Macro-Equality Measures to Study and Compare Equality in Well Being among Populations of Different Subdivision Areas of a Country or Group of Countries, with Global Examples

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Introduction

Previous researches concerned mainly with micro-equality issues. We believe that macro-equality issues are, as well, important to address the variations in well being between linked subdivision areas. This includes equality in services distribution and other shared benefits. Macro-equality levels also reflect the micro-equality levels in places where different ethnics and population groups live in different subdivision areas of a country. Inequality of wellbeing among different subdivision areas proved to initiate conflicts between marginalized areas and the federal governments. For global issues international organizations are usually concerned with the improvement of the levels of human development aspect to achieve different goals and targets for different countries. The relative paces of approaches towards these goals also need macro-equality measurements.

This paper concerns with: first, development of a measure of macro equality with comparability validity to compare well being levels among Populations of different subdivision areas of a country or group of countries; Second, addressing a method to evaluate trend of equality in well being among these units using the correlation coefficient statistic. This developed index and method had been used in a paper to study the poverty variation and trends through population of Sudan states presented in 2015 IARIW- CAPMAS Conference in Cairo. In this paper we are going to introduce more concepts in this respect, to expand the application of these indices for global groups of countries, and to present an Excel worksheet system for evaluation and monitoring macro-equality strategies.

The global groups of countries to be introduced here are The European Union countries and the World countries classified by level of human development categories.

Objectives

The objectives of this paper are:

First: To throw more light on the definition of concept of equality.

Second: To expand the application of the developed macro-equality index and the micro-equality evaluation & monitoring procedure that presented in 2015 IARIW- CAPMAS Conference in Cairo.

Third; To develop an Excel worksheet system that facilitates macro-equality monitoring through time.

Definition of concepts

Here we take equality as conjugate of inequality; and we differentiate between level of variability and equality. Variability concerns with disparities among what we call independent units, while equality deals with linked units. Independent units are units that free from any inter-beneficial commitments; that is to say not sharing any kind of services or well being for example countries. However some countries might have some links which could be described as linked units. On the other hand Linked Units are units that are tied by inter-beneficial commitments for example states and other subdivisions of a country.

Equality development through subdivisions of a region could be experienced by three scenarios: chance, inertial and enforced scenario. The chance scenario is the case where there is no deliberate action takes place in this respect. In this case the relationship between the pace of change of the concerned variable and its level for individual areas is likely to be insignificant; and here the concept of variability is relevant. The inertial scenario is the case where there is some internal relationship between the pace of change of the concerned variable and its level. This is the case

where there is self control of the change of the variable level through time; for example the pace of increase of life expectancy at birth decreases as its value increases. In this case there might be a significant relationship between the pace of change of the variable and its level; but it is still relevant to variability concept. The third scenario, the enforced experience is the case where there is deliberate action towards equality. In this case a significant relationship between the pace of change of the concerned variable and its level should be attained, and the level of variation of the variable through subdivision units could be defined as equality level.

Methodologies

The macro-equality index: It is well known that the standard deviation statistic measures variability. However, this statistical measure lacks validity of comparability. It cannot compare between dispersion levels of different variables unless the means of these variables are the same. To solve this problem we found that when the percentages of values of different variables across a set of units are considered the means of these percentages are equal. Accordingly, if the percentages of values of a variable in different sets of units are considered the statistical means of these percentages are equal for all sets as far as the total numbers of units in these sets are equal. We call this mean "the standardized mean (SM)", and the standard deviation of these percentages "the standardized standard deviation (SSD)". Hence the macro-equality index (MEI) is defined by the following equation:

[MEI = SM − SSD] ---------- (1)

The lower limit of the index equals zero when the SM = SSD, and the upper limit equals SM when SSD=0. Therefore, we can compare between equality levels of different variables across subdivision areas of a region, or of a variable across subdivision areas of different regions with equal numbers of subdivision units. To compare between equality levels of variables for regions with different number of subdivision areas the percent macro-equality index (%MEI) could be used.

In this paper we are going to apply the macro-equality index first; to measure the equality in human development level and its components of education, health and economic status levels across the European Union Countries in the year 2014, and the equality in human development levels through the previous years from 2010 to 2014; second, to compare the variability of human development levels among different groups of the world countries in the years 2010 and 2014.

The correlation coefficient statistic: The correlation coefficient statistic (CC) could be used to evaluate the equality trend among administrative units of a region through time, and accordingly to develop a mechanism to monitor strategies of equality control. This could be done by calculating the correlation coefficient of the relationship between (the values of a variable referred to a base year time) and (the differences between these values and values of the same variable referred to a future point of time). We would call this correlation coefficient "the Equality Correlation Coefficient (ECC)". A significant ECC in this respect indicates enforced or inertial equality change during the two points of time. For a complete equality the ECC value of this relationship would be -1; In this case the value of the tested variable would be the same for all units at the target time. For a complete inequality the ECC value of the relationship would be 1. Accordingly, a macro-equality line could be defined to be the case when the ECC value equals zero.

In this paper we are going to measure the experiences of equality in human development levels among the EU countries through the years from 2010 to 2014; and that for the different groups of the world between 2010 and 2014.

Projections of macro-equality indices: To project the levels and the corresponding macro-equality indices of a variable across different units through a period of time towards specific targets at the end of the period the following steps would be taken:

First: To sort in descending order the base-year values of the concerned variable for the concerned units ($Q_{0(i)}$).

Second: To specify the target year (T) to attain the required values of the target levels to be reached for each unit ($Q_{T(i)}$). The target level could be specified as fixed value (Q_T) for all units; or two maximum and & minimum values for the first and last units ($Q_{T(1)}$ & $Q_{T(N)}$), and the in-between values could be calculated as follows:

$[Q_{T(i+1)} = Q_{T(i)} - (Q_{T(1)} - Q_{T(N)})/(N-1)$ for i = 1 to N-2 where N is the total number of units] --------- (2)

Third: To subtract the values of the variable at the base-year form that at the target year for each unit ($Q_{T(i)} - Q_{0(i)}$) and divide the differences by the number of years of projections (T), $(Q_{T(i)} - Q_{0(i)})/T$.

Fourth: To calculate the value of the concerned variable for each unit for each year during the period as follows:

$[Q_{j,(i)} = Q_{(j-1),i} + (Q_{T(i)} - Q_{0(i)})/T$ for i = 1 to N and j = 1 to T-1] --------- (3)

Fifth: To calculate the corresponding macro-equality indices and the ECC values.

Two exercises have been done here to project the HDI values and macro-equality indices & ECC values for EU countries from the year 2014 to the year 2024 on the basis of fixed target HDI equals 0.95 for all countries at 2024, and different targets of HDI decreasing evenly from 0.95 for the maximum initial value to 0.85 for the minimum initial value.

Data and frame of application

Two sets of countries were considered in this application; the European Union countries (28 countries) and the World countries (188 countries). The world countries classified into four groups according to the human development level: Very High HD level (49 countries), High HD level (56 countries), medium HD level (39 countries), and low HD level (44

countries).The indicators used for the European countries are the Human Development Index, life expectancy at birth, mean years of schooling and Gross National Income per capita; The Human Development index is the indicator used for the world countries. Data of these indicators for the world countries, including European Unity countries, were obtained from United Nations sources in its Web side. We used in this paper the data referred to the years from 2010 to 2014.

For the European countries first, we applied the micro-equality Index to compare equality in human development level and its components of education, longevity, and economic status across the EU members in a specific year (2010); second, we evaluated equality experience in human development across these countries during some back years (2010, 2011, 2013, 2014); third, we projected the HDI values for the member countries and the corresponding equality levels through 10 forward years (from 2014 to 2024) to attain specific HDI targets; and finally we applied the developed Excel worksheet system as an example to monitor planning of macro equality levels through time.

 For the world countries we used the developed measures to compare and evaluate the variation of human development in the different categories in a specific year (2010) and during the period between 2010 and 2014).

For the European Unity countries as there are some links in socioeconomic benefits among the included countries the equality index compares, however, the level of **equality** of human development indicators among the member countries; and the ECC evaluates the trend of these levels through time. For the world countries the equality index compares the level of **variability** of human development indicators among the different groups of countries, as the countries in each group defined to be independent units.

Findings: 1-The European Union Countries

Levels: Table (1) presents the macro equality Indicators of human development, health, education, and Economical status for the European Union countries in 2014. The summary of findings is as follows:

- According to our MEI, Equality level in human development among EU members in 2014 found to be 3.41 out of 3.57 (95.56%); the maximum HDI equals 0.923 registered in Demark, and the minimum equals 0.830 registered in Portugal (Appendix 1).
- Comparing equality levels in education, longevity, and economic status among the EU countries we found that in 2014 longevity experienced the highest degree of equality among these countries, MEI=3.44 out of 3.57 (96.33%). The maximum life expectancy at birth equals 83.1 years registered in Italy, and the minimum equals 73.3 years registered in Lithuania (Appendix 1). Equality level in education came in the second place, MEI=3.22 out of 3.57 (90.27%). The maximum mean years of schooling equals 13.1 years registered in Germany and United Kingdom, and the minimum equals 8.3 years registered in Portugal (Appendix 1). Equality in economic status among EU members lagged behind with considerable gap, MEI=2.41 out of 3.57 (67.45%). The maximum GNI per capita equals 58711 PPP$ registered in Luxemburg, and the minimum equals 15956 PPP$ registered in Bulgaria (Appendix 1).
- Appendix 3 presents the percentages from which the macro-equality indices were calculated.

