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LOOKING BEYOND THE GDP: QUANTITATIVE EVALUATION OF THE "HOLISTIC PROGRESS INDEX" (HPI)

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Abstract. As an alternative to the conventional GDP, a new "progressive" GDP termed as the "Holistic Progress Index" or the HPI has been proposed; and an original approach to its quantitative evaluation has been presented. The HPI integrates social, economic, ecological and political aspects of human progress. The rationale of HPI and its evaluation methodology are presented. As proposed, the HPI is based on three major parameters i.e. the Net GDP per capita, Socio-Ecological Progress Index and Socio-Political Progress Index representing Peaceful Development, Sustainability and Human Freedom respectively. The factors involved in the quantitative evaluation of HPI are GDP, military expenditure, health, education, carbon emission, poverty reduction, leisure, population growth, crime and human freedom. Hence the proposed HPI is much more comprehensive than the conventional GDP. Future actions / projects required to utilize the concept of HPI are also proposed and discussed. It is concluded that a pursuit of the growth in HPI (rather than a growth in GDP alone) will lead to Peaceful and Sustainable Development without curtailing Human Freedom.

Keywords: GDP, Holistic Progress, Sustainable Development.

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JEL Classifications: O1, Q01

1. Introduction

Concerns about the inadequacy of the GDP (i.e. the Gross Domestic Product) as an indicator of human well-being have been expressed in many quarters. A special report (New Scientist 2008) clearly sets the tone in this regard: "Growth graphs are stark reminders of the crisis facing our planet. Consumption of resources is rising rapidly, biodiversity is plummeting and just about every measure shows humans affecting earth on a vast scale. Most of us accept the need for a more sustainable way to live, by reducing carbon emissions, developing renewable technology and increasing energy efficiency. But are these efforts to save the planet doomed?...Personal carbon virtue and collective environmentalism are futile as long as our economic system is built on the assumption of growth… If we are serious about saving earth, we must reshape our economy."

More recently, Nobel Laureate Joseph Stiglitz (2009) pointed out the pit falls of GDP fetishism. He linked the current economic recession to an undue focus on the GDP. Development of an alternative economic indicator (or a more "Progressive" GDP) which includes factors such as health, income distribution, environmental degradation etc, is the need of the hour. With this motivation, a model has been developed in this paper to evaluate a modified GDP indicator termed as the "Holistic Progress Index" (or HPI). The basis of HPI, its expression and evaluation methodology are presented in this paper. Many

indices of human welfare, which look beyond the GDP as an indicator of progress, have been developed in the past e.g. Human Development Index (HDI), Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), Sustainable Net benefit Index (SNBI), Index of Economic Well-Being (IEWB), Happy Planet Index (HPI) etc (Lawn 2005; Koroneos and Rokos 2012). Besides mentioned variety approaches towards development in scientific literature could be found (Čepėnaitė, Kavaliūnaitė, S. 2013; Dudzevičiūtė 2012; Ercsey 2012; Grybaitė 2011; Korsakienė, Breivytė; Wamboye 2011; Lankauskienė, Tvaronavičienė 2012; Lapinskienė, Tvaronavičienė 2009; Smaliukienė *et al.* 2012; Tvaronavičienė, Grybaitė 2012; . Tvaronavičienė, Lankauskienė 2011; Šileika, Bekerytė 2013; Tvaronavičienė, Lankauskienė 2013; Vosylius *et al.* 2013). Despite variety of researches in the indicated field, the author presents a fresh approach to evaluation development and introduces a new indicator termed above as the Holistic Progress Index (HPI). Compared to the previously developed indices having their own strengths and weaknesses, the index proposed in this paper is expected to be more comprehensive, less subjective, and simpler to evaluate.

