not always encouraging, because it does not always reflect environmental sustainability. Other important disadvantages are related to the methodology of quantifying the “immeasurable” components, especially those from the natural resources chapter (mentioned above). More than that, researchers criticize the GS for the over-simplistic methodology, considering that it is not possible to measure environmental and economic changes in one indicator. Another disadvantage is related to the partial perspective of this welfare indicator. As van den Bergh and Antal (2014, p. 7) mention, the GS indicator neglects the historical contexts. They also explain that a country that has wasted all its natural resources can register with difficulty a negative GS afterwards.

### ***Human Development Index***

The Human Development Index (HDI) of the United Nations, is another type of welfare indicator that accounts for the average performance registered in the three key dimensions of the human development: quality of life (health), education and standard of living. The HDI is calculated using the geometric mean of the values resulting from each of the three dimensions. As opposed to the previous types of indicators, HDI is not expressed by a monetary value.

The wellbeing dimension of the HDI is measured by taking into account the life expectancy at birth while the education component is calculated by considering the average years of schooling for adults and expected years of schooling for children of school age. The standard of living component is rooted in the gross national income per capita (GNI). The resulting values for the three dimensions of the HDI are then aggregated into a composite index, using geometric mean. The final result of the index takes a value from 0 to 1. The HDI approach has a strong arbitrary character given the arbitrary selection of the components and the arbitrary aggregation procedure.

From our point on view, the main disadvantage of HDI, compared with other indicators, is related to the complete neglect of the environmental component. The human wellbeing cannot be measured without taking into consideration the quality of water or air, radioactivity and various toxins that affect health or even the degree of deforestation. Despite the disadvantages mentioned above, HDI is considered to be an improvement over the GDP, especially for the assessment of changes in the developing countries.

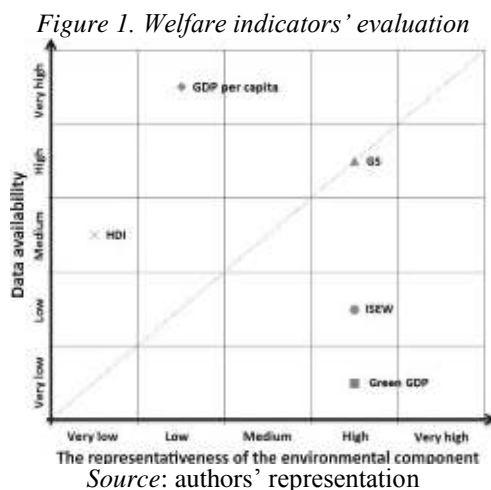
#### 4. Conclusions and final remarks

The findings of this paper revealed that all the analysed welfare indicators are far from being perfect. Moreover, the indicators are constantly criticized with regard to their composition or methodological approach. On the one hand we have the GDP per capita and Human Development Index which almost entirely neglect the environmental dimension of the welfare, are not really representative and have various miscalculations. On the other hand, we observed that “green” indicators have an unclear or a simplistic methodology, are built on strong arbitrary variables or cannot totally gauge the environmental component.

Given those mentioned above it’s pretty hard to emphasize a leading indicator that will facilitate the measuring of sustainable welfare. In order to have a clearer image of the differences between all the analysed indicators, we have tackled the indicators by applying two filters: the first takes into account the environmental dimension of sustainable development and gauges the representativeness of the environmental component within the welfare indicator, and the second derives from the need of the statistical data and is represented by the data availability. All the indicators are assessed on a scale from “very low” to “very high” for both filters.

For a clearer visualised comparison among the indicators we decided to represent the results on a two-dimensional graph (see Figure 1). The indicators with a high environmental representativeness can be found on the right side of the graph, while those which neglect this component or underestimate it should be positioned on the left side. With regard to the data availability we can observe that the upper side of the graph is dedicated to those indicators with a large availability, in contrast with “hard to find” welfare measures positioned in the lower side.

Analysing Figure 1 we can notice that indicators with the weakest representativeness of the environmental dimension are the GDP per capita and Human Development Index (left hemisphere of the graph). Although their large availability (being positioned in the middle and upper limit of the graph) and the involvement of globally important institutions in their estimation, these indicators underestimate the importance of the environmental dimension when assessing the level of welfare. Thus, GDP and HDI are almost useless when it comes to analyse the welfare of a country/region from a multidimensional perspective, including the environmental dimension.



On the opposite side one can see the ISEW and the green GDP as having a high representativeness of the “green” component but with a low availability of the statistical data (lower limit of the graph), making almost impossible the ranking and comparison of various different countries. Even though these indicators fit with “the portrait” of the sustainable welfare indicator, the lack of statistical estimations makes them useful only for country case analyses. Even if this study revealed that all analysed welfare indicators are far from being perfect, we would like to emphasize the indicator that converges towards the concept of sustainable welfare. The Genuine Savings indicator adopted by the World Bank as a central indicator under the name “adjusted net savings” is distinguished by a strong representativeness of the environmental component as well as by a high availability of the statistical data. Moreover, GS is a balanced indicator which arises from its positioning on the

bisector of the graph (the diagonal line that divides the chart into two equal parts).

We are aware that this indicator requires many improvements, but at the moment it is the most appropriate tool for measuring the sustainable welfare and has a very good prospect for constant amelioration under the umbrella of the World Bank.