Table (1)

Macro Equality Indicators of Human development, Health, Education
And Economical status for European Union countries in 2014

	HDI%	LE %	M sch yr%	GNP/C%
SM	3.57	3.57	3.57	3.57
SSD	0.16	0.13	0.35	1.16
MEI	3.41	3.44	3.22	2.41
%MEI	95.56	96.33	90.27	67.45

Previous trends: Table (2) presents the Macro-Equality indicators for human development levels for the European Union Countries during 2010-2014. The summary of findings is as follows:

- The Macro Equality level in human development in 2010 among EU countries was found to be 3.406 (95.38%); It was almost the same in 2011 experiencing very slight equality development retardation of ECC = 0.0298 between 2010 and 2011. It increased gradually in the years 2012, 2013, and 2014 to be 3.408 (95.44%), 3.411 (95.51%), and 3.413 (95.56%) respectively. Equality development between these years measured to be of ECC equals – 0.2866, -0.2868, and - 0.3277 respectively. It should be noted here that the ECC values are not significant; this indicates that equality improvement was rather self determined, not with deliberate actions.
- Appendix 2 presents the human development indices for the EU countries in the years from 2010 to 2014; Appendix 4 and Appendix 5 present the percentages from which the macro-equality indicators were calculated.

Table (2)
Macro-Equality indicators of human development for the European Union Countries during 2010-2014

Indicator	2010	2011	2012	2013	2014
MEI	3.406	3.406	3.408	3.411	3.413
MEI%	95.38	95.37	95.44	95.51	95.56
	(2010-2011)	(2011-2012)	(2012-2013)	(2013-2014)	(2010-2014)
ECC	0.0298	-0.2866	-0.2868	-0.3277	-0.2878

Projection of equality levels: Appendix (6) and Appendix (7) present the two scenarios of projections of HDI for the EU countries during 2014-2024 to attain specific targets of HDI values. In the first scenario the target of HDI value in 2024 was taken to be 0.95 for all members of EU countries; in the

second scenario the targets of HDI values were taken to be 0.95 for the maximum required value, and 0.85 for the minimum required value. Table (3) and Table (4) present the projected macro-equality indices based on the HDI projected values. Graphic representations of the projections are presented in Figure (1) and Figure (2) for the two scenarios respectively. The summary of the results is presented below:

- With respect to the first scenario of target HDI = 0.95 for all EU members in 2024 the development of equality through each year would be of ECC equals -1, towards complete equality. Accordingly, the MEI values increases gradually from 3.413 (95.56%) in the year 2014 to 3.571 (100%) in the year 2024, as shown in Table (3), representing a straight line of HDI target equals 0.95 for all members as shown in Figure (1).

- With respect to the second scenario of partial equality with evenly decreasing values of HDI from maximum = 0.95 in 2014 to minimum = 0.85 in 2024, the MEI values increases gradually from 3.413 (95.56%) in the year 2014 to 3.451 (96.615%) in the year 2024 showing gradual decrease in equality development from ECC = -0.84889 in 2013-2014 to ECC = -0.75917 in 2023-2024 as indicated in Table (4). The graph of this scenario shows a straight line in the target year of HDI values equal 0.95 for the upper target and 0.85 for the lower target as presented in Figure (2).

- It is noticed here that the ECC values are significant indicating a deliberate action of equality improvement.

Table (3)

Projections of macro equality indicators of HDI during 2014-2024 of HDI target equals 0.95 in 2024 for all members of EU countries

	2014	2015	2016	2017	2018	2019
ECC between		-1	-1	-1	-1	-1
SM	3.571	3.571	3.571	3.571	3.571	3.571
SSD	0.159	0.141	0.124	0.108	0.092	0.076
MEI	3.413	3.430	3.447	3.464	3.480	3.496
%MEI	95.56	96.04	96.52	96.98	97.44	97.88

Table (3) continued

	2020	2021	2022	2023	2024
ECC between	-1	-1	-1	-1	-1
SM	3.571	3.571	3.571	3.571	3.571
SSD	0.060	0.045	0.029	0.015	0.000
MEI	3.512	3.527	3.542	3.557	3.571
%MEI	98.32	98.75	99.18	99.59	100.00

Table (4)

Projections of macro equality indicators of HDI for EU countries during 2014-2024 of targets, maximum equals 0.95 and minimum equals 0.85

	2014	2015	2016	2017	2018	2019
*ECC between		-0.84889	-0.84144	-0.83346	-0.82494	-0.81580
SM	3.571	3.571	3.571	3.571	3.571	3.571
SSD	0.159	0.154	0.149	0.145	0.141	0.137
ME	3.413	3.418	3.422	3.426	3.430	3.434
%MEI	95.56	95.69	95.82	95.94	96.05	96.16

Table (4) continued

	2020	2021	2022	2023	2024
*ECC between	-0.80602	-0.79552	-0.78426	-0.77217	-0.75917
SM	3.571	3.571	3.571	3.571	3.571
SSD	0.133	0.130	0.127	0.124	0.121
MEI	3.438	3.442	3.445	3.448	3.451
%MEI	96.27	96.36	96.46	96.54	96.62

*At significant level below 0.05

Figure (1)

The projected HDI values for the EU countries from 2014 to 2024 based on HDI target of 0.95
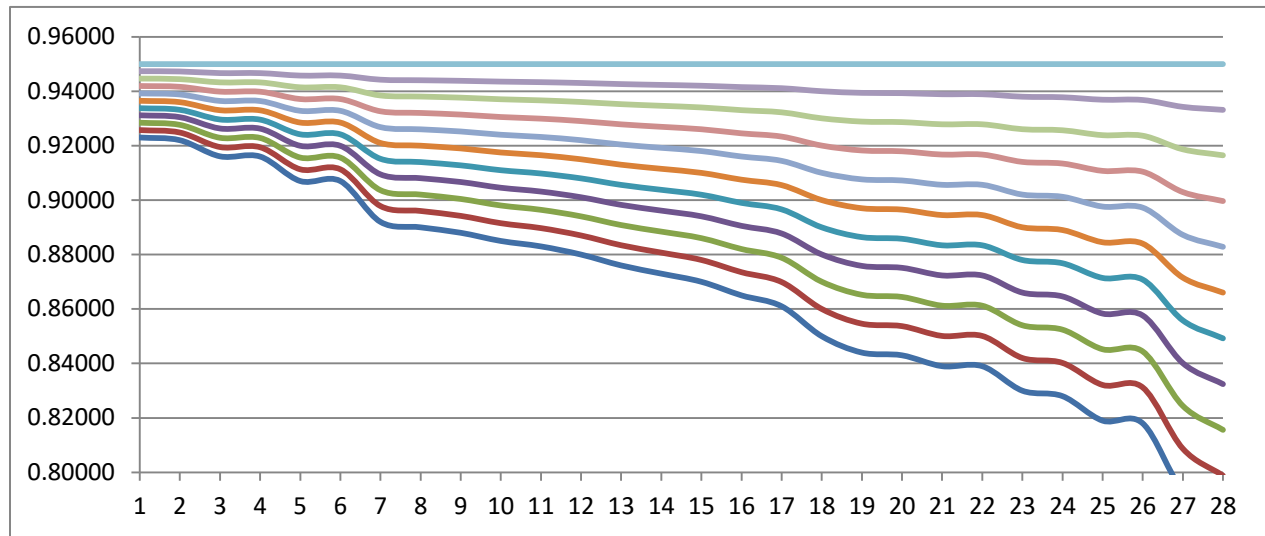
The lines represent the projected values of HDI in the years from 2014 up to 2024

Figure (2)