2. Basis and evaluation of HPI

The GDP (or the sum total of goods and services produced in an economy) is essentially an economic indicator. The GDP does not include other human development aspects belonging to social, ecological and political domains. From these (other than economic) domains, the following parameters may be considered as crucial to determining human survival, welfare and happiness:

1. Peace (absence of war)
2. Education
3. Health
4. Poverty reduction (or income-distribution)
5. Leisure
6. Climate Change
7. Population Growth
8. Crime
9. Freedom

The GDP / capita as an indicator of economic progress is important and perhaps irreplaceable. However, the above parameters are not reflected in the GDP values. Hence, the GDP needs to be modified or moderated by the above factors, in order to reflect the true or holistic progress made by human beings on a year-to-year basis. An effort has been made to incorporate all the above parameters in developing a new "Progressive" GDP, which has been called the Holistic Progress Index or the HPI.

It is proposed to evaluate the HPI by the following expression:

HPI = Net GDP / capita x SEPI x SPPI

All the above terms used in the expression of HPI are explained below. The terms SEPI and SPPI refer to SOCIO-ECOLOGICAL PROGRESS INDEX and SOCIO-POLITICAL PROGRESS INDEX respectively. The term Net GDP / capita is elaborated first:

2.1 Net GDP / capita:

The term Net GDP is meant to denote the GDP minus the military expenditure (on army, navy and air force) on a purchasing power parity basis.

Hence, Net GDP / capita = GDP / capita - Military Expenditure / capita

The Net GDP may also be called the "Civilized" GDP or the "Demilitarized" GDP or the "Peaceful" GDP. Large military expenditure not only threatens peace, but also diverts scarce material, energy and human resources to destructive activities, which could otherwise be used to improve the quality of life. Obviously, in order to improve HPI, military expenditure should be reduced and disarmament efforts need to be intensified.

That reduced military expenditure has a positive effect on GDP growth, is well argued by the noted economist John Kenneth Galbraith (1984):

"Through the decade of the 1970s we (Americans) used from 5 to 8 % of our Gross National Product for military purposes. The Germans during this period used between 3 and 4 % - in most years relatively about half as much as did we. The Japanese in these ten years devoted less than 1 % of their Gross National Product annually to military use. In 1977, to take a fairly typical year, our military spending was $ 441 per capita, that of Germany was $ 252 per capita; the Japanese spent a mere $ 47 per capita. It was the capital so saved and invested in civilian capital improvement that brought Germany and Japan to the industrial eminence that now challenges so successfully our own. Again the figures are striking. Through the decade of the seventies, our investment

in fixed non-military and non-residential investment ranged from 17 % of Gross National Product to 19 %. That of Germany ranged from 21 to 27 %. The Japanese range in these years was from 31 % to a towering 37 %. The investment in improvement of civilian plant was broadly the reciprocal of what went for weapons. Out of ten industrial countries in the years 1970 – 79, Japan, with its low military expenditures, had by far the highest rate of growth in productivity – an astonishing 8 % annually. Germany also had a highly favourable growth rate. The United States and Britain, with the highest military expenditures, had the lowest rate of productivity growth in the non-socialist world. Any one looking at these figures will have a more thoughtful view of the suggestion that military expenditures have an economically positive effect."

Hence, demilitarization will cause the 'Net GDP' to grow in two ways: (A) Military expenditure will decrease, and (B) GDP will increase. Reduced military expenditure will have yet another positive effect. The authority of military dictatorships, in oppressive states around the world, will decrease. They will tend to be less tyrannical, allowing human freedom in such states to flourish.

2.2 Socio - Ecological Progress Index (SEPI):

The Socio-Ecological Progress Index (SEPI) depends upon seven factors (elaborated below). These are related to quality of life and happiness such as health, education, leisure etc along with ecological factors such as carbon emissions. This index can be evaluated as:

$$SEPI = \frac{(EF \times HF \times PRF \times LF \times CRF)}{(PGF \times CF)}$$

The abbreviations used in the evaluation of the Socio - Ecological Progress Index (SEPI) are explained below:
EF = Education Factor
HF = Health Factor
PRF = Poverty Reduction Factor
LF = Leisure Factor
CRF = Carbon Reduction Factor
PGF = Population Growth Factor
CF = Crime Factor

A. Education Factor (EF):

The Education Factor can be represented by the percentage of population in a country that is literate (preferably literate up to High School). For 100 % literacy, the value assigned for EF is 1. Literacy for only 70 % of the population in a country would mean that EF is 0.7.

