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Taking into account sustainable development for MENA countries: The calculation of a modified HDI index

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Abstract: GDP, a measure of economic welfare, may be supplemented with other measures of economic welfare and environmental sustainability. This article discusses alternative measures which have been proposed in the literature concerning pollution, which can be used to augment GDP as a measure of welfare to produce a better index.

Introduction:

The Gross Domestic Product (GDP) level and rate of economic growth remain the main symbols of success and progress, despite the importance of other major indicators for decision making such as unemployment, inflation or the major indices.

GDP is a measure of economic growth. We can assume that developing countries seek growth while developed countries seek post-growth and intellectual development tools for thinking about sustainable development (economically efficient, socially equitable and ecologically sustainable). However, the countries of the MENA region should find measuring instruments that could show their comparative advantages in terms of well-being (tourism) or for potential foreign investors (FDI).

Growth is not synonymous with development or progress, or even well-being (whether economic or social). So, GDP must be supplemented by other macroeconomic indicators. We consider that the concept of « sustainable development » captures the complexity of the reality in which we currently operate and helps to understand the challenges facing our society. Indeed, sustainable development seeks to establish conditions conducive to a healthy living environment (environmental dimension), a way of life that is physically, intellectually and morally satisfying (social dimension) and an adequate standard of living (economic dimension). Historically, sustainability concepts date back to Nordhaus and Tobin (1972), Zolotas (1981), and Osberg (1985). The "Compendium of Sustainable Development Indicator Initiatives" document more than 500 attempts to build a sustainable development indicator (Parris and Kates, 2003).

Following the Brundtland Report (1987), the central role of sustainable development indicators was highlighted by the UNCED (United Nations Conference on Environment and Development) in Rio de Janeiro in 1992 in Agenda 21, Chapter 40: "Develop and identify indicators of sustainable development to improve the information available to decision-making at all levels". A new measure of economic progress and social well-being would show that different factors contribute to the well-being of a society and the achievement of sustainable development.

Because of the challenges due to globalization, the first objective was, as stated by the Secretary General of the OECD Angel Gurria, "to measure how the world has become better." To implement and generalize this statement signed by the UN and UNDP, the European Commission organized on 19 and 20 November 2007 in Brussels an international conference called "Beyond the GDP, during which President José Manuel Durão Barroso defended the introduction of new indices to measure current issues. These institutional meetings brought together many alternative indicators developed worldwide to assess social and environmental well-being. Among these alternative synthetic indicators, some consider social problems, other study inequality and poverty, economic and social security or the ecological heritage of a country.

In a two-part plan, we will select in the first part the main alternative indicators to GDP. To do this, we will see in the first step the synthetic and composite indicators of sustainable development, then in a second step overall sustainable development indicators and finally, we will record the interactions between the economy and the environment in economically and environmentally integrated accounting. In the second part, we use the database of the United Nations (Statistical Yearbook), World Bank and OECD to conduct an empirical study to include pollution in one important MENA indicator, Human Development Index (HDI).

Part I: Selection of sustainable development indicators

I- Composite synthetic indicators of sustainable development

These are unique indicators obtained by aggregation of heterogeneous basic indicators representing the different dimensions of sustainable development, such as GDP per capita, total greenhouse gas emissions, renewable energy share in gross inland consumption, transport energy consumption and GDP, resource productivity, index of abundance of common bird population, fish catches outside safe biological limits, life expectancy in good health, risk of poverty rate after social transfers, employment rate of older workers, and official development assistance.

A) UNDP Indicators

The HDI is a composite statistical index, created by the United Nations Program for Development (UNDP) in 1990 to assess the level of human development in the world. The index was developed in 1990 by the Indian economist Amartya Sen and Pakistani economist Mahbub ul Haq. It aims to evaluate the progress of developing countries. The HDI is based on three major criteria: life expectancy at birth, level of education, and standard of living.

Used since the 1990s, the HDI combines three factors to assess the "capacity" of the residents in these countries (their "capabilities" according to economist Amartya Sen):

- Health and Longevity: life expectancy at birth

- Knowledge: access to education, measured from the average years of schooling of adults (in years) and the expected enrollment of children in school age (years) duration.
- A decent standard of living: the real standard of living per capita calculated from the logarithm of gross national income per capita in purchasing power parity (PPP).

The HDI ranks countries by averaging these three major indexes "normalized" (that is to say, reduced to a scale of 0-1).

UNDP also publishes three other synthetic indicators:

- First, from 1995, Gender (or sexual) Human Development Index (GDI), which corrects the HDI.
- Then, since 1995 the Indicator of Women Participation (IWP) in economic and political life, which complements the previous index by averaging the rates of participation of women in political or economic positions.

• The Human Poverty Index (HPI) is introduced since 1997. It is built on a principle other than the "capabilities" of Amartya Sen. It reported shortages, deprivation or exclusion of a fundamental part of the population, taking into account four factors: longevity, education, employment and living standards. Two variants of calculations are distinguished:

• Variant 1 (HPI- 1) for economically developing countries

• Variant 2 (HPI- 2) for the economically developed countries.

B) EPI « Environmental Performance Index »and ESI « Environmental sustainability Index » (Yale e and Columbia Universities)

The EPI and ESI, developed at the universities of Yale and Columbia, have mainly environmental purposes and are designed with the objective to support decision making. EPI seeks to assess the effectiveness of environmental policies of a country towards a given international or national objective established by experts. Rather, the Environmental Sustainability Index (ESI) is a barometer of long-term trajectory of the environment of a country. Built around the concept of "sustainability", it reflects the past, present and future of a countries' environment. It includes values related to natural resources, pollution control and the degree of degradation of the ecosystem. It also reports on current environmental policies and capacity of a society to curb negative trends. The ESI is calculated from a list of 76 variables integrated in 21 intermediate indicators. The 21 indicators include the quality of air and water, biodiversity, artificial territory, stresses on ecosystems, waste, management of natural resources, environmental policy and so on. However, for these two indices, the result is very dependent on the choice of basic indicators and weightings applied to them. Other choices may lead to very different results. The principle of aggregation is also a problem. Rank must also be interpreted with caution: many differences of ranks between countries are low compared to imprecise data.