The projected HDI values for the EU countries from 2014 to 2024 based on HDI targets of 0.95 maximum and 0.85 minimum
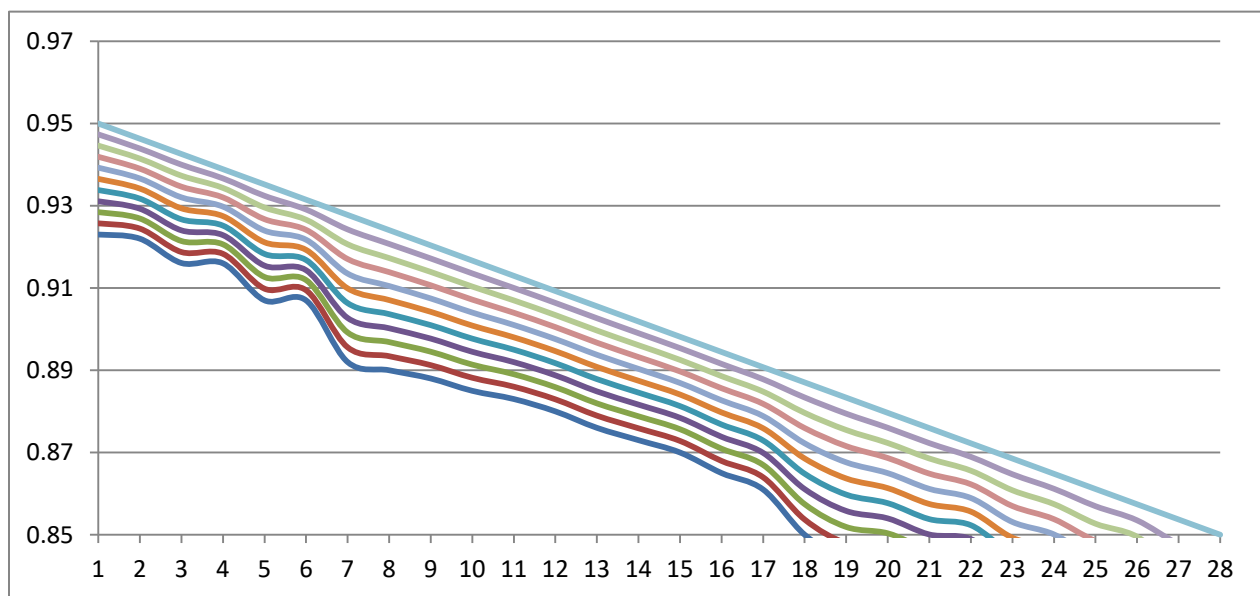
The lines represent the projected values of HDI in the years from 2014 up to 2024

Findings: 2 – The World

Levels: Table (5) presents the macro equality indicators of human development levels for the World and EU Countries in 2014. The summary of findings is presented below:

- The Macro Equality Index in human development among world countries in 2014 was found to be 77.66% which was far lower than that of the EU countries (95.56).

- The group of world countries with high human development levels (56 countries) experienced the highest macro equality level of HDI among them in 2014 (%MEI = 96.36%) compared to other groups.

- The group of world countries with low human development levels (44 countries) experienced the lowest macro equality level of HDI among them in 2014 (MEI% = 88.88%) compared to other groups.

- Macro equality level among countries with very high human development levels in 2014 (%MEI = 95.7%) was almost the same as that of EU countries (%MEI = 95.6%).

Previous trend: Table (6) presents the macro equality indicators of human development level for the World and EU countries in 2010 & 2014. The summary of findings is presented below:

- Macro Equality Index of human development level for the world countries increased during 2010-2014 from 76.85% in 2010 to 77.66% in 2014. This increase was obtained by ECC values of -0.285 ECC during this period.

- For the five groups world countries the variability in human development levels decreased in all groups between the years 2010-2014 with different levels of change. The highest increase in MEI was shown by the median HD level group (from 92.92% in 2010 to 93.28% in 2014) with ECC value equals -0.248. The lowest change was shown by the high HD level

group (from 96.21% in 2010 to 96.36% in 2014) with ECC value equals -0.250.

- It should be noted here that the ECC values are not comparable between groups of countries because the total numbers of countries in these groups are not equal.

- The Appendices from 8 to 11 present the human development indices for the four world groups in the years from 2010 to 2014 and the percentages from which the macro-equality indicators are calculated.

Table (5)

Micro equality indicators of human development for the World in 2014

Region	All	Low	Median	High	Very High
Number	188	44	39	56	49
SM	0.532	2.273	2.564	1.786	2.041
SSD	0.119	0.253	0.172	0.065	0.088
MEI	0.413	2.020	2.392	1.721	1.953
%MEI	77.66	88.88	93.28	96.36	95.70

Table (6)

Macro equality indicators of human development level for the World in 2010 & 2014

Region	All	Low	Median	High	Very High
Number	188	44	39	56	49
MEI 2010	0.408 (76.85%)	2.013 (88.58%)	2.382 (92.92%)	1.718 (96.21%)	1.947 (95.40%)
MEI 2014	0.413 (77.66%)	2.020 (88.88%)	2.392 (93.28%)	1.721 (96.36%)	1.953 (95.70%)
ECC	-0.285	-0.048	-0.248	-0.250	-0.418

The macro-equality monitoring system model

In this section we introduce the EXCEL worksheet system that we developed to facilitate macro-equality monitoring through time. The system consists of two components:

The system from actual data: This component is based on data on the variable of concern for the different units at specific reference time. The data would be sorted in descending order. The system inputs are the number of units of the concerned region, the required upper target value for the highest base-value unit, and the required lower target value for the lowest base-value unit. The system automatically generates the future values of the variable of concern for the other units along with the macro-equality indices, (See Worksheet (1)).

The variable values for the units in the different years between the reference-date and the future-target date could be calculated as in equation (3) in the projections section.

The following worksheet presents the application of this system component on the HDI values for the EU countries in 2014 with upper and lower future targets of HDI equals 0.95 and 0.85 respectively. The inputs are the figures in the un-shaded cells while the outputs are the figures in the shaded cells. As shown in the example the HDI values for the 28 EU members at the future target time is decreasing gradually from 0.95 to 0.85 by decrement equals 0.003704. With this upper and lower target of HDI values the equality level measured by %MEI for the EU countries increases from 95.56% in 2014 to 96.61% in the future with ECC development level of -0.8489 as the table shows.

Worksheet (1)
EXCEL Worksheet of The system from actual data

	A	B	C	D	E	F
1	Country Code	HDI	Target	Difference	HDI %	HDI%
2		2014	future		2014	future
3	1	0.923	0.9500	0.027	3.807900	3.769841
4	2	0.922	0.9463	0.024	3.803775	3.755144
5	3	0.916	0.9426	0.027	3.779021	3.740447
6	4	0.916	0.9389	0.023	3.779351	3.725750
7	5	0.907	0.9352	0.028	3.741891	3.711052
8	6	0.907	0.9315	0.024	3.741891	3.696355
9	7	0.892	0.9278	0.036	3.680008	3.681658
10	8	0.890	0.9241	0.034	3.671757	3.666961
11	9	0.888	0.9204	0.032	3.663505	3.652263
12	10	0.885	0.9167	0.032	3.651129	3.637566
13	11	0.883	0.9130	0.030	3.642878	3.622869
14	12	0.880	0.9093	0.029	3.630501	3.608172
15	13	0.876	0.9056	0.030	3.613999	3.593474
16	14	0.873	0.9019	0.029	3.601622	3.578777
17	15	0.870	0.8981	0.028	3.589245	3.564080
18	16	0.865	0.8944	0.029	3.568617	3.549383
19	17	0.861	0.8907	0.030	3.552115	3.534685
20	18	0.850	0.8870	0.037	3.506734	3.519988
21	19	0.844	0.8833	0.039	3.481980	3.505291
22	20	0.843	0.8796	0.037	3.477855	3.490594
23	21	0.839	0.8759	0.037	3.461353	3.475897
24	26	0.839	0.8722	0.033	3.461353	3.461199
25	28	0.830	0.8685	0.039	3.424222	3.446502
26	25	0.828	0.8648	0.037	3.415971	3.431805
27	27	0.819	0.8611	0.042	3.378841	3.417108
28	23	0.818	0.8574	0.039	3.374716	3.402410
29	24	0.793	0.8537	0.061	3.271576	3.387713
30	22	0.782	0.850	0.068	3.226195	3.373016
31	Total	24.239	25.200		100.000	100.000
32				SM	3.571429	3.571429
33				SSD	0.158575	0.120899
34				MEI	3.412854	3.450529
35				%MEI	95.560	96.615
36				Equality Correlation coefficient =		-0.8489
37						
38						
39		N. Units	Upper HDI	Lower HDI	Decrement	
40		28	0.95	0.85	0.0037037	

The system from quadratic equations: This component based on two quadratic equations derived from regression analysis operation. These equations aimed to predict the expected ECC value from a specific decrement of the unit's variable from a fixed highest target value, or vice versa. The regression operation correlates different hypothetical decrements from a fixed target value of the concerned variable with the corresponding ECC values between the base and target points of time. The worksheet consists of two parts; the first one when the decrement variable is the dependent variable, and the second one when the ECC variable is the dependent variable (See worksheet 2).

The method of deriving the quadratic equations is as follows:

1. The values of the concerned variable for the region' units at the most recent point of time are sorted in ascending order.
2. A hypothetical future upper limit target is fixed for the unit acquired the highest value of the variable.
3. A hypothetical series (D) of decrements from the upper limit value are calculated by arithmetic progression starting from 0.05 / (n-1) and increasing by 0.005 / (n-1), where n is the number of units.
4. A set of ECC values are calculated from the association between the values of the variable at the reference time and the differences from different D values.
5. Tow regression quadratic equations are obtained by regressing D and ECC variables mutually as dependent variables. This would be done by bargaining the operation with different numbers of units for each dependent variable to get the best fit.