A literacy level of 10 % or less may be assigned a fixed value of 0.1.

B. Health Factor (HF):

This factor can be represented by the average age of the population in a country. For an average age of 80 years (or more), this factor may be considered as 1. For 60 years average age, this factor is 60 / 80 i.e. 0.75.

A higher average age would indicate better health of the population; which may be achieved by providing clean drinking water, sanitation and proper medical facilities etc.

To clarify a mathematical possibility, an average age of "0" for a country's population is impossible; as in such a case, the population and the country vanishes from earth! However, to provide a minimum limit of HF, for an average age of 8 years or below (a country without adults!), the value of HF may be fixed at 0.1.

C. Poverty Reduction Factor (PRF):

This factor may be represented by the percentage of the population that is above the poverty line. For a country, without poor people, the value of PRF is 1. If 70 % of the population for a country is above the poverty line, the PRF for that country is 0.7. If, for a country, the population above the poverty line is only 10 % or less, the PRF may be fixed at 0.1. It is presumed that the income-distribution aspect is somewhat included in the poverty reduction factor, as poverty reduction demands better income-distribution. Further, common people are more concerned about a basic dignified life than the excessive wealth of a minority. Money is superfluous beyond a point!

D. Leisure Factor (LF):

This factor is positively related to happiness along with reduction in mental and physical stress. Presently, some people are over-worked; and some are idle due to unemployment. Both the situations lead

to stresses in life. The over-worked people need to be given more leisure time, and the unemployed need to be made employable through appropriate education and training. The Leisure Factor can be evaluated from the number of paid holidays (particularly in the private sector because of its strong profit motives). If in a year, there were two months paid holidays along with a 5-day week, the number of holidays per year would be about 140. This may be assigned a leisure factor 1. If in a country's organised private sector, the number of paid holidays are only 70 per year, then the leisure factor is equal to 70 / 140 i.e. 0.5. If the paid holidays allowed are only 14 (i.e. 2 weeks) or less, the value of LF may be fixed at 0.1. Improvement in this factor would indicate a higher happiness level of the general population.

E. Carbon Reduction Factor (CRF):

Out of the several ecological factors, the key factor of carbon emission only has been considered because of its serious implications for global warming. As per the IPCC (Intergovernmental Panel on Climate Change) report, 2.3 tonnes per capita per year is considered as a safe limit for carbon emissions. This can be used as a basis to evaluate the carbon reduction factor. For USA, the carbon emission value is estimated to be 20 tonnes per capita per year. Hence the carbon reduction factor for USA is 2.3 / 20 i.e. 0.115. For India, the emissions are in the safe limit; hence, for India the CRF value is equal to 1. For carbon emission values less than 2.3 tonnes per capita per year, the CRF value may be fixed at 1. Reduction in carbon emissions (i.e. improvement in CRF) can be considered as a key indicator of ecological progress.

F. Population Growth Factor (PGF):

This factor can be evaluated as:

PGF = (Np + 1)

Here, Np stands for population growth rate in a particular country. If population growth rate is zero (or negative), this factor is assigned a fixed value of 1. For India, this factor would be 3, because of about 2 % growth rate in the country's population. Hence, the HPI would be reduced to its one-third value for India, as compared to a similar country with zero population growth.

The factor of [1 / (Np + 1)] in the HPI expression is such that population growth has a punishing effect on HPI. This expression was deliberately chosen in this manner, because population growth causes congestion, over crowding, reduction in spaces of wilderness etc and therefore leads to a poor quality of life.