### Acknowledgements

This work is partially supported through the UAIC Grant for Young Researchers competition of the Alexandru Ioan Cuza University of Iași, Romania (Grant registration number: GI-2015-24).

The POSCCEO 2.2.1, SMIS-CSNR 13984-901, No. 257/28.09.2010 Project, CERNESIM, is also gratefully acknowledged for the infrastructure used in this work.

### 5. References

1. Boarini, R., Johansson, A. and Mira d'Ercole, M., 2006. Alternative measures of well-being. *OECD Economics Department Working Papers*, 476.
2. Boos, A., 2015. Genuine savings as an indicator for “Weak” sustainability: Critical survey and possible ways forward in practical measuring. *Sustainability*, 7, pp. 4146-4182.
3. Christoforou, A., 2010. Social capital and human development: An empirical investigation across European countries. *Journal of Institutional Economics*, 62 (2), pp. 191-214.
4. Daly, H. E. and Cobb, J., 1989. *For the Common Good: Redirecting the Economy Toward Community, the Environment, and a Sustainable Future*, Boston: Beacon Press.
5. El Serafy, S., 2001. Steering the right compass: the quest for a better assessment of the national product. In: E. C. van Ierland, J. van der Straaten and H. R. J. Vollebergh, eds. 2001. *Economic Growth and Valuation of the Environment. A debate*. Cheltenham, UK: Edward Elgar.
6. Estes, R. J., 2010. The world social situation: Development challenges at the outset of a new century. *Social Indicators Research*, 98, pp. 363-402.
7. Gerlagh, R., Dellink, R. B., Hofkes, M. W. and Verbruggen, H., 2002. A measure of sustainable national income for the Netherlands. *Ecological Economics*, 41, pp. 157-174.
8. Glatzer, W., 2012. Cross-national comparisons of quality of life in developed nations, including the impact of globalization. In: K. C. Land, A. C. Michalos and M. J. Sirgy, eds. 2012. *Handbook of social indicators and quality of life research*. New York: Springer.
9. Greasley, D., Hanley, N., Kunnas, J., McLaughlin, E., Oxley, L. and Warde, P., 2014. Testing genuine savings as a forward-looking indicator of future well-being over the (very) long-run. *Journal of Environmental Economics and Management*, 67, pp. 171-188.
10. Hanley, N., Dupuy, L. and McLaughlin, E., 2015. Genuine Savings and Sustainability. *Journal of Economic Surveys*, 29 (4), pp. 779-806.
11. Hueting, R., 1980. *New Scarcity and Economic Growth*, Amsterdam: North Holland Publishing Co.
12. Hussain, M. A., 2016. EU Country Rankings’ Sensitivity to the Choice of Welfare Indicators. *Social Indicators Research*, 125 (1), pp. 1-17.
13. Kangas, O. E. and Ritakallio, V.-M., 2007. Relative to what? Cross-national picture of european poverty measured by regional, national and european standards. *European Societies*, 9 (2), pp. 119-145.
14. Lancee, B. and van de Werfhorst, H., 2012. Income inequality and participation: A comparison of 24 European countries. *Social Science Research*, 41 (5), pp. 1166–1178.
15. Lawn, P. A., 2003. A theoretical foundation to support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and other related indexes. *Ecological Economics*, 44 (1), pp. 105-118.
16. Neumayer, E., 1999. The ISEW - not an index of sustainable economic welfare. *Social Indicators Research*, 48, pp. 77-101.
17. Neumayer, E., 2000. On the methodology of ISEW, GPI and related measures: some constructive suggestions and some doubt on the “threshold” hypothesis. *Ecological Economics*, 34, pp. 347-361.
18. Nordhaus, W. D. and Tobin, J., 1972. Is growth obsolete? In: NBER, ed. 1972. *Economic Research: Retrospect and Prospect*. London, UK: NBER.
19. OECD 2015. Foreword. *National Accounts at a Glance 2015*. Paris: OECD Publishing.
20. Pulselli, F. M., Ciampalini, F., Tiezzi, E. and Zappia, C., 2006. The index of sustainable economic welfare (ISEW) for a local authority: A case study in Italy. *Ecological Economics*, 60, pp. 271-281.
21. Stockhammer, E., Hochreiter, H., Hobermayr, B. and Steiner, K., 1997. The index of sustainable economic welfare (ISEW) as an alternative to GDP in measuring economic welfare. The result of the Austrian (revised) ISEW calculation, 1955–1992. *Ecological Economics*, 21, pp. 19-34.
22. van den Bergh, J. C. J. M., 2009. The GDP Paradox. *Journal of Economic Psychology*, 30 (2), pp. 117-135.

23. van den Bergh, J. C. J. M. and Antal, M., 2014. Evaluating Alternatives to GDP as Measures of Social Welfare/Progress. *WWWforEurope Working Paper*, 56.
24. Whelan, C. and Maitre, B., 2005. Vulnerability and multiple deprivation perspectives on economic exclusion in Europe: A latent class analysis. *European Societies*, 7 (3), pp. 423-450.
25. World Bank, 2006. *Where Is the Wealth of Nations?*, Washington, D.C.: The World Bank.
26. Yang, C. and Poon, J. P. H., 2013. A Regional Analysis of China's Green GDP. *Eurasian Geography and Economics*, 50 (5), pp. 547-563.