We applied this system for the EU countries using data on human development indices for the EU members in 2014, and taking the maximum target of HDI equals 0.95. The regression operation includes 8 cases when ECC is the dependent variable and 9 cases when D is the dependent variable. With this number of cases R squared value reached 0.997 for the first operation and 0.984 for the second operation. The system predicts

first, the ECC value corresponds to a specific pace of decrease of the HDI values for the EU countries from the fixed maximum target value. Second, the decrement value corresponds to a specific ECC value. The following worksheet presents the model of the system. The input values along with the quadratic curves of the two operations are shown in worksheet (3) at the end of this section.

Worksheet (2)
The EXCEL Worksheet System from Quadratic Regression Fit

ECC as Dependent variable				Decrement as Dependent variable			
8 cases				9 cases			
constant	b1	b2	R squared	constant	b1	b2	R squared
-0.892	-107.243	28565.808	0.997	-0.286	-0.623	-0.335	0.984

INPUT	OUTPUT		INPUT	OUTPUT
Decrement	ECC		ECC	Decrement
0.003	-0.957		-0.957	0.00307

ECC = -0.892 -107.243*decrement + 28565.808*decrement^2 Decrement = -0.286 -0.623*ECC -0.335*ECC^2

As shown above the left hand side part of the system presents the quadratic regression coefficients and R squired value when the ECC is dependent variable, and the right hand side part presents the coefficients and R squired value when the decrement is the dependent variable. In this example, according to the underlying data of the system, equality in human development across the EU countries would improve by ECC equals -0.957 between the base-time and target-time when the pace of decrease of the HDI from the highest value (0.95) taken to be 0.003; and the same value of ECC would yield HDI decrement of 0.00307 from the highest value at the target time.

Worksheet (3)
Quadratic Regression data and curves

Quadratic Regression Inputs

S. N	Decrement	ECC
1	0.001852	-0.99379
2	0.002037	-0.99146
3	0.002222	-0.98834
4	0.002407	-0.98416
5	0.002593	-0.97851
6	0.002778	-0.97082
7	0.002963	-0.9602
8	0.003148	-0.94534
9	0.003333	-0.92421

Quadratic Curve when ECC as Dependent Variable
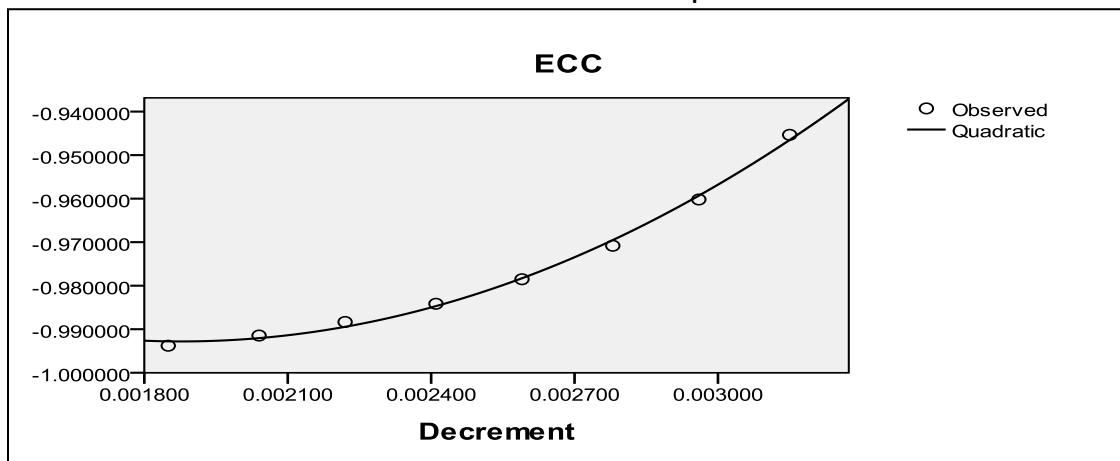
Quadratic Curve when Decrement as Dependent Variable
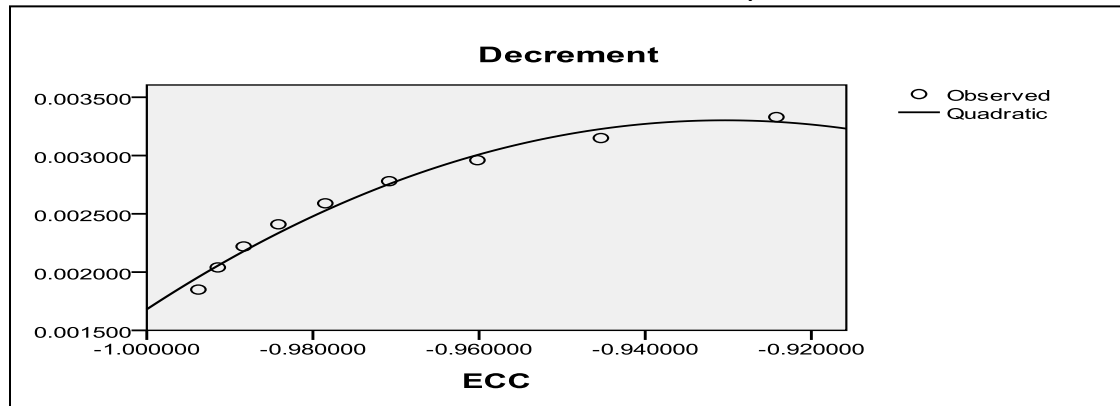
Conclusions

- According to our MEI indicator longevity reported the highest level of equality among the EU countries of the three human development components in 2014, followed by education. Equality level in economical status was considerably low compared to longevity and education. The high level of equality in longevity among these countries could be attributed to the inertial trend of life expectancy at birth toward the maximum life span.
- According to our MEI and ECC values equality level in human development among EU countries dropped very slightly between 2010 and 2011 and increased gradually with slight pace during 2011-2014 showing insignificant value of ECC. The insignificant ECC indicates that the development of equality during these periods was by self-determined scenario rather by deliberate action scenario.
- The projections of human development levels for the EU countries between 2014 and 2024 using the fixed and varied targets scenarios yielded the following macro equality indices:
  - For the fixed scenarios of target HDI equals 0.95 for all members in 2024: MEI would increase from 3.413 (95.56%) in 2014 to 3.571 (100%) in 2024.
  - For the varied scenario of maximum HDI = 0.95 and minimum HDI=0.85: MEI would increase from 3.413 (95.56%) in 2014 to 3.451 (96.62) in 2024.
- Equality level in human development among world countries with high development levels was reported to be higher than those with low development levels. A slight increase in equality level of this variable reported among all three groups during 2011-2014.
- An EXCEL worksheet system of two components has been developed to monitor macro-equality development through time. The first component is based on the concerned variable values at a base reference time to obtain the target values at future time, along with the macro equality indicators; the second component based on two quadratic equations emerged from regression operations; the first one to predict the ECC value from the required pace of decrease of the variable values from a fixed upper target; and the second one to predict this pace of decrease from the required ECC value.

Appendices

Appendix (1)

EU Countries by Human Development Index, Life Expectancy at Birth, Mean Years of Schooling and GNP per Capita as in 2014

Serial Number	Country	Human Development Index (HDI) Value	Life expectancy at birth (years)	Mean years of schooling (years)	Gross national income (GNI) per capita (2011 PPP $)
1	Denmark	0.923	80.2	12.7	44,025
2	Netherlands	0.922	81.6	11.9	45,435
3	Germany	0.916	80.9	13.1	43,919
4	Ireland	0.916	80.9	12.2	39,568
5	Sweden	0.907	82.2	12.1	45,636
6	United Kingdom	0.907	80.7	13.1	39,267
7	Luxembourg	0.892	81.7	11.7	58,711
8	Belgium	0.890	80.8	11.3	41,187
9	France	0.888	82.2	11.1	38,056
10	Austria	0.885	81.4	10.8	43,869
11	Finland	0.883	80.8	10.3	38,695
12	Slovenia	0.880	80.4	11.9	27,852
13	Spain	0.876	82.6	9.6	32,045
14	Italy	0.873	83.1	10.1	33,030
15	Czech Republic	0.870	78.6	12.3	26,660
16	Greece	0.865	80.9	10.3	24,524
17	Estonia	0.861	76.8	12.5	25,214
18	Cyprus	0.850	80.2	11.6	28,633
19	Slovakia	0.844	76.3	12.2	25,845
20	Poland	0.843	77.4	11.8	23,177
21	Lithuania	0.839	73.3	12.4	24,500
22	Bulgaria	0.782	74.2	10.6	15,596
23	Croatia	0.818	77.3	11.0	19,409
24	Romania	0.793	74.7	10.8	18,108
25	Hungary	0.828	75.2	11.6	22,916
26	Malta	0.839	80.6	10.3	27,930
27	Latvia	0.819	74.2	11.5	22,281
28	Portugal	0.830	80.9	8.2	25,757

