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CONSTRUCTION OF A STATISTICAL INDEX USING THE MILLENNIUM DEVELOPMENT GOAL INDICATORS AS A MEASURE OF A COUNTRY'S MULTIDIMENSIONAL DEVELOPMENT

by

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ABSTRACT

Economic growth is expected to enhance the policies for poverty reduction and other social problems. But it is not always the case; economic growth doesn't necessarily reflect human development. This situation can be answered by the fact that economic growth is most commonly measured by GDP. Because of this, researchers have formulated different indices that assess economic and human development. Human Development Index (HDI) measures the basic dimensions of human development and does not take into account other indicators of development. With this in mind, this paper aims to construct an alternative measure of a country's performance using Millennium Development Goals indicators. Initial variables that were considered in the study are the different indicators for monitoring progress of the eight Millennium Development Goals. The analysis of data considered only a specific year which has the most number of available indicators. Variables were then subjected to Principal Component Analysis to reduce its dimensionality. The identified principal components with high loadings were used in the construction of the statistical index as an alternative measure of development. Bootstrap samples were generated to check the statistical properties of the index such as unbiasedness, precision, accuracy, and consistency. The proposed index, the Multidimensional Development Index (MDI) which is composed of 11 MDG indicators, was found to possess desirable characteristics of an estimator. This index encompasses development through eradicating extreme poverty and hunger, reducing child mortality, improving maternal health, ensuring environmental sustainability, and developing a global partnership for development.

Keywords: development, Millennium Development Goals, Multidimensional Development Index (MDI)

I. INTRODUCTION

Economic growth measures the economic output of a country. The determination of economic growth can be considered as one of the most important indicators for the assessment of economic policy in a given country. It is used as a basis for policies regarding the reduction of poverty, unemployment, and other social problems. The most common measure of economic growth is the gross domestic product. In contrast of the importance of GDP, it is surrounded by controversies. The most famous of which is the limitation of using GDP as an indicator of economic growth in improving living standards. Because of the limitations of GDP, local and international organizations, non-government organizations, individuals from private sector and academe have formulated different indices that assess economic, government, and even human development issues.

Among the existing indices, Human Development Index (HDI) can be regarded as the most famous measure of human development. It is a focus measure that concentrates on the essential aspects of human development: *people should lead a long and healthy life, people should acquire knowledge, and people should have access to resources needed for a decent standard of living*. As mentioned, it just focuses on the basic dimensions of human development and does not take into account a number of other important dimensions of human development. Millennium Development Goals reflect the multidimensional aspect of development as these encompass the United Nations" vision of fighting

poverty in its many dimensions. Thus, using the MDG indicators, this study generally aims to construct a statistical index which could serve as a measure of a country"s multidimensional development.
Specifically, the study aims to compare the constructed statistical index with the existing measure(s) of economic growth and human development, and evaluate the statistical properties of the constructed index.

Despite the relevance of HDI, the index has been criticized for the reason of applying equal weights to its components. Noorbakhsh in 1998 proposed alternative indices based on the same components with that of HDI as a measure of human development, namely: Modified Human Development Index (MHDI), Modified Human Development Index Factor 1 (MHDIF1), Modified Human Development Index Factor 2 (MHDIF2), and Borda ranking. Moreover, the researcher investigated whether the proposed indices are redundant with existing indices like HDI. Based on the results of the study, MHDI, HDI, and MHDIF1 produced almost similar ranking of countries.

De Muro, et al. (2009) proposed a new and alternative composite index of development and poverty known as the Mazziotta-Pareto Index (MPI). The index was designed to satisfy three properties of an index which are deemed important: 1) normalization of the indicators by a specific criterion that delete the unit of measure and the variability effect; 2) synthesis independent from an ideal unit; and 3) simplicity of the computation.

Choice of the indicators to be included in the composite index, transformation technique, and weighting system are some of the considerations that need to be addressed in index construction. A technical paper published by Australian Bureau of Statistics provides information on the concepts, data, and method used to create the Socio-Economic Indexes for Areas (SEIFA). Principal Component Analysis is used to determine the weights of the variables included in the index (Pink, 2011). Ramirez (2008) and Albacea (2010) also used Principal Component Analysis in determining the weights of the happiness index among UPLB undergraduate students and UPLB faculty, respectively.