C) Social Health Index (Fordham Institute for Innovation in Social Policy)

The Index of Social Health (ISH) was developed in the United States by two researchers, Marc and Marque-Luisa Miringoff. The ISH is a synthetic social index to complement GDP to assess the economic and social progress. It is a kind of summary of the major social problems present in the public debate in the United States in the 1990s. It is composed of sixteen social indicators which it averages. This index includes criteria of health, education, unemployment, poverty and inequality, accidents and various risks. ISH earned an international reputation in 1996, with the publication of a major article in the Economic Review « Challenge » showing differences between curves of GDP and the ISH in the United States, the first continuing to increase while the second plunged permanently after years 1973 to 1975.

ISH provides an example of confrontation, often illustrated with graphics, between traditional economic indicators from the national accounts (GDP, consumption ...) and various synthetic indicators supposed to better approximate the development of "social health ", well- being or quality of life.

D) Measurement of Economic Well-being (Nordhaus and Tobin, 1973)

In 1972, Yale economists William Nordhaus and James Tobin (1972) presented their measure of economic welfare (MEW) as an alternative to gross GDP. MEW adjust the domestic production, including an assessment of the value of leisure time and the amount of unpaid work in the economy, which increases the value of the welfare compared to GDP. They also included the value of the environmental damage caused by industrial production and consumption, which reduces the value of the welfare compared to GDP. MEW can be considered as the precursor of subsequent attempts to create a sophisticated index of sustainable development.

E) Index of Economic Well-being (Osberg and Sharpe)

Lars Osberg's work (1985) on the "economic well-being" in Canada was done in the mid-80s, but it was only in 1998 that a series for Canada was built in collaboration with Andrew Sharpe (1998), and in 1999, a series for the United States (including a comparison with Canada). In 2000, Osberg and Sharpe have international statistics for six OECD countries comparing, on the same graph, GDP growth and their own synthetic index. This work has quickly become a global benchmark, and it was cited in an OECD report published in 2008.

Osberg and Sharpe consider four components characterizing the well-being for the construction of an indicator of economic well-being (IEW):

1. Consumption: Actual flow of per capita consumption, which includes consumption of market goods and services, actual per capita flows of non-market goods and changes in the practice of leisure services.

2. Wealth: Net accumulation in the company of productive resources stocks, including the net accumulation of tangible property and housing stock, the net accumulation of human capital and investment in Research & Development (R & D), environmental costs and the net change in the level of external debt;

3. Gender: Income distribution, according to the Gini index of inequality, and the extent and impact of poverty.

4. Economic Security: Economic security against unemployment, disease, insecurity of single parent families and the elderly people.

Thanks to their indicator, we can compare trends in economic well-being in six OECD countries: USA, UK, Canada, Australia, Norway and Sweden.

F) ISEW and Friends of Earth with the New Economic Foundation

1. The Index of Sustainable Economic Welfare

The Index of Sustainable Economic Welfare (ISEW) develops the MEW by better adjusting GDP by taking into account a wider range of adverse effects of economic growth, and excluding the value of public expenditures in defense.

This index is monetized and is primarily focused on environmental sustainability. The first internationally cited version of the ISEW is in the book by Herman Daly and John Cobb (1989). But the book published in 1994 by Clifford Cobb and John Cobb is a major landmark. The Daly-Cobb Index of Sustainable Economic Welfare is a more comprehensive indicator of well- being, taking into account not only the average consumer, but also the distribution and degradation of the environment. After adjusting the consumption component in the index of the distributional inequality, the authors incorporate several environmental measures, such as the depletion of non-renewable resources, loss of agricultural land against soil erosion and urbanization, loss of wetlands, and the cost of air pollution and water. They also include what they call "environmental damage in the long term", a figure that tries to take into account these large-scale changes such as the effects of global warming and the depletion of the ozone layer.

The main weakness of the ISEW is its reliance on only the information that is available in few countries. For example, few developing countries have comprehensive data on the extent of pollution in air and water.

2. Sustainable Well-being Index (Friends of the Earth)

A second example is provided by the index of sustainable welfare of Friends of the Earth. This international NGO proposes since 2001, in cooperation with the New Economics Foundation (a "think tank" that specializes in social reporting) and the Centre for Environmental Strategy at the University of Sussex, his own ISEW index for the United Kingdom, including an online tool allowing everyone to "create their own ISEW" in valuing other variables and so initiators can calculate an alternative outcome of this "online survey". Methodologically, among the innovations that this index offers compared to its predecessors, there are three revisions, relating to the treatment of income inequality, damage assessment related to global warming, and the cost of the destruction of the ozone layer. By his calculation, it is very close to the Genuine Progress Indicator.

G) Genuine Progress Indicator

It is an alternative indicator to GDP or HDI to attempt to measure the evolution of the real well-being of a country.

While GDP measures only monetary economic activity, IPV:

• adds to GDP the estimated non-monetary economic activities, such as domestic work or volunteer activities value;

• subtracts from the GDP the estimated value of lost natural resources (environmental damage, destruction of non-renewable resources, and so on) and the value of social damages (unemployment, crime, crime, delinquency, accidents, disease, inequality, etc.).

The Genuine Progress Indicator (GPI) is an extension of ISEW, which highlights the true and actual progress of society and seeks primarily to monitor the well-being and sustainability of the economy. The ISEW and GPI summarize the economic well-being thanks to a single digit with the same logic that GDP summarizes economic output in a single figure. In addition to economic issues, social and environmental considerations are included in monetary terms.

H) Non-monetary Variables Indicator: « dashboard of sustainable development »

There are few synthetic and known indicators with environmental component that do not use the monetization of variables. That is why a recent and promising initiative should be mentioned: the « dashboard of sustainable development » which is both a free software and an international database for flexible use. This is not strictly speaking an indicator, but it is a tool allowing everyone to see lots of data, to build dashboards, and eventually build national composite indicators by the variables.