Appendix (2)
EU Countries by Human Development Index as in the Years from 2010 to 2014

Country	Human Development Index (HDI)				
	2010	2011	2012	2013	2014
Denmark	0.908	0.92	0.921	0.923	0.923
Netherlands	0.909	0.919	0.92	0.92	0.922
Germany	0.906	0.911	0.915	0.915	0.916
Ireland	0.909	0.91	0.912	0.916	0.916
Sweden	0.901	0.903	0.904	0.905	0.907
United Kingdom	0.906	0.901	0.901	0.902	0.907
Luxembourg	0.886	0.888	0.888	0.89	0.892
Belgium	0.883	0.886	0.889	0.888	0.89
France	0.881	0.884	0.886	0.887	0.888
Austria	0.879	0.881	0.884	0.884	0.885
Finland	0.878	0.881	0.882	0.882	0.883
Slovenia	0.876	0.877	0.878	0.878	0.88
Spain	0.867	0.87	0.874	0.874	0.876
Italy	0.869	0.873	0.872	0.873	0.873
Czech Republic	0.863	0.866	0.867	0.868	0.87
Greece	0.866	0.864	0.865	0.863	0.865
Estonia	0.838	0.849	0.855	0.859	0.861
Cyprus	0.848	0.852	0.852	0.85	0.85
Slovakia	0.827	0.832	0.836	0.839	0.844
Poland	0.829	0.833	0.838	0.84	0.843
Lithuania	0.827	0.831	0.833	0.837	0.839
Bulgaria	0.773	0.775	0.778	0.779	0.782
Croatia	0.807	0.814	0.817	0.817	0.818
Romania	0.784	0.786	0.788	0.791	0.793
Hungary	0.821	0.823	0.823	0.825	0.828
Malta	0.824	0.822	0.83	0.837	0.839
Latvia	0.811	0.812	0.813	0.816	0.819
Portugal	0.819	0.825	0.827	0.828	0.83

Appendix (3)
Calculation of Macro-Equality Indices on HDI, Life Expectancy at Birth, Mean Years of Education and Per Capita GNP for the EUCs as in 2014

Country	HDI%	LE %	M sch yr	GNP/C%
Denmark	3.8095179	3.6124499	3.9900868	4.8817051
Netherlands	3.8031871	3.6755101	3.7267579	5.0380104
Germany	3.7796136	3.64398	4.0958429	4.8698465
Ireland	3.7773925	3.64398	3.8241476	4.3874567
Sweden	3.741394	3.7025359	3.7912923	5.0602301
United Kingdom	3.740906	3.6349714	4.0919777	4.3540885
Luxembourg	3.6796512	3.6800144	3.671801	6.5101323
Belgium	3.6730967	3.6394757	3.5336578	4.5669639
France	3.6642032	3.7025359	3.4897381	4.2198267
Austria	3.6514949	3.6665015	3.3961035	4.8643856
Finland	3.6420076	3.6394757	3.2241952	4.2906163
Slovenia	3.6319118	3.6214585	3.7277602	3.0883469
Spain	3.6147626	3.7205531	3.0034946	3.5532506
Italy	3.6019669	3.7430746	3.1664696	3.6625116
Czech Republic	3.5898693	3.5403811	3.8617621	2.9561884
Greece	3.5696375	3.64398	3.2160454	2.7193262
Estonia	3.5516811	3.4593036	3.9119149	2.7958197
Cyprus	3.5059271	3.6124499	3.6421196	3.1749014
Slovakia	3.4804569	3.4367821	3.8325799	2.8658186
Poland	3.4767672	3.4863294	3.7063924	2.5699272
Lithuania	3.4633336	3.3016531	3.8815506	2.7166836
Bulgaria	3.2250796	3.3421918	3.3118213	1.729344
Croatia	3.3730516	3.4818251	3.4563715	2.1521942
Romania	3.2709678	3.3647133	3.3781414	2.0078759
Hungary	3.4176545	3.3872348	3.6473842	2.540983
Malta	3.4615037	3.6304671	3.2379872	3.0970127
Latvia	3.3781105	3.3421918	3.5981369	2.4705441
Portugal	3.4248535	3.64398	2.5844673	2.8560097
	100.0	100.0	100.0	100.0
SM	3.5714286	3.5714286	3.5714286	3.5714286
SSD	0.1587458	0.1309398	0.3475799	1.1624488
MEI	3.4126827	3.4404887	3.2238487	2.4089797
MEI%	95.555117	96.333685	90.267764	67.451433

Appendix (4)
Calculation of Macro-Equality Indices on HDI for the EU Countries as in the years from 2010 to 2014

Country	2010	2011	2012	2013	2014
	%	%	%	%	%
Denmark	3.7841217	3.8193291	3.8139805	3.8162573	3.8079003
Netherlands	3.7882892	3.8151777	3.8098393	3.8038535	3.8037747
Germany	3.7757866	3.7819661	3.7891337	3.7831804	3.7790213
Ireland	3.7882892	3.7778147	3.7767103	3.787315	3.779351
Sweden	3.7549489	3.7487546	3.7435812	3.7418341	3.7418912
United Kingdom	3.7757866	3.7404517	3.7311579	3.7294302	3.7418912
Luxembourg	3.6924359	3.6864829	3.6773232	3.6798148	3.6800077
Belgium	3.6799333	3.67818	3.6814643	3.6715455	3.6717565
France	3.6715982	3.6698771	3.6690409	3.6674109	3.6635054
Austria	3.6632632	3.6574228	3.6607587	3.655007	3.6511287
Finland	3.6590956	3.6574228	3.6524764	3.6467378	3.6428775
Slovenia	3.6507606	3.640817	3.6359119	3.6301993	3.6305008
Spain	3.6132528	3.6117569	3.6193474	3.6136608	3.6139986
Italy	3.6215878	3.6242112	3.6110651	3.6095262	3.6016219
Czech Republic	3.5965826	3.5951511	3.5903595	3.5888531	3.5892452
Greece	3.6090852	3.5868482	3.5820772	3.5681799	3.5686173
Estonia	3.4923942	3.5245766	3.5406659	3.5516414	3.552115
Cyprus	3.5340696	3.5370309	3.5282425	3.5144298	3.5067338
Slovakia	3.4465514	3.454002	3.4619844	3.468949	3.4819804
Poland	3.4548864	3.4581534	3.4702667	3.4730836	3.4778548
Lithuania	3.4465514	3.4498505	3.449561	3.4606797	3.4613525
Bulgaria	3.2215045	3.2173696	3.2217989	3.2208716	3.2261951
Croatia	3.3632007	3.379276	3.383303	3.3779873	3.3747156
Romania	3.2673474	3.2630355	3.2632102	3.2704871	3.2715763
Hungary	3.4215462	3.416639	3.4081497	3.4110643	3.4159712
Malta	3.4340488	3.4124875	3.4371377	3.4606797	3.4613525
Latvia	3.3798708	3.3709731	3.3667384	3.3738526	3.3788411
Portugal	3.4132111	3.4249419	3.4247143	3.4234681	3.4242224
	100	100	100	100	100
SM	3.5714286	3.5714286	3.5714286	3.5714286	3.5714286
SSD	0.1650395	0.1655491	0.1629446	0.1605454	0.158575
MEI	3.4064	3.4059	3.4085	3.4109	3.4129
MEI%	95.379	95.365	95.438	95.505	95.560
Duration	2010-2011	2011-2012	2012-2013	2013-2014	2010-2014

Appendix (5)

Calculation of ECC Values of the Correlation between the HDI of the EU Countries at in the years from 2010 to 2014 and Interval Differences