Statistical properties are important to be assessed in order to determine the validity of the index. In the year 2011, Ynion used bootstrap resampling technique to assess the statistical properties of Student Evaluation of Teachers (SET) score index. The constructed index was consistent, accurate, and precise. Thus, Ynion concluded that bootstrap resampling method is a good method to assess statistical properties of an estimator.

II. METHODOLOGY

Data Sources

Data from the World Bank were retrieved from the organization"s data bank. Initial variables that were considered in the study are the different indicators for monitoring progress of the eight Millennium Development Goals. The MDG indicators are expressed in various units and have to be normalized. This is performed in order to avoid problems in combining different measurement units and having extreme values dominate, and partially correct for data quality problems. Standardization addresses the measurement units by converting the individual indicators to a common scale. After standardization, indicators will have an average of zero and a standard deviation of 1. Unlike other normalization techniques which are highly affected by the presence of outliers, standardization avoids introducing aggregation distortions stemming from differences in variable means (Freudenberg, 2003).

Index Construction

Among the countries included in the data, those with poor statistical accounts data were omitted. According to United Nations, there is no five-year period when the availability of data is more than 70% of what is required. Thus, the criterion for determining whether a country has poor statistical accounts data

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was set to as not having a value for an indicator which is observed in at least 50% of the countries. Countries with available data on at least 70% of the indicators present were retained.

Data on some variables are not completely collected due to lack of well-established statistical system thus producing „missing data". Thus, imputation, which is a statistical technique to estimate missing values, is required. Countries were classified according to the region they belong to: Eastern Africa, Middle Africa, Northern Africa, Southern Africa, Western Africa, Caribbean, Central America, South America, Northern America, Central Asia, Eastern Asia, Southern Asia, South-Eastern Asia, Western Asia, Eastern Europe, Northern Europe, Southern Europe, Western Europe, Australia and New Zealand, Melanesia, Micronesia, and Polynesia. Mean for a certain region was computed and was used as a replacement for the missing values for countries belonging to that region.

For each individual indicator, the average and standard deviation of values across countries was calculated. The standardization formula is:

$$I_{pc} = \frac{x_{pc} - \bar{x}_{pc}}{\sigma_{pc}}$$

where x_{pc} is the value of indicator *p* for country *c*, $\bar{X}_{pc}$ is the average value of indicator *p* for country c, and σ_{pc} is the standard deviation of indicator *p* for country *c*.

Correlation among the normalized indicators was computed to determine which indicators to remove. Indicators with very high correlation coefficient were scrutinized to avoid having indicators which measure same aspect of development. The reduced list of variables was subjected to Principal Component Analysis to reduce its dimensionality while retaining as much as possible of the variation present in the data set. This is achieved by transforming to a new set of variables, the principal components (PCs), which are uncorrelated, and which are ordered so that the first few retain most of the variation present in all of the original variables. The identified principal components with high loadings were used in the construction of the statistical index.

Statistical Properties of Index

The population of the statistical indices across countries was considered as the „surrogate population". The mean value of the constructed indices across countries was computed. Samples of size *m* were repeatedly drawn from the population of the constructed statistical indices across countries for different number of resamples. Based on the bootstrap samples, statistical properties of the index such as unbiasedness, precision, accuracy, and consistency were checked. This is the methodology used by Ynion in 2011 in her study.

III. RESULTS AND DISCUSSION

Data on the indicators that measure Millennium Development Goals were retrieved from the World Bank website. From the years with available data, 2010 had the highest number, which accounted to 59 MDG indicators. With this in mind, data on the MDG indicators for year 2010 was considered. The initial number of MDG indicators of 134 was reduced to 59. It means that only 59 indicators were observed in at least 50% of the number of countries in the data set. After removing variables observed on less than 50% of the countries, observations with more than 30% of unobserved variables were removed. Out of the initial 202 countries considered, 164 countries were retained in the analysis.