This "dashboard" contains 46 indicators in three areas (environment, economy, and society) and one hundred countries. There are for example the following indicators:

- Environment (13 indicators): water quality, air and soil, levels of toxic waste...

- Economy (15 indicators): GDP, investment, productivity, competitiveness, inflation, energy consumption...

- Company (18 indicators): offenses, health, poverty, unemployment, education, governance, military spending and cooperation....

The data for each indicator are available on a scale from 0 to 1000. The country with the highest absolute value is assigned 1000 points and the country with the lowest absolute value is assigned 0 points. Between these extremes, a simple linear interpolation can compare the results by country.

Example 1- Sustainable Development Indicator (INSEE)

Indicators of sustainable development aim to inform all stakeholders (government, elected officials, local authorities, businesses, NGOs, citizens ...) of developments in the economy of society, pressures on the environment and to convince and encourage behavior change.

15 headline indicators, 35 additional indicators (second level) and four indicators of economic and social context were selected to support the national strategy for sustainable development. These indicators were selected by a committee according to the governance of the Grenelle of environment.

Example 2- Sustainable Development Indicator (Eurostat)

The sustainable development indicators are used to monitor the European sustainable development strategy in a report published by Eurostat every two years.

Key indicators: Among more than 100 indicators, eleven were identified as key indicators. They are supposed to give an overall indication of the level of progress achieved by the EU towards sustainable development in terms of objectives and targets defined in their strategy.

I) Better Life Index (OECD)

Since its creation in 1961, the GDP was the main indicator which the OECD has used to measure and analyze economic and social progress. But it failed to capture many factors that affect people's lives, such as security, leisure, income distribution and a clean environment. Is life really better? How can we tell? What are the key ingredients to improving life? Is it a better education, environment, health, housing, or working hours? Does progress mean the same thing to all persons or in all countries and for all companies? Pioneering this emerging field of research, the OECD has been working for nearly ten years to determine the best way to measure the progress of societies - Beyond GDP - and to explore areas that impact people's lives. Today, the fruit of this work is evident in the "Better Life Initiative" of the OECD (BLI).

In May 2011, the OECD released a new interactive index that will allow everyone to measure and compare their own quality of life beyond the conventional statistics framework of Gross Domestic Product. This tool is part of the "Better Life Initiative" of the OECD to measure well-being and progress. The index allows citizens to compare their well-being in 34 countries based on 11 dimensions: housing, income, work, community, education, environment, governance, health, subjective well-being, security, and balancing work and private life. This gives them the possibility of granting a variable weight to each of these dimensions.
Ratios of social inequalities show the socio-economic gaps of the welfare acquired for all 11 subjects of the BLI. For each indicator, when the socio-economic distribution is available, the ratios are calculated by dividing the greatest achievement between high and low socio-economic statuses by the lowest performance between high and low socio-economic statuses.

In summary, though, this type of indicator has limitations as follows: It has simplified assumptions, a limited number of basic indicators and subjective weighting, including investigations.

Also, the method used to make the data comparable (Method for Standardization) assumes a common scale for indicators of different dimensions, resulting in a final indicator bounded with minimum and maximum values. The method also has aggregation problems

Global indicators presented in Part II can overcome the problem of heterogeneity of the indicators and their aggregation.

II- The global sustainable development indicators

A) Adjusted net savings (World Bank)

It measures the surplus of economic, human and natural resources available for the economy to offset the depreciation of physical, human and natural capital.

Adjusted net savings ("genuine savings") is an indicator of the World Bank that seeks to highlight the extra resources available to the economy after an annual cycle of production and consumption, once the depreciation of economic, human and natural capital has been offset. Adjusted net savings is calculated as gross savings (production minus consumption), taken from the national accounts, minus the consumption of fixed capital (depreciation of economic capital), plus education expenditure (consumption reclassified as investment in human capital), minus damages to natural assets (depreciation of natural capital). In national accounts, gross saving includes household savings (not consumed disposable income in the current period and which can be accumulated in the form of financial or non-financial assets), corporate savings (retained profits) and government saving. The concept of « adjusted net savings » goes beyond the accounting framework that is only interested in productive capital; in this approach, human capital and natural capital are considered as heritage. Environmental damage is assessed as the reduction of energy stocks, minerals and forests, which are added to the damage caused by CO2 emissions. They are calculated with reference to a theoretical model based on the pricing of exhaustible resources. Adjusted net savings is expressed as a percentage of gross national income. The higher the index, the higher the country's ability to increase its assets (broadly defined) is important. In this approach, we consider that the decrease of exhaustible natural resources may be offset by increased investment in economic or human capital (through efforts including training).

This indicator has the merit of coupling economic, human, and environmental issues. From a theoretical point of view, we show that under certain assumptions the « adjusted net savings » is an indicator of sustainability understood as "the ability to conserve wealth, or the possibilities for creating well-being to future generations". « Adjusted net savings » also has the advantage of relying on the concepts and figures derived from national accounts to calculate gross savings. In addition, the opening of economies is not taken into account. Finally, being reduced to a simple measure of spending on education, the approach of human and social capital remains very fragmented; so we might wonder whether it would not be better to focus solely on the interactions between the economic activity and the changing environment.

B) GDP per capita

First, the GDP records everything that has a monetary value and nothing else, without prejudging the positive or negative contribution of this activity to well-being. Second, GDP, identifying the goods and services produced and consumed, can only be a proxy for the well-being. Finally, the well-being provided by non-monetized activities (typically free time) or work outside the commercial sphere (domestic work) are, by definition, not taken into account. GDP was not designed to measure well-being, but to describe the functioning of an economy with a consistent accounting model. However, GDP per capita may retain some legitimacy as a synthetic indicator of well-being.GDP per capita is the GDP divided by the population at midyear and GDP is calculated without deductions for degradation of natural resources.

C) Green GDP

During the summit of Rio +20 in June 2012, the UN introduced a new indicator of wealth: the Inclusive Wealth Index (IWI). The Green GDP is expected to integrate to the wealth of a country, in addition to the classic GDP, its "natural capital", that is to say its ecological heritage, to measure the sustainability of growth. The economist Jean Gadrey criticizes that IWI adds production flows (annual GDP) and stocks of wealth (natural capital). These ecological capitals are considered as substitutable but we can not measure them.