2010	Diff_10_11	2011	Diff_11_12	2012	Diff_12_13	2013	Diff_13_14	2014	Diff_10_14
0.908	0.012	0.920	0.001	0.921	0.002	0.923	0.000	0.923	0.015
0.909	0.010	0.919	0.001	0.920	0.000	0.920	0.002	0.922	0.013
0.906	0.005	0.911	0.004	0.915	0.000	0.915	0.001	0.916	0.010
0.909	0.001	0.910	0.002	0.912	0.004	0.916	0.000	0.916	0.007
0.901	0.002	0.903	0.001	0.904	0.001	0.905	0.002	0.907	0.006
0.906	-0.005	0.901	0.000	0.901	0.001	0.902	0.005	0.907	0.001
0.886	0.002	0.888	0.000	0.888	0.002	0.890	0.002	0.892	0.006
0.883	0.003	0.886	0.003	0.889	-0.001	0.888	0.002	0.890	0.007
0.881	0.003	0.884	0.002	0.886	0.001	0.887	0.001	0.888	0.007
0.879	0.002	0.881	0.003	0.884	0.000	0.884	0.001	0.885	0.006
0.878	0.003	0.881	0.001	0.882	0.000	0.882	0.001	0.883	0.005
0.876	0.001	0.877	0.001	0.878	0.000	0.878	0.002	0.880	0.004
0.867	0.003	0.870	0.004	0.874	0.000	0.874	0.002	0.876	0.009
0.869	0.004	0.873	-0.001	0.872	0.001	0.873	0.000	0.873	0.004
0.863	0.003	0.866	0.001	0.867	0.001	0.868	0.002	0.870	0.007
0.866	-0.002	0.864	0.001	0.865	-0.002	0.863	0.002	0.865	-0.001
0.838	0.011	0.849	0.006	0.855	0.004	0.859	0.002	0.861	0.023
0.848	0.004	0.852	0.000	0.852	-0.002	0.850	0.000	0.850	0.002
0.827	0.005	0.832	0.004	0.836	0.003	0.839	0.005	0.844	0.017
0.829	0.004	0.833	0.005	0.838	0.002	0.840	0.003	0.843	0.014
0.827	0.004	0.831	0.002	0.833	0.004	0.837	0.002	0.839	0.012
0.773	0.002	0.775	0.003	0.778	0.001	0.779	0.003	0.782	0.009
0.807	0.007	0.814	0.003	0.817	0.000	0.817	0.001	0.818	0.011
0.784	0.002	0.786	0.002	0.788	0.003	0.791	0.002	0.793	0.009
0.821	0.002	0.823	0.000	0.823	0.002	0.825	0.003	0.828	0.007
0.824	-0.002	0.822	0.008	0.830	0.007	0.837	0.002	0.839	0.015
0.811	0.001	0.812	0.001	0.813	0.003	0.816	0.003	0.819	0.008
0.819	0.006	0.825	0.002	0.827	0.001	0.828	0.002	0.830	0.011
2010 - 2011	ECC 0.0298	2011 - 2012	ECC -0.2866	2012 - 2013	ECC -0.2868	2013 - 2014	ECC -0.3277	2010 - 2014	ECC -0.2878

Appendix (6)
Projections of HDI for EUCs 2014-2024 for HDI Target = 0.95

Country Code	2014	2015	2016	2017	2018	2019
1	0.9230	0.9257	0.9284	0.9311	0.9338	0.9365
2	0.9220	0.9248	0.9276	0.9304	0.9332	0.9360
3	0.9160	0.9194	0.9228	0.9262	0.9296	0.9330
4	0.9161	0.9195	0.9229	0.9263	0.9296	0.9330
5	0.9070	0.9113	0.9156	0.9199	0.9242	0.9285
6	0.9070	0.9113	0.9156	0.9199	0.9242	0.9285
7	0.8920	0.8978	0.9036	0.9094	0.9152	0.9210
8	0.8900	0.8960	0.9020	0.9080	0.9140	0.9200
9	0.8880	0.8942	0.9004	0.9066	0.9128	0.9190
10	0.8850	0.8915	0.8980	0.9045	0.9110	0.9175
11	0.8830	0.8897	0.8964	0.9031	0.9098	0.9165
12	0.8800	0.8870	0.8940	0.9010	0.9080	0.9150
13	0.8760	0.8834	0.8908	0.8982	0.9056	0.9130
14	0.8730	0.8807	0.8884	0.8961	0.9038	0.9115
15	0.8700	0.8780	0.8860	0.8940	0.9020	0.9100
16	0.8650	0.8735	0.8820	0.8905	0.8990	0.9075
17	0.8610	0.8699	0.8788	0.8877	0.8966	0.9055
18	0.8500	0.8600	0.8700	0.8800	0.8900	0.9000
19	0.8440	0.8546	0.8652	0.8758	0.8864	0.8970
20	0.8430	0.8537	0.8644	0.8751	0.8858	0.8965
21	0.8390	0.8501	0.8612	0.8723	0.8834	0.8945
26	0.8390	0.8501	0.8612	0.8723	0.8834	0.8945
28	0.8300	0.8420	0.8540	0.8660	0.8780	0.8900
25	0.8280	0.8402	0.8524	0.8646	0.8768	0.8890
27	0.8190	0.8321	0.8452	0.8583	0.8714	0.8845
23	0.8180	0.8312	0.8444	0.8576	0.8708	0.8840
24	0.7930	0.8087	0.8244	0.8401	0.8558	0.8715
22	0.7820	0.7988	0.8156	0.8324	0.8492	0.8660

Appendix (6) continued

Country Code	2020	2021	2022	2023	2024
1	0.9392	0.9419	0.9446	0.9473	0.95
2	0.9388	0.9416	0.9444	0.9472	0.95
3	0.9364	0.9398	0.9432	0.9466	0.95
4	0.9364	0.9398	0.9432	0.9466	0.95
5	0.9328	0.9371	0.9414	0.9457	0.95
6	0.9328	0.9371	0.9414	0.9457	0.95
7	0.9268	0.9326	0.9384	0.9442	0.95
8	0.9260	0.9320	0.9380	0.9440	0.95
9	0.9252	0.9314	0.9376	0.9438	0.95
10	0.9240	0.9305	0.9370	0.9435	0.95
11	0.9232	0.9299	0.9366	0.9433	0.95
12	0.9220	0.9290	0.9360	0.9430	0.95
13	0.9204	0.9278	0.9352	0.9426	0.95
14	0.9192	0.9269	0.9346	0.9423	0.95
15	0.9180	0.9260	0.9340	0.9420	0.95
16	0.9160	0.9245	0.9330	0.9415	0.95
17	0.9144	0.9233	0.9322	0.9411	0.95
18	0.9100	0.9200	0.9300	0.9400	0.95
19	0.9076	0.9182	0.9288	0.9394	0.95
20	0.9072	0.9179	0.9286	0.9393	0.95
21	0.9056	0.9167	0.9278	0.9389	0.95
26	0.9056	0.9167	0.9278	0.9389	0.95
28	0.9020	0.9140	0.9260	0.9380	0.95
25	0.9012	0.9134	0.9256	0.9378	0.95
27	0.8976	0.9107	0.9238	0.9369	0.95
23	0.8972	0.9104	0.9236	0.9368	0.95
24	0.8872	0.9029	0.9186	0.9343	0.95
22	0.8828	0.8996	0.9164	0.9332	0.95

Appendix (7)
Projections of HDI for EUCs 2014-2024 for HDI Targets from 0.95 Down to 0.85

Country Code	2014	2015	2016	2017	2018	2019
1	0.9230	0.9257	0.9284	0.9311	0.9338	0.9365
2	0.9220	0.9244	0.9269	0.9293	0.9317	0.9341
3	0.9160	0.9187	0.9213	0.9240	0.9266	0.9293
4	0.9161	0.9184	0.9206	0.9229	0.9252	0.9275
5	0.9070	0.9098	0.9126	0.9155	0.9183	0.9211
6	0.9070	0.9094	0.9119	0.9143	0.9168	0.9192
7	0.8920	0.8956	0.8992	0.9027	0.9063	0.9099
8	0.8900	0.8934	0.8968	0.9002	0.9036	0.9070
9	0.8880	0.8912	0.8945	0.8977	0.9009	0.9042
10	0.8850	0.8882	0.8913	0.8945	0.8977	0.9008
11	0.8830	0.8860	0.8890	0.8920	0.8950	0.8980
12	0.8800	0.8829	0.8859	0.8888	0.8917	0.8946
13	0.8760	0.8790	0.8819	0.8849	0.8878	0.8908
14	0.8730	0.8759	0.8788	0.8817	0.8845	0.8874
15	0.8700	0.8728	0.8756	0.8784	0.8813	0.8841
16	0.8650	0.8679	0.8709	0.8738	0.8768	0.8797
17	0.8610	0.8640	0.8669	0.8699	0.8729	0.8759
18	0.8500	0.8537	0.8574	0.8611	0.8648	0.8685
19	0.8440	0.8479	0.8519	0.8558	0.8597	0.8637
20	0.8430	0.8467	0.8503	0.8540	0.8577	0.8613
21	0.8390	0.8427	0.8464	0.8501	0.8538	0.8575
26	0.8390	0.8423	0.8456	0.8490	0.8523	0.8556
28	0.8300	0.8339	0.8377	0.8416	0.8454	0.8493
25	0.8280	0.8317	0.8354	0.8390	0.8427	0.8464
27	0.8190	0.8232	0.8274	0.8316	0.8358	0.8401
23	0.8100	0.8219	0.8259	0.8298	0.8338	0.8377
24	0.7930	0.7991	0.8051	0.8112	0.8173	0.8234
22	0.7820	0.7888	0.7956	0.8024	0.8092	0.8160