Mean imputation was applied to address missing data problem. Countries were classified according to the region they belong to. Mean for a certain region was computed and was replaced to missing values for countries belonging to that region. Based on the constructed histograms of the 59 indicators before and after applying mean imputation, it can be noticed that the two datasets have the same distribution for most of the indicators. The imputation method that was applied in the dataset did not distort the distribution of the indicators.

After imputation of missing values, each of the 59 indicators was then standardized. For the final set of variables that will be included in the composite index, those with correlation coefficient of at least 0.80 were scrutinized to avoid having indicators which measure same concept. Twenty-seven indicators were retained; three of which are indicators for monitoring the progress on eradication of extreme poverty and hunger, two indicators each for achievement of universal primary education, reduction on child mortality, improvement of maternal health, and combat of HIV/AIDS, malaria and other diseases five are for promoting gender quality and empowering women. In addition, five of the retained variables are used as indicators for the promotion of gender equality and empowerment of women, and global partnership for development. The highest number of retained variables are indicators for the environmental sustainability.

The 27 indicators of Millennium Development Goals were considered in Principal Component Analysis. Based on scree plot, a point of inflection can be seen between the eigenvalues of factor components 7 and 8. Thus, only the first 7 principal components were retained for further analysis which account for about 74.62% of the total variance. From the seven principal components, variables with high factor loadings were considered in the final construction of the statistical index. Based on the factor loadings, 11 variables were found to have high loadings of at least 0.70 Based on scree plot, a point of inflection can be seen between the eigenvalues of factor components 2 and 3. Thus, only the first 2 factors were retained for the construction of the statistical index which account for about 75.64% of the total variance.

Table 1 shows the factor loadings using Varimax rotation. It can be noticed that the first factor has high loadings for *improved sanitation facilities (% of population with access), internet users (per 100 people), improved water source (% of population with access), telephone lines (per 100 people), GDP per person employed (constant 1990 PPP $), mobile cellular subscriptions (per 100 people), prevalence of undernourishment (% of population), adolescent fertility rate (births per 1,000 women ages 15-19), maternal mortality ratio (per 100,000 live births, and mortality rate, infant (per 1,000 live births)*. On the other hand, the second factor has high loading for *forest area (% of land area)*. Based on the communality of the factors, the variables share a high percentage of variation.

Table 1. Factor loadings of the variables in the Multidimensional Development Index

Variable name	Variables with high loadings	Factor		Communality
		1	2	
sanitation	*Improved sanitation facilities (% of population with access)*	**0.9178**	-0.0794	0.848
internet	*Internet users (per 100 people)*	**0.8814**	0.0959	0.786
water	*Improved water source (% of population with access)*	**0.8715**	0.0262	0.760
telephone	*Telephone lines (per 100 people)*	**0.8521**	0.0729	0.731
capita_GDP	*GDP per person employed (constant 1990 PPP $)*	**0.8103**	0.0585	0.659
cellular	*Mobile cellular subscriptions (per 100 people)*	**0.7849**	0.0090	0.616
undernourished	*Prevalence of undernourishment (% of population)*	**-0.7893**	-0.0029	0.622
adolescent_fertility	*Adolescent fertility rate (births per 1,000 women ages 15-19)*	**-0.8289**	0.1684	0.715
maternal_mortality	*Maternal mortality ratio (per 100,000 live births)*	**-0.8699**	0.0598	0.760
infant_mortality	*Mortality rate, infant (per 1,000 live births)*	**-0.9193**	-0.0339	0.846
forest_area	*Forest area (% of land area)*	0.0066	**0.9864**	0.973

Based on the factor loadings from the factor analysis, the Multidimensional Development Index (MDI) can be expressed as follows:

$$MDI = 0.9178\,(sanitation) + 0.8814(internet) + 0.8715(water) + 0.8521(telephone) + 0.8103(capita\_GDP)$$
$$+0.7849(cellular) - 0.7893(undernourished) - 0.8289(adolescent\_fertility) - 0.8699(maternal\_mortality)$$
$$-0.9193\,(infant\_mortality) + 0.9864(forest\_area)$$

The equation of the Multidimensional Development Index yielded the highest index value of 12.65043 and the lowest index value of -18.45922. The index has a mean of 0.2611 and a standard deviation of 7.4304. Moreover, fifty percent of the constructed indices are at most 1.5731. Moreover, the distribution is negatively skewed which implies that few extremely low values of index are present.