G. Crime Factor (CF):

Crime, of any nature, in a country leads to a poor quality of life for its citizens. This factor can be evaluated as:

CF = (Nc + 1)

Here, Nc stands for the percentage of population directly or indirectly involved in any crime. The crime could be petty or less serious (e.g. disobedience of traffic rules, tax evasion or theft) or serious (e.g. rape, terrorism or murder). For a crime free society, the CF would be evaluated as 1. The definition of "CRIME" should be comprehensive in nature and scope. Tax evasion, disruption of communal harmony, female harassment, breaking traffic rules etc should all be included in the crime factor. Cyber crimes, child labour, racism, production of spurious drugs, and adulteration in foodstuffs are some more examples. One can go to the extent of including the production of films and video games promoting terror & violence as a crime. Some of it may be controversial, but a consensus may not be difficult. If for a country, the section of the population involved in any sort of crime (directly or indirectly) is, say, 10 %; then the Crime Factor (CF) is evaluated as 11. The HPI reduces by a factor of (1 / 11) compared to a similar but crime-free country. Again, the expression for CF is such that the effect of crime on HPI is punishing; and without doubt, it deserves to be so.

General Remarks:

The equation for evaluating the SEPI (and the HPI) is so framed that there should be significant punishment for negative factors (like population growth and crime) and significant reward for improving the positive factors (like higher literacy rate, reduction in carbon emission etc). By doing so, the idea of justice has been implemented here. This is one reason why product and division functions have been incorporated in the SEPI equation.

Another reason relates to the nature of the factors involved. Though apparently different, they are essentially intermingled (or fused) with each other. An improvement in one factor will most likely lead

to an improvement in other factor / factors. For example, an improvement in carbon reduction factor would demand more renewable energy programmes and therefore would lead to more creation of jobs, thereby improving the Poverty Reduction Factor. Improvement in Poverty Reduction Factor would reduce the Crime Factor. A higher Literacy Factor may also reduce the Crime Factor. Improvement in Literacy Factor would reduce Population Growth Factor and would lead to better health awareness. An improvement in the Leisure Factor would lead to a more stress-free society, which is likely to have a positive impact on the Health Factor. Such links can be seen in other factors also.

The product and division functions involved in the SEPI expression would act as an incentive for the governments to act in the right direction; because an appreciable increase in HPI is feasible by improving positive factors and simultaneously curbing negative factors.

Numerical Range of SEPI:

The range of numerical values of the various factors involved in SEPI is summarized below:

(i) EF varies between 0.1 and 1.
(ii) HF varies between 0.1 and 1.
(iii) PRF varies between 0.1 and 1.
(iv) LF varies between 0.1 and 1.
(v) CRF value lies in a range, such that $0 < CRF \leq 1$. Again, to clarify a mathematical possibility, a situation where CRF = 0 is impossible to arise, as it implies infinite carbon emissions!
(vi) PGF value can be equal to or greater than 1. However, it is beyond human capability to increase the PGF to an infinite value!
(vii) CF value can be equal to or greater than 1. Its maximum value is 101, when the entire population of a country is criminalized!

Therefore, the quantitative value of SEPI lies in the range of 0 to 1, such that $0 < SEPI \leq 1$.

2.3 Socio-Political Progress Index (SPPI):

Essentially, human beings seek freedom in order to be happy. The level of freedom (an important parameter to assess "quality of life") available to a citizen depends on political, legal, and social institutions existing in a country. Hence reforms are required if freedom level is to be up-graded. This is the basis of the Socio-Political Progress Index (SPPI).

The Socio-Political Progress Index (SPPI) can be evaluated by awarding credit points for the level of freedom existing in a country for its citizens. This level of freedom would depend upon the existence or non-existence of the following types of freedoms:

1. Freedom to choose the government.
2. Freedom of expression and communication.
3. Freedom of religious and spiritual pursuits.
4. Freedom of forming political groups, associations and trade unions.
5. Freedom to choose one's educational stream.
6. Freedom to choose one's profession.
7. Freedom for socio-cultural pursuits.
8. Freedom from social inequalities based on race, colour, caste, creed and gender.
9. Freedom in family / personal / sexual matters.
10. Freedom to travel / migrate to any country.