Appendix (7) continued

Country Code	2020	2021	2022	2023	2024
1	0.9392	0.9419	0.9446	0.9473	0.950
2	0.9366	0.9390	0.9414	0.9439	0.946
3	0.9320	0.9346	0.9373	0.9399	0.943
4	0.9298	0.9320	0.9343	0.9366	0.939
5	0.9239	0.9267	0.9295	0.9324	0.935
6	0.9217	0.9241	0.9266	0.9290	0.931
7	0.9135	0.9170	0.9206	0.9242	0.928
8	0.9104	0.9139	0.9173	0.9207	0.924
9	0.9074	0.9107	0.9139	0.9171	0.920
10	0.9040	0.9072	0.9103	0.9135	0.917
11	0.9010	0.9040	0.9070	0.9100	0.913
12	0.8976	0.9005	0.9034	0.9063	0.909
13	0.8937	0.8967	0.8996	0.9026	0.906
14	0.8903	0.8932	0.8961	0.8990	0.902
15	0.8869	0.8897	0.8925	0.8953	0.898
16	0.8827	0.8856	0.8886	0.8915	0.894
17	0.8788	0.8818	0.8848	0.8878	0.891
18	0.8722	0.8759	0.8796	0.8833	0.887
19	0.8676	0.8715	0.8755	0.8794	0.883
20	0.8650	0.8686	0.8723	0.8760	0.880
21	0.8612	0.8648	0.8685	0.8722	0.876
26	0.8623	0.8656	0.8689	0.8722	0.8722
28	0.8570	0.8608	0.8647	0.8685	0.8685
25	0.8538	0.8575	0.8611	0.8648	0.8648
27	0.8485	0.8527	0.8569	0.8611	0.8611
23	0.8456	0.8495	0.8535	0.8574	0.8574
24	0.8355	0.8416	0.8476	0.8537	0.8537
22	0.8296	0.8364	0.8432	0.8500	0.8500

Appendix (8)
HID Values of the World Countries (Very High Group) as in 2010 and 2014, and the Calculation of MEI Levels in these Years and ECC Value between 2010 & 2014

Country	2010	2014	Diff_10-14	2010%	2014%
Norway	0.9400	0.9440	0.0040	2.2183	2.2026
Australia	0.9270	0.9350	0.0080	2.1876	2.1816
Switzerland	0.9240	0.9300	0.0060	2.1805	2.1699
Denmark	0.9080	0.9230	0.0150	2.1428	2.1536
Netherlands	0.9090	0.9220	0.0130	2.1451	2.1512
Germany	0.9060	0.9160	0.0100	2.1381	2.1372
Ireland	0.9080	0.9160	0.0080	2.1428	2.1372
United States	0.9090	0.9150	0.0060	2.1451	2.1349
Canada	0.9030	0.9130	0.0100	2.1310	2.1302
New Zealand	0.9050	0.9130	0.0080	2.1357	2.1302
Singapore	0.8970	0.9120	0.0150	2.1168	2.1279
Hong Kong, China (SAR)	0.8980	0.9100	0.0120	2.1192	2.1232
Liechtenstein	0.9020	0.9080	0.0060	2.1286	2.1186
Sweden	0.9010	0.9070	0.0060	2.1263	2.1162
UK	0.9060	0.9070	0.0010	2.1381	2.1162
Iceland	0.8920	0.8990	0.0070	2.1050	2.0976
Korea (R)	0.8860	0.8980	0.0120	2.0909	2.0952
Israel	0.8830	0.8940	0.0110	2.0838	2.0859
Luxembourg	0.8860	0.8920	0.0060	2.0909	2.0812
Japan	0.8840	0.8910	0.0070	2.0861	2.0789
Belgium	0.8830	0.8900	0.0070	2.0838	2.0766
France	0.8810	0.8880	0.0070	2.0791	2.0719
Austria	0.8790	0.8850	0.0060	2.0743	2.0649
Finland	0.8780	0.8830	0.0050	2.0720	2.0602
Slovenia	0.8760	0.8800	0.0040	2.0673	2.0532
Spain	0.8670	0.8760	0.0090	2.0460	2.0439
Italy	0.8690	0.8730	0.0040	2.0507	2.0369
Czech Republic	0.8630	0.8700	0.0070	2.0366	2.0299
Greece	0.8660	0.8650	-0.0010	2.0437	2.0182
Estonia	0.8380	0.8610	0.0230	1.9776	2.0089
Brunei Darussalam	0.8430	0.8560	0.0130	1.9894	1.9972
Cyprus	0.8480	0.8500	0.0020	2.0012	1.9832
Qatar	0.8440	0.8500	0.0060	1.9917	1.9832
Andorra	0.8230	0.8450	0.0220	1.9422	1.9716
Slovakia	0.8270	0.8440	0.0170	1.9516	1.9692
Poland	0.8290	0.8430	0.0140	1.9563	1.9669
Lithuania	0.8270	0.8390	0.0120	1.9516	1.9576
Malta	0.8240	0.8390	0.0150	1.9445	1.9576
Saudi Arabia	0.8050	0.8370	0.0320	1.8997	1.9529
Argentina	0.8110	0.8360	0.0250	1.9139	1.9506
United Arab Emirates	0.8280	0.8350	0.0070	1.9540	1.9482
Chile	0.8140	0.8320	0.0180	1.9209	1.9412
Portugal	0.8190	0.8300	0.0110	1.9327	1.9366
Hungary	0.8210	0.8280	0.0070	1.9375	1.9319

Country	2010	2014	Diff_10-14	2010%	2014%
Bahrain	0.8190	0.8240	0.0050	1.9327	1.9226
Latvia	0.8110	0.8190	0.0080	1.9139	1.9109
Croatia	0.8070	0.8180	0.0110	1.9044	1.9086
Kuwait	0.8090	0.8160	0.0070	1.9091	1.9039
Montenegro	0.7920	0.8020	0.0100	1.8690	1.8713
SM=				2.040816	2.040816
SSD=				0.087772	0.093939
MEI=				1.95304	1.94689
%MEI=				95.70%	95.40%
ECC = -0.418					

Appendix (9)
HID Values of the World Countries (High Group) as in 2010 and 2014, and the Calculation of MEI Levels in these Years and ECC Value between 2010 & 2014

Country	2010	2011	Diff_10-14	2010%	2014%
Belarus	0.7860	0.7980	0.0120	1.8962	1.8965
Russian (F)	0.7830	0.7980	0.0150	1.8889	1.8965
Oman	0.7950	0.7930	-0.0020	1.9179	1.8846
Romania	0.7840	0.7930	0.0090	1.8913	1.8846
Uruguay	0.7800	0.7930	0.0130	1.8817	1.8846
Bahamas	0.7740	0.7900	0.0160	1.8672	1.8775
Kazakhstan	0.7660	0.7880	0.0220	1.8479	1.8727
Barbados	0.7800	0.7850	0.0050	1.8817	1.8656
..	0.7820	0.7830	0.0010	1.8865	1.8608
Bulgaria	0.7730	0.7820	0.0090	1.8648	1.8585
Palau	0.7670	0.7800	0.0130	1.8503	1.8537
Panama	0.7610	0.7800	0.0190	1.8359	1.8537
Malaysia	0.7690	0.7790	0.0100	1.8552	1.8513
Mauritius	0.7560	0.7770	0.0210	1.8238	1.8466
Seychelles	0.7430	0.7720	0.0290	1.7924	1.8347
	0.7720	0.7720	0.0000	1.8624	1.8347
Serbia	0.7570	0.7710	0.0140	1.8262	1.8323
Cuba	0.7780	0.7690	-0.0090	1.8769	1.8276
Lebanon	0.7560	0.7690	0.0130	1.8238	1.8276
Costa Rica	0.7500	0.7660	0.0160	1.8093	1.8204
Iran (I R)	0.7430	0.7660	0.0230	1.7924	1.8204
	0.7570	0.7620	0.0050	1.8262	1.8109
Turkey	0.7380	0.7610	0.0230	1.7804	1.8085
Sri Lanka	0.7380	0.7570	0.0190	1.7804	1.7990
Mexico	0.7460	0.7560	0.0100	1.7997	1.7967
Brazil	0.7370	0.7550	0.0180	1.7780	1.7943
Georgia	0.7350	0.7540	0.0190	1.7731	1.7919
Saint Kitts and Nevis..	0.7390	0.7520	0.0130	1.7828	1.7872
Azerbaijan	0.7410	0.7510	0.0100	1.7876	1.7848
Grenada	0.7370	0.7500	0.0130	1.7780	1.7824
Jordan	0.7430	0.7480	0.0050	1.7924	1.7777