D) The ecological footprint, "carbon" footprint or CO2 budget

The ecological footprint is purely environmental. It is an indicator which measures the economic pressures on the environment. It does not require an economic aggregate but uses equivalency factors to measure the biological surface necessary for the survival of a given population. The ecological footprint represents the surface of soil and oceans needed to provide the resources consumed by a given population and to eliminate the waste and residues of this population. Resource consumption can come from productive areas outside the territory occupied by this population. The ecological deficit or credit of a country is the ratio between its ecological footprint and biocapacity, defined as the productive area available in a country. This type of calculation used to estimate whether the country is living beyond its means and needs to import resources from abroad. This indicator was developed by Mathis Wackernagel (University of Vancouver, under the responsibility of William Rees), who created the organization Global Footprint Network responsible for its development.

It is a synthetic indicator. We can calculate the footprint of a population from one individual to that of the planet.

Many reports have been produced, including the World Wide Fund for Nature or WWF. But their effects are limited due to poor visibility of the problem in the public sphere; its negative impact on daily life is not really affecting the dominant economic, political and media actors and the most favored nations, even if their ecological footprint is yet by far the most important. Therefore, they may still believe in the benefits of physical and indefinite growth. In addition, the ecological footprint is a synthetic indicator, which reflects a small part of the consequences of climate change and ecosystem degradation. The ecological footprint is limited because it illustrates very indirectly the importance of the following consequences of global warming:

• The acceleration of global warming in recent years is directly related to anthropogenic greenhouse gas emissions.

• The size of the global human catastrophes predictable beyond two degrees of warming: droughts, floods and storms, rising sea levels, etc.

III- An integrated environmental and economic accounting: interaction between economy and environment.

An ambitious accounting conceptual framework was established in the mid-1990s by the UN, the European Commission, the IMF, the OECD and the World Bank. It resulted in the publication of a

joint book: the System of Integrated Environmental and Economic Accounting (SEEA), whose current version dates from 2003. This system is annexed to the System of National Accounts and it brings together economic and environmental information to better assess the contribution of the environment to the economy and the impact of the economy on the environment. The SEEA includes four major categories of accounts: material flows, spending for Environmental Protection, Natural Heritage accounts and evaluation of non-market flows.

Natural capital accounting:

Rio +20 is an opportunity for countries and the private sector to affirm their commitment to an accounting of global wealth and integrated reporting. Several financial institutions have already signed a Declaration on natural capital, and many companies are listed on integrated reporting initiatives that allow them to incorporate biodiversity and take environmental consideration when making decisions of management.

In sum, three major reports have recently been written by expert groups on measures of sustainable development. The first one, by a working group of the OECD/UNECE/Eurostat in 2008, recommends using a table of variables of flows and stocks to capture all the components of sustainability, and distinguishes the « economic well-being » from the « fundamental welfare » that considers environmental indicators (global warming, air pollution, water quality, biodiversity). The second one, by the French Economic, Social and Environmental Council in 2009, assesses the ecological footprint, but has also sought to quantify sustainability. Thus, it concludes that the carbon footprint is more relevant and suggests using indicators of international boards. The third one, by a working group headed by Stiglitz, Sen and Fitoussi 2009, recommended improving existing measures of economic performance. First, it suggested improving the measurement of GDP by taking into account the services and non-market production. These services can be public or private and for the public services, they can be collective (security) or individual (health, education). It should include the point of view of the households and their living standards in the measurement of GDP (consumption, income, wealth). Second, it proposed to measure well-being in the context of sustainability because it considers that the two measures are different but complementary: to establish a system for measuring welfare with different indicators. These indicators should be sufficiently numerous to take into account all relevant dimensions (the material conditions of life, health, education, personal activities including work, participation in the life policy and governance, social connections and relationships, the environment, economic and physical insecurity). Then, these indicators of quality of life should be properly aggregated. Third, it proposes a definition of sustainability: at least maintain the current level of well-being for future generations. "Economic sustainability" is to assess whether or not countries consume an excessive proportion of their wealth, whether they live above their means. "Environmental sustainability" is to say if we reach dangerous levels of consumption for the environment but it is difficult to monetize it.

However, none of these reports have advocated the exclusive use of an indicator of sustainable development. Finally, if we want to challenge the supremacy of GDP, we should not replace it with another hegemonic indicator. There should be several management tools, each pointing out an important element for the specific policy makers.

For the case of MENA countries, what indicators would be most appropriate to capture the peculiarities of this economy? What are the available data that would allow their calculations? Should we change the composition of an indicator to make it compatible with existing data or should we

establish new channels of collection of the information for this purpose? What would be their purpose and for whom?

Part 2: Empirical study

I- General characteristics of the MENA region

In this region, the economic characteristics of oil exporting and oil importing countries are very different. The Gulf countries and Algeria are very rich in natural resources, while Egypt, Morocco and Yemen are poor compared to the needs of their population. With the Arab Spring, some of these countries are in political transition and therefore are experiencing social instability. The region remains in a state of stagnation with high levels of unemployment and is unattractive for investors.

Growth has always been a major objective for any economy needing progress and development. It is primarily based on the development of production factors due to the increased use of available resources and technical progress.

The persistence of economic growth through a cumulative movement over the long term has a positive effect on the standards of living and therefore, may permit poverty reduction. However, economic growth does not have only positive effects; it also has negative aspects that can be identified by the harmful consequences of the intensification of resource exploitation. These consequences are essentially environmental pollution, overexploitation of resources, increased spatial disparities and increasing social inequalities.

As a condition *sine qua non* for economic development, the assessment of growth should not be limited to quantifiable aspects. Other aspects also play an important role in economic and social life and, therefore, must be taken into account to actually account for the economic growth in all of its dimensions. This is what we strive to do in the case of the countries of MENA region (Middle East and north Africa) where we'll try to identify and to determine the most relevant elements to build up an indicator that would really reflect growth, through sustainable development.