If all the above types of freedom are available in a country to its citizens, the maximum credit points of 100 may be awarded. Each type of freedom may be assigned equal weight i.e. 10 credit points due to number of freedoms being 10. If four types of freedom only are available in any country, the credit points earned by that country would be 40. If no freedom exists in a country, that country may be assigned only 1 credit point. If a particular type of freedom is available only partially, one can assign the credit points (out of 10) by assessing what percentage of the population enjoys that freedom or to what level that freedom is available. Some uncertainty in the values assigned to partial freedom may always be there. However, an honest assessment can take us very close to the true value. It is not suggested here that the credit points be awarded for absolute freedom. Of course, any freedom needs constraints commensurate with public morality and welfare of fellow citizens. However, the credit point system for SPPI would discourage governments to curtail the freedom available to its citizens.

Numerical Range of SPPI:

The quantitative value of SPPI lies in the range of 1 to 100, such that $1 \leq SPPI \leq 100$.

3. Results

Annual evaluation of the HPI based on the three major parameters i.e. Net GDP / capita, SEPI, and SPPI

(a product function again because of the advantages cited in the General Remarks above), will provide a numerical value of HPI on a year- to - year basis. The trends in HPI growth / decay can then be observed and analysed.

From the HPI evaluation methodology, it can be observed that a growth in HPI will occur, if:
– GDP increases
– military expenditure reduces
– literacy level increases
– health factor improves
– poverty reduction (or income-distribution) factor improves
– leisure factor improves
– carbon reduction factor improves (i.e. carbon emission is reduced)
– population growth is reduced
– crime factor is reduced
– freedom level is improved

To summarize, it may be permitted to use the following analogy:

Net GDP / capita ≅ Peaceful Development ≅ Production of delicious cake
(the bigger the better)

SEPI ≅ Sustainability ≅ Distribution of the cake with equity (to present and future generations)

SPPI ≅ Human Freedom ≅ Consumption of the cake with icing

HPI ≅ Peaceful and Sustainable Development without curtailing Human Freedom

Hence the goal of HPI is akin to building a delicious cake, distributing it to all, and enjoying it with a variety of icings!

4. Future actions/projects required:

The HPI, as proposed above, is much more comprehensive than the GDP. It is believed that it is a rational indicator of human well-being and that it indeed measures "holistic" progress made by a country's citizens. The following actions / projects are proposed in order to utilize the concept of HPI:

A. Governments across the world need to be persuaded to adopt the proposed HPI as an indicator of well being of its citizens, in place of the GDP.

B. All the factors related to HPI need to be analysed on a country wise basis in order to evaluate the current level of HPI for each country, in order to grade the countries based on HPI. The countries having very high GDP values may not hold the crown based on HPI. Such countries will be forced to reorganize their affairs, in order to retain the lost glory.

C. Strategies need to be developed and formulated to improve the HPI for each country. Financial aid from the International Monetary Fund and the World Bank should be linked to projects designed for HPI improvement. In order to improve the HPI, the world's focus and attention has to necessarily shift to:
– demilitarization
– literacy
– health care
– poverty reduction
– protection of leisure rights of working people (Get inspired from Bertrand Russell's "In praise of Idleness"(Russell 1935)!)
– energy conservation and renewable energy
– population stabilization
– crime prevention
– political, legal and social reforms

The role of the United Nations (along with individual states) will be crucial in HPI improvement. The United Nations, therefore, needs to be strengthened, both economically and politically, to contribute effectively in HPI improvement. A more democratic UN will be better equipped to handle HPI improvement.

D. The crucial link between energy and HPI needs to be examined and analysed, in order to formulate appropriate energy strategies. The positive impact of energy conservation and renewable energy on the HPI needs to be highlighted.