Country	2010	2014	Diff_10-14	2010%	2014%
	0.7380	0.7470	0.0090	1.7804	1.7753
Ukraine	0.7320	0.7470	0.0150	1.7659	1.7753
Algeria	0.7250	0.7360	0.0110	1.7490	1.7491
Peru	0.7180	0.7340	0.0160	1.7321	1.7444
Albania	0.7220	0.7330	0.0110	1.7418	1.7420
Armenia	0.7210	0.7330	0.0120	1.7394	1.7420
Bosnia and Herzegovina	0.7100	0.7330	0.0230	1.7128	1.7420
Ecuador	0.7170	0.7320	0.0150	1.7297	1.7396
Saint Lucia	0.7300	0.7290	-0.0010	1.7611	1.7325
China	0.6990	0.7270	0.0280	1.6863	1.7277
Fiji	0.7170	0.7270	0.0100	1.7297	1.7277
Mongolia	0.6950	0.7270	0.0320	1.6766	1.7277
Thailand	0.7160	0.7260	0.0100	1.7273	1.7254
Dominica	0.7230	0.7240	0.0010	1.7442	1.7206
Libya	0.7560	0.7240	-0.0320	1.8238	1.7206
Tunisia	0.7140	0.7210	0.0070	1.7225	1.7135
Colombia	0.7060	0.7200	0.0140	1.7032	1.7111
	0.7110	0.7200	0.0090	1.7152	1.7111
Jamaica	0.7270	0.7190	-0.0080	1.7538	1.7087
Tonga	0.7130	0.7170	0.0040	1.7201	1.7040
Belize	0.7090	0.7150	0.0060	1.7104	1.6992
Dominican Rep	0.7010	0.7150	0.0140	1.6911	1.6992
SM=				1.785714	1.785714
SSD=				0.064994	0.067663
MEI=				1.7207	1.718
%MEI=				96.36%	96.21%
ECC = -0.2500					

Appendix (10)
HID Values of the World Countries (Median Group) as in 2010 and 2014, and the Calculation of MEI Levels in these Years and ECC Value between 2010 & 2014

Country	2010	2014	Diff_10-14	20.1	20.14
Botswana	0.6810	0.6980	0.0170	2.8260	2.8310
Moldova (Republic of)	0.6720	0.6930	0.0210	2.7886	2.8107
Egypt	0.6810	0.6900	0.0090	2.8260	2.7985
Turkmenistan	0.6660	0.6880	0.0220	2.7637	2.7904
Gabon	0.6630	0.6840	0.0210	2.7513	2.7742
Indonesia	0.6650	0.6840	0.0190	2.7596	2.7742
Paraguay	0.6680	0.6790	0.0110	2.7720	2.7539
Palestine, State of	0.6700	0.6770	0.0070	2.7803	2.7458
Uzbekistan	0.6550	0.6750	0.0200	2.7181	2.7377
Philippines	0.6540	0.6680	0.0140	2.7139	2.7093
El Salvador	0.6530	0.6660	0.0130	2.7098	2.7012
South Africa	0.6430	0.6660	0.0230	2.6683	2.7012
Viet Nam	0.6530	0.6660	0.0130	2.7098	2.7012
Bolivia (Plurinational State of)	0.6410	0.6620	0.0210	2.6600	2.6849

Country	2010	2014	Diff_10-14	20.1	20.14
Kyrgyzstan	0.6340	0.6550	0.0210	2.6309	2.6566
Iraq	0.6450	0.6540	0.0090	2.6766	2.6525
Cabo Verde	0.6290	0.6460	0.0170	2.6102	2.6201
Micronesia (Federated States of)	0.6380	0.6400	0.0020	2.6475	2.5957
Guyana	0.6240	0.6360	0.0120	2.5894	2.5795
Nicaragua	0.6190	0.6310	0.0120	2.5687	2.5592
Morocco	0.6110	0.6280	0.0170	2.5355	2.5470
Namibia	0.6100	0.6280	0.0180	2.5313	2.5470
Guatemala	0.6110	0.6270	0.0160	2.5355	2.5430
Tajikistan	0.6080	0.6240	0.0160	2.5230	2.5308
India	0.5860	0.6090	0.0230	2.4317	2.4700
Honduras	0.6100	0.6060	-0.0040	2.5313	2.4578
Bhutan	0.5730	0.6050	0.0320	2.3778	2.4538
Timor-Leste	0.6000	0.5950	-0.0050	2.4898	2.4132
Syrian Arab Republic	0.6390	0.5940	-0.0450	2.6517	2.4091
Vanuatu	0.5890	0.5940	0.0050	2.4442	2.4091
Congo	0.5540	0.5910	0.0370	2.2989	2.3970
Kiribati	0.5880	0.5900	0.0020	2.4400	2.3929
Equatorial Guinea	0.5910	0.5870	-0.0040	2.4525	2.3808
Zambia	0.5550	0.5860	0.0310	2.3031	2.3767
Ghana	0.5540	0.5790	0.0250	2.2989	2.3483
Lao People's Democratic Republic	0.5390	0.5750	0.0360	2.2367	2.3321
Bangladesh	0.5460	0.5700	0.0240	2.2657	2.3118
Cambodia	0.5360	0.5550	0.0190	2.2243	2.2510
Sao Tome and Principe	0.5440	0.5550	0.0110	2.2574	2.2510
SM=				2.56410	2.56410
SSD=				0.172423	0.18167
MEI=				2.3917	2.382
%MEI=				93.28%	92.92%
ECC = -0.24822					

Appendix (11)
HID Values of the World Countries (Low group) as in 2010 and 2014, and the Calculation of MEI Levels in these Years and ECC Value between 2010 & 2014

	2010	2014	Didd_10-14	2010%	2014%
Kenya	0.5290	0.5480	0.0190	2.6631	2.6616
Nepal	0.5310	0.5480	0.0170	2.6732	2.6616
Pakistan	0.5220	0.5380	0.0160	2.6279	2.6130
Myanmar	0.5200	0.5360	0.0160	2.6178	2.6033
Angola	0.5090	0.5320	0.0230	2.5624	2.5839
Swaziland	0.5250	0.5310	0.0060	2.6430	2.5790
Tanzania (United Republic of)	0.5000	0.5210	0.0210	2.5171	2.5305
Nigeria	0.4930	0.5140	0.0210	2.4819	2.4965
Cameroon	0.4860	0.5120	0.0260	2.4466	2.4868
Madagascar	0.5040	0.5100	0.0060	2.5373	2.4771

Country	2010	2014	Diff_10-14	2010%	2014%
Zimbabwe	0.4610	0.5090	0.0480	2.3208	2.4722
Mauritania	0.4880	0.5060	0.0180	2.4567	2.4576
Solomon Islands	0.4940	0.5060	0.0120	2.4869	2.4576
Papua New Guinea	0.4930	0.5050	0.0120	2.4819	2.4528
Comoros	0.4880	0.5030	0.0150	2.4567	2.4431
Yemen	0.4960	0.4980	0.0020	2.4970	2.4188
Lesotho	0.4720	0.4970	0.0250	2.3762	2.4139
Togo	0.4590	0.4840	0.0250	2.3107	2.3508
Haiti	0.4710	0.4830	0.0120	2.3711	2.3459
Rwanda	0.4530	0.4830	0.0300	2.2805	2.3459
Uganda	0.4730	0.4830	0.0100	2.3812	2.3459
Benin	0.4680	0.4800	0.0120	2.3560	2.3313
Sudan	0.4650	0.4790	0.0140	2.3409	2.3265
Djibouti	0.4530	0.4700	0.0170	2.2805	2.2828
South Sudan	0.4700	0.4670	-0.0030	2.3661	2.2682
Senegal	0.4560	0.4660	0.0100	2.2956	2.2633
Afghanistan	0.4480	0.4650	0.0170	2.2553	2.2585
Côte d'Ivoire	0.4440	0.4620	0.0180	2.2352	2.2439
Malawi	0.4200	0.4450	0.0250	2.1144	2.1613
Ethiopia	0.4120	0.4420	0.0300	2.0741	2.1468
Gambia	0.4410	0.4410	0.0000	2.2201	2.1419
Congo (Democratic Republic of the)	0.4080	0.4330	0.0250	2.0540	2.1031
Liberia	0.4050	0.4300	0.0250	2.0389	2.0885
Guinea-Bissau	0.4130	0.4200	0.0070	2.0791	2.0399
Mali	0.4090	0.4190	0.0100	2.0590	2.0351
Mozambique	0.4010	0.4160	0.0150	2.0187	2.0205
Sierra Leone	0.3880	0.4130	0.0250	1.9533	2.0059
Guinea	0.3880	0.4110	0.0230	1.9533	1.9962
Burkina Faso	0.3780	0.4020	0.0240	1.9029	1.9525
Burundi	0.3900	0.4000	0.0100	1.9634	1.9428
Chad	0.3710	0.3920	0.0210	1.8677	1.9039
Eritrea	0.3810	0.3910	0.0100	1.9180	1.8991
Central African Republic	0.3620	0.3500	-0.0120	1.8224	1.6999
Niger	0.3260	0.3480	0.0220	1.6412	1.6902
SM=				2.2727	2.2727
SSD=				0.25277	0.25944
MEI=				2.0199	2.0133
%MEI=				88.88%	88.58%
ECC = -0.04804					