The progress realized in the field of statistical analysis through the development and the multiplication of statistical tools, the greater availability and reliability of statistical data (databases) and the ease of access to data through NITC (new information technology and communication), are important elements that contribute to decipher the phenomenon of growth and to determine the contribution of each of the elements involved in the process.

The MENA region includes 19 countries from Morocco in Northwest Africa to Iran in Southwest Asia, and a broader definition would include nine additional countries in Europe, Central Asia and Africa. The MENA region is very heterogeneous in terms of wealth, population size and level of economic development:

• With 381 million inhabitants, the MENA region accounts for 6 % of the world population.

• It owns 60 % of global oil reserves and 45% of natural gas and so appears as a strategic source of supply of energy resources worldwide. Eight of the twelve OPEC countries are MENA countries.

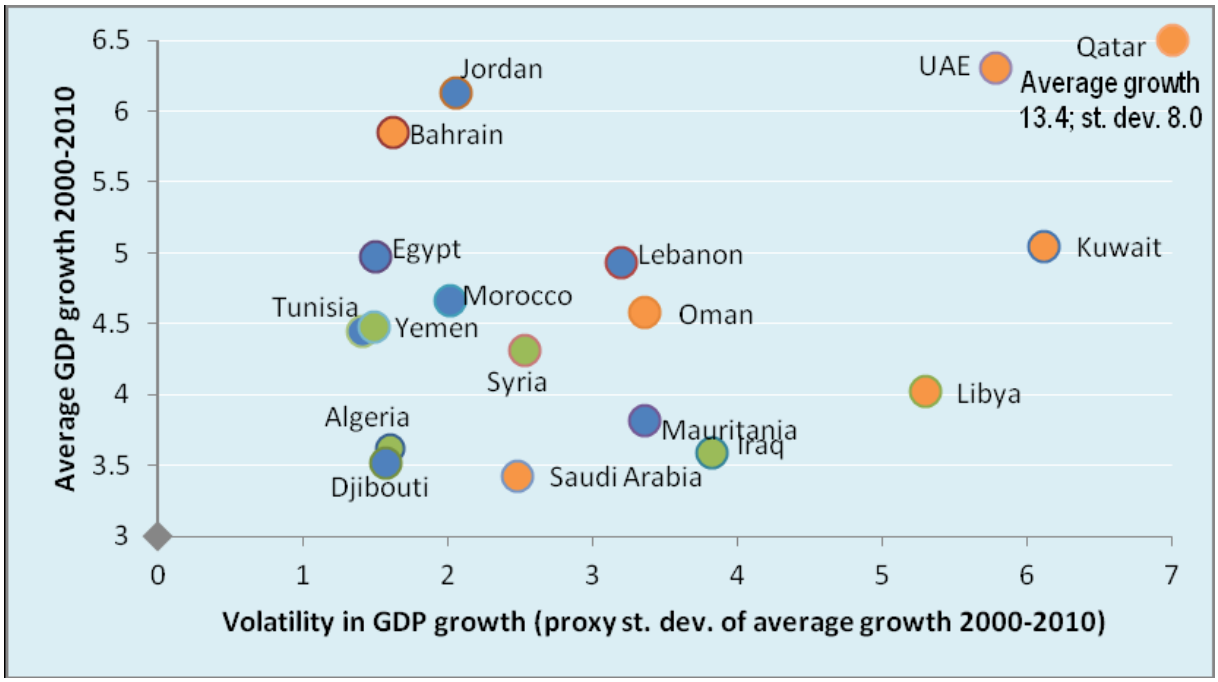
• The MENA region is characterized by the very low level of economic integration between its different countries. Trade across MENA countries accounts for about 10% to 12 % of total trade in the region against 60 % for Europe and 36.8% for Asia.

• Economic diversification is very low in the MENA region. This is the case of oil-producing countries which don't succeed in emancipating from the mastery of hydrocarbons in the economy. This is also the case for non-oil producing countries, but in the latter case, the low level of diversification of the economy finds its origin mainly in the low level of productive investment, in inefficient training structures in place, and in the lack of investment in intangible capital (as the main source of innovation).

• Capital transactions in the MENA region have experienced significant quantitative progress, and this is a result of different oil shocks. However, they remain relatively limited if we refer to the mass and the invested capital generated in the region. Indeed, it is estimated that the oil producing countries of the Gulf have generated 2,000 billion dollars, but the major part of this amount was an outflow to the U.S. A (Treasury bills mainly), Switzerland and Great Britain.

• Excluding the circle of oil producing countries of the Gulf, the economic performance of MENA countries remains limited and is even declining since the advent of the global crisis of 2008. This is a direct consequence of inadequate production systems, the low level of development of productive forces involved in the production process, the low productive investment which is the guarantee of sustainable growth, and the shortcomings in institutional and organizational business environments.