It is further suggested that the link between Net Energy and HPI should be explored. The term "Net Energy" means the energy available to society after subtracting that required to build the energy supply system. To be more specific, one can even explore the Net Exergy – HPI link; because only 'exergy' (i.e. the useful part of energy) can drive development.

E. Role of academic institutions in HPI improvement will be very important. A pro-active role of academic institutions in the area of sustainability is the need of the hour. One can consider the example of eco-friendly and decentralized energy technologies. By demonstration (through actual use on campuses), training, and extension of such technologies, the

academic institutions can act as role models for surrounding communities and catalysts in the process of sustainable development. The students will become more sensitive to the problems of the local surrounding communities. This will motivate them to take up appropriate and relevant projects for research and development.

Hence, in addition to teaching and research, the academic institutions need to act as "engines of regional development" as opposed to being ivory towers. The problems of global poverty and climate change demand that academic institutions act in this "third-dimension" as well. Some sample projects in this regard should be taken up urgently particularly in the developing world. A serious introspection into the goals of education needs to be made particularly in the developing countries. "Is education to be a 'passport to privilege' or is it something which people take upon themselves almost like a monastic vow, a sacred obligation to serve the people?" so aptly asked by E.F.Schumacher in his path-breaking book "Small is Beautiful" (Schumacher 1973: 173). The academic institutions particularly in developing countries need to embrace the spirit of what Schumacher said.

F. The role of the corporate sector in HPI improvement will also be very important. Corporate Social Responsibility should be considered neither a charity nor philanthropy, but a new way of doing business in a sustainable manner based on 'Life Cycle Thinking'.

Conclusions and recommendations

The HPI as proposed above is a much more comprehensive indicator of progress as compared to the GDP. The HPI integrates social, economic, ecological and political aspects of human progress. Quantitative estimation of the HPI is simple and without ambiguity; and can be carried out for all countries across the world.

One can also observe that GDP growth does not necessarily ensure growth in HPI. HPI may actually decrease, while GDP grows if appropriate policies are not adopted and implemented. Hence, an obsession with GDP may be counter productive. The energy – HPI link needs to be examined and analysed in detail to formulate appropriate energy strategies.

Worldwide efforts are required to encourage national statistical agencies to adopt HPI as an indicator of their country's progress, in place of the GDP. Further efforts are required in the direction of improving the HPI, both at the national and global levels. The United Nations needs to be strengthened, both economically and politically, to contribute effectively in HPI improvement. Academic institutions, across the world, need to play the role of a catalyst in the process of HPI improvement. Corporate Social Responsibility should become as much a core of business practice as profit-making in order to further improve the HPI.

The HPI model proposed in this paper may be improved or modified (if required) on the basis of the insight gained while practically evaluating the HPI. It can be observed that a pursuit of the growth in HPI (rather than a growth in GDP alone) will lead to Peaceful and Sustainable Development without curtailing Human Freedom.

That economic growth is not a sole pre-condition for a sustainable world, was rightly pointed out in the much-acclaimed book "Energy for a Sustainable World" (Goldemberg *et al.* 1988):

"The approach to a sustainable world involves economic growth as a necessary, but not a sufficient, condition. At the most fundamental level, the goals of society should be equity, economic efficiency, environmental harmony, long-term viability, self-reliance and peace. Energy production and use should be compatible with, and if possible contribute to, these societal goals. These goals are relevant to both developing countries (for which they define the objectives of development) and industrialized countries, as well as for the relationship between these countries and for the global community".

More recently, Nobel Laureate Joseph Stiglitz gave a wake-up call to the world: "A fetish for GDP has to go! An undue focus on GDP has led to the current economic recession."

The GDP has outlived its utility. A new era of HPI has to begin…This article is a humble attempt to change the world for the better. It seeks to promote Peaceful and Sustainable Development without curtailing Human Freedom. This article is dedicated to Mahatma Gandhi, an Apostle of Applied Human Ecology.

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