Figure II.1: Average GDP growth in MENA countries 2000-2010



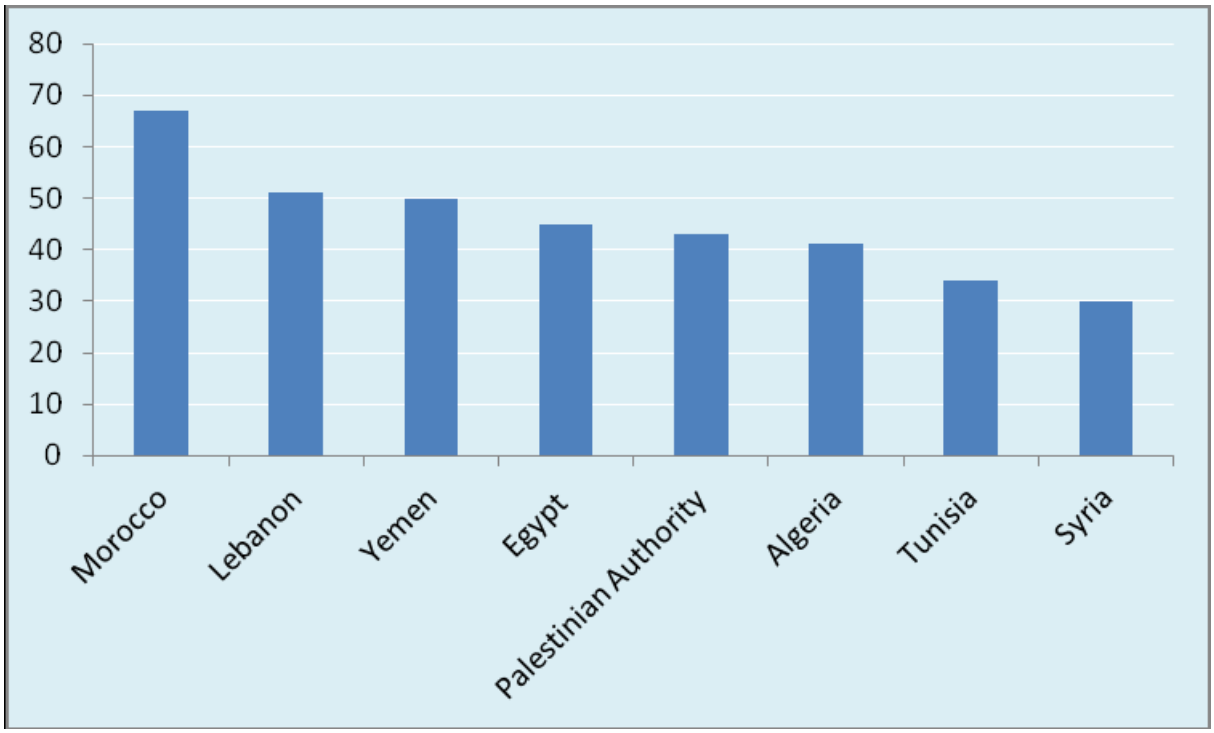
Source: OECD calculations based on data staff from IMF 2011d.

• The large inflow of income resulting from the different oil shocks has made it possible for oil exporting countries to initiate major projects (infrastructure, equipment ...) giving rise to migration flows within the MENA region. However, these flows have failed to reduce unemployment in the MENA region which is characterized by the highest unemployment rates in the world. Indeed, more than half of the population of working age is unemployed and unschooled, and the inactivity rate of women and youth is one of the highest in the world.

According to the World Bank, the MENA region must create in the next seven years, 28 million jobs and that, only to contain the rise of unemployment.

• The informal sector plays an important role in most countries of the MENA region, and it tends to gain ground in the context of crisis as well as the inability of the state to reduce unemployment that affects young people. In addition, the wave of protests (Arab Spring) which affects all MENA countries since 2011 has resulted in a lax state in repressing informal activities, and has so created a favorable environment to the development of the informal sector.

Figure II-2: Informal employment 2000-2007 (Yearly average, in thousand people)



Source: Heintz and Chang 2007.

• All MENA countries face (even if with varying degrees) the problem of governance. This problem is first the result of the incompetence of policy makers resulting in gaps in management and, secondly, illegal patronage practices which destroy any attempt of implementation of any project of society. Thus, the report entitled "Middle East and North Africa: Harnessing the Global Recovery, a Tough Road Ahead" presents the problems that MENA countries face and the opportunities available to them. According to the report, corruption remains endemic in most countries of the region and is a common practice in recruitment to the public service in particular.

• As highlighted by the FAO report for 2013, the MENA region is characterized by a high dependence on food import, and that, despite some progress in several countries of the region. Conflicts,

population growth, rapid urbanization, and low agricultural productivity are the main reasons of that food situation. At the regional level, the number of undernourished people remains high affecting nearly 43.7 million people (more than 10 % of the population), while 24.5% of children less than five years of age suffer from stunted growth due to chronic malnourishment.

With the exception of fruit and vegetables, all other major food groups saw the gap widen between consumption and domestic production. The region has become increasingly dependent on the world market to meet its basic food needs. Thus, during the period 2006-2010, the region imported 47% of its cereals, 72% of vegetable oil, and 60% of its sugar.

The above list of the elements that characterize the MENA region is not exhaustive, but it seems relevant and representative of the factors that really reflect the evolution of the economy in the MENA region. More generally, variables related to development (GDP per capita), education, health and environment are crucial to characterizing MENA countries.

The following section intends to integrate some economic, social and environmental factors in an original single indicator for MENA countries with international comparisons.

II- A modified HDI indicator which takes environment into account: An application to MENA countries.

The previous sections show that there is no single indicator to measure sustainable development. Moreover, the lack of data availability for some indicators for MENA countries, such as certain components of the EPI makes it difficult to apply sustainability indices in these countries. A third difficulty is related to the existence of numerous measures of sustainable development, which makes difficult the selection of appropriate indicators and their relative importance.

This section is intended, from the available data on MENA, to propose a modified human development index taking into account the environment, measured by pollution. Pollution is indeed the environmental factor most frequently cited as an obstacle to sustainable development. In addition, data for this variable are available for virtually all countries. The HDI will therefore be modified to take into account four factors related to sustainable development: life expectancy (as a measure of health), education, GDP per capita and the air pollution that we measure as CO2 emissions per capita as well as the concentration of pollution in large cities. We see that the corrected HDI can lead to a rather different ranking of countries linked to the traditional classification of HDI.

Leaving the HDI uncorrected, Table II-1 gives us the values for 2012 for MENA in comparison with selected reference countries (some OECD countries and other emerging countries in Latin America and Asia). It appears that except Israel, that is placed 16th in the world, most MENA countries are ranked in the second half of world classification (ranking after the 90th position). Moreover, even if Lebanon, Turkey, Algeria and Tunisia remain below the hundredth place, it does not hold true for Egypt, Syria and Morocco. These countries rank at levels similar to those of India or China levels. Brazil and Argentina are in turn generally better placed than the MENA countries. Unsurprisingly, the countries at the top of the world ranking are countries of Western Europe and North America, as well as Australia and Japan.

Table II-1: Human development Index 2012 and rank for 186 countries

Country	IDH	Rang
Australia	0,938	2
United States	0,937	3
Germany	0,920	5
Sweden	0,916	7
Japan	0,912	10
Canada	0,911	11
Israel	0,900	16
France	0,893	20
Spain	0,885	23
Italy	0,881	25
United Kingdom	0,875	26
Argentina	0,811	45
Lebanon	0,745	72
Brazil	0,730	85
Turkey	0,722	90
Algeria	0,713	93
Tunisia	0,712	94
Jordan	0,700	100
China	0,699	101
Egypt	0,662	112
Syrian Arab Republic	0,648	116
Morocco	0,591	130
India	0,554	136

Source: United Nations Development Program (https://data.undp.org/dataset/Table-1-Human-Development-Index-and-its-components/wxub-qc5k)

The question that arises is whether the consideration of environmental factors leads to a significant change in the ranking. In this regard, we propose to amend the HDI by adding a composite indicator of pollution that takes into account both the level of CO2 emissions as well as their concentration in large cities. Table II-2 shows that on this point, MENA countries, because of their lower economic development, generally emit far less CO2 per capita than the industrialized reference countries. Turkey and Lebanon are close to the world average and Israel and Libya are two exceptions which have CO2 emission levels comparable to those of the developed countries. Thus, if we consider only the level of CO2 emissions, the MENA countries appear as relatively good performers.

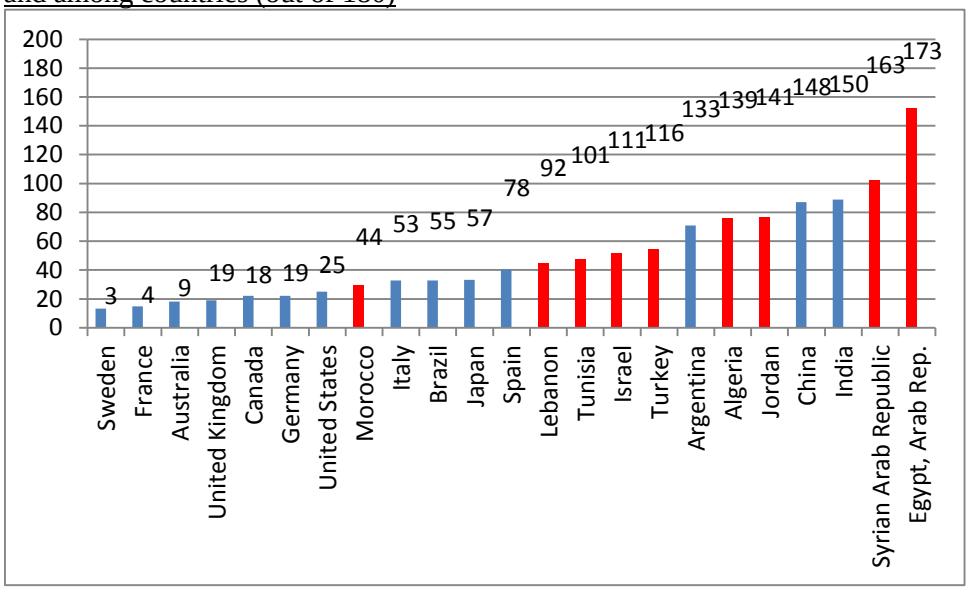
Table II-2: Emissions of CO2 per capita and rank of the countries (out of 205 total)

Country	CO2	Rank
Morocco	1,60	78
India	1,67	82
Brazil	2,15	92
Tunisia	2,45	96
Egypt, Arab Re	2,62	99
Syrian Arab Re	2,87	103
Algeria	3,33	108
Jordan	3,44	110
Turkey	4,13	116
Argentina	4,47	122
Lebanon	4,70	125
World	**4,88**	
France	5,56	140
Sweden	5,60	141
Spain	5,79	142
China	6,19	146
Italy	6,72	153
United Kingdo	7,86	166
Germany	9,11	173
Japan	9,19	174
Israel	9,27	175
Libya	9,77	176
Australia	16,93	194
Canada	14,68	191
United States	17,56	196

Source: World Bank (http://data.worldbank.org/indicator/EN.ATM.CO2E.PC)

However, these observations mask a more complex reality than can be measured by the concentration of air pollution in large cities. Thus, Figure II-3 shows that a measure of pollution in cities of over 100,000 inhabitants gives us a different picture than the previous table. Indeed, the least polluted cities are rather the cities of the North, while MENA countries are almost all in the second half of the table, with the exception of Morocco which has less pollution because of its urban structure and the location of Rabat and Casablanca near the Atlantic ocean breezes which assists with dispersing pollutants. In contrast, countries such as Syria, Egypt, Jordan and Algeria are among the countries with the most polluted cities in the world (rank greater than 130).

Figure II-3: Air pollution in cities of 100,000 or more inhabitants in micrograms per cubic meter) and among countries (out of 180)



Source: The World Bank, Development Economics Research Group Estimates (2010)

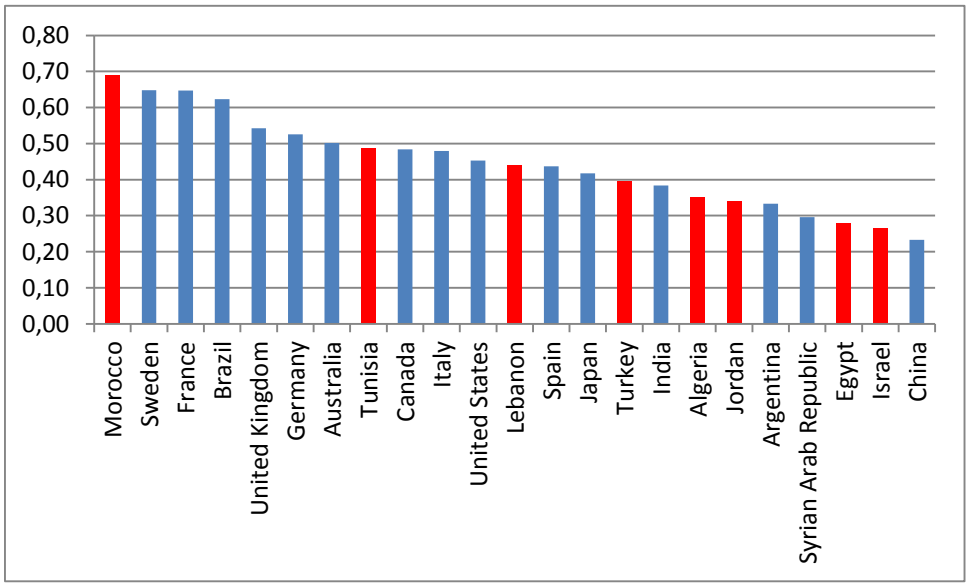
Thus, it seems appropriate to include these two measures of pollution (emissions and concentration) in order to take into account these two aspects of air pollution. We therefore propose an additional component of the HDI between 0 and 1 (most and least polluted countries) using the following index:

$$Ipollution_i = \left[1 - \left(\frac{\frac{rankemission_i - 1}{rankemission_{max} - 1} + \frac{rankconcentration_i - 1}{rankcentration_{max} - 1}}{2}\right)\right]$$

This pollution index takes the value 1 if country i is ranked first both in terms of low emission levels and low concentration of pollution. It takes the value 0 if a country is ranked last for both components.

The value of this index is reported in Figure II-4. It appears that the dichotomy between North and South disappears. Indeed, some Northern countries such as Sweden and France are classified favorably to the extent that they have limited CO2 emissions given their level of development and standard of living. Italy, Spain and the USA are badly ranked. Similarly, among MENA countries, Morocco appears favorably ranked because of low CO2 emissions and limited pollution of cities. However, Israel and Egypt are at the bottom of the table, while the other MENA countries are in an intermediate situation.

Figure II-4: Composite indicator of pollution



Source: Authors' calculations

The final step is to correct the HDI of this indicator of pollution. Whereas the HDI consists of three components (life expectancy, education and GDP), the inclusion of a fourth component provides the following adjusted HDI:

$$HDI_{corrected} = [(0.75 * HDI) + (0.25 * Ipollution)]$$

The results are presented in Table II-3. This table shows that for almost all countries, their HDI deteriorate if we take into account the pollution component. Morocco is an exception in so far as its correct performance in terms of pollution is increasing HDI which is among the lowest in the region. Other countries perform rather well as their HDI decreases only slightly taking pollution into account. This is the case of Sweden, France, Brazil, India and Tunisia. The reasons are various. In Sweden and France, it is explained by contained pollution given their high economic development. For other countries, it is largely explained by per capita emissions which are still limited because of their low level of development.

Conversely, Egypt, Jordan, Algeria and Syria lose nearly 0.1 point of their HDI due to their poor performance in terms of pollution. This pushes their HDI down to very low levels (between 0.5 and 0.6). Among the countries that lose the most in HDI, one has to include Israel (-0.15 points), but also the USA, Japan, Argentina and China have very poor performance in terms of pollution.

Table II-3: Adjusted HDI by emissions pollution and its concentration

	(1)	(2)	(3)	(4)
Country	HDI	Ipollution	HDI corrected	Gap (3) - (1)
Morocco	0,591	0,688	0,615	0,024
Sweden	0,916	0,648	0,849	-0,067
France	0,893	0,647	0,832	-0,061
Brazil	0,730	0,623	0,703	-0,027
United Kingdom	0,875	0,542	0,792	-0,083
Germany	0,920	0,525	0,821	-0,099
Australia	0,938	0,502	0,829	-0,109
Tunisia	0,712	0,485	0,655	-0,057
Canada	0,911	0,484	0,804	-0,107
Italy	0,881	0,480	0,781	-0,100
United States	0,937	0,453	0,816	-0,121
Lebanon	0,745	0,440	0,669	-0,076
Spain	0,885	0,437	0,773	-0,112
Japan	0,912	0,417	0,788	-0,124
Turkey	0,722	0,395	0,640	-0,082
India	0,554	0,383	0,511	-0,043
Algeria	0,713	0,350	0,622	-0,091
Jordan	0,700	0,340	0,610	-0,090
Argentina	0,811	0,333	0,691	-0,120
Syrian Arab Republic	0,648	0,296	0,560	-0,088
Egypt	0,662	0,278	0,566	-0,096
Israel	0,900	0,265	0,741	-0,159
China	0,699	0,233	0,582	-0,117

Source: authors' calculations

In conclusion, we observe that the inclusion of pollution in the HDI leads to greater heterogeneity in the ranking of the North (with a strong downgrade for the U.S., Israel and Japan while Sweden and France improve their ranking relatively). This is also true for the South (downgrade of China and Argentina while Morocco and Tunisia realize good results too). Brazil and India are not performing too badly, but results for India are mainly linked to low emissions due to its low economic development.

Thus, these results demonstrate the high sensitivity of the HDI to environmental factors. The exercise carried out above partly raises the question concerning the ranking made by the United Nations Development Program. It clearly appears that some countries are heavily overrated without taking into account their poor environmental performance (USA, Japan, and Israel). Even Australia and Canada are among the countries upgraded. In contrast, countries in Northern Europe, including France seem relatively underrated due to better performance in terms of air pollution. Among MENA countries, Morocco and Tunisia appear underrated while Egypt, Syria, Algeria and Jordan seem significantly overrated.

This analysis has to be refined by taking into account alternative measures of pollution (sensitivity analysis) and environment. Maybe, we could use a composite indicator that does not take into account only the air pollution but also other environmental factors, according to the available data.

Finally, it is appropriate to propose an econometric model to identify the determinants of this indicator (beyond its components).

Conclusion:

GDP of a nation, which is a universally accepted indicator of economic welfare, would not reflect the whole picture during times of financial turmoil and crisis. An alternative indicator that takes into account the economic, social and environmental well-being can be seen as a new instrument to promote governance based on sustainable development, where the long term is as important as the short term and the future of the humanity becomes a priority.

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