Tables 2 and 3 present the ranking of countries based on the highest and lowest computed Multidimensional Development Index, respectively. Sweden tops the list with an index value of 12.6503, followed by Finland (12.0564), and Luxembourg (11.8064). On the other hand, Niger, Sierra Leone, and Chad are the countries with the lowest development. The top 20 countries are dominated by European countries: seven each from Northern and Western Europe, and two from Southern Europe. Only two countries each from Eastern Asia and Northern America made it to the list of countries with the highest Multidimensional Development Index. Ninety percent of the countries included in the bottom 20 are African countries: eight from Western Africa, seven from Eastern Africa, and 3 from Middle Africa. The remaining 2 countries are from Caribbean and Southern Asia.

Table 2. Top 20 countries with the highest Multidimensional Development Index

Rank of Country	Country	Multidimensional Development Index	Rank of Country	Country	Multidimensional Development Index
1	Sweden	12.65043	11	Estonia	10.16343
2	Finland	12.05635	12	Norway	9.992999
3	Luxembourg	11.80638	13	United States	9.868635
4	Korea	11.54021	14	Canada	9.750610
5	Austria	11.14391	15	United Kingdom	9.738764
6	Switzerland	11.06934	16	Belgium	9.715790
7	Germany	10.71250	17	Denmark	9.669542
8	France	10.60489	18	Iceland	9.567798
9	Japan	10.56217	19	Italy	9.551594
10	Slovenia	10.40945	20	Netherlands	9.475440

Table 3. Bottom 20 countries with the lowest Multidimensional Development Index

Rank of Country	Country	Multidimensional Development Index	Rank of Country	Country	Multidimensional Development Index
145	Kenya	-9.957184	155	Afghanistan	-11.62775
146	Nigeria	-10.06565	156	Angola	-11.72454
147	Burkina Faso	-10.40977	157	Mali	-12.13424
148	Malawi	-10.50500	158	Madagascar	-12.31068
149	Burundi	-10.68524	159	Mozambique	-12.33467
150	Liberia	-10.82847	160	Ethiopia	-12.98359
151	Haiti	-11.09491	161	Central African Rep	-14.13098
152	Tanzania	-11.17042	162	Niger	-15.14985
153	Togo	-11.29724	163	Sierra Leone	-15.78111
154	Guinea	-11.52057	164	Chad	-18.45922

The top 20 countries with the highest Multidimensional Development Index are somewhat different with that of the Human Development Index (HDI). But the bottom percent of the countries are in agreement with that of the HDI. No clear comparison can be made with the rankings on Multidimensional Poverty Index (MPI) since this only reports acute poverty for 103 developing countries. To have a clear idea of the association between the rankings on the proposed index, HDI, and MPI, Spearman rank correlation analysis was performed. Based on the analysis, there is a very strong positive association (r_s = 0.9608) between the ranking of countries using the proposed index and that of using HDI. Also, there exists a very strong positive association (r_s = 0.9214) between the ranking of countries using the proposed index and that of using MPI.

Bootstrap resampling technique was used to evaluate the statistical property of MDI. Bootstrap resamples, *B*, of size 500, 750, 1000, 1500, and 2000 and different sample sizes of 5%, 10%, 15%, 20%, 25%, and 30% were considered in the study. Table 4 shows the mean of Multidimensional Development Index for each combination of the percentage of samples and number of bootstrap samples with the corresponding standard error (those in parentheses). The highest mean index was observed for 5% samples and *B=1000* resamples while the lowest mean index was observed for 5% samples and *B=500* resamples which also has the lowest precision.

Table 4. Mean of the Multidimensional Development Index for each combination of the number of samples and number of bootstrap samples

Number of samples, *m*	**Number of bootstrap resamples, *B***				
	B=500	*B=750*	*B=1000*	*B=1500*	*B=2000*
5%	0.0997	0.1073	0.5562	0.2377	0.2708
	(0.1186)	(0.0954)	(0.0815)	(0.0665)	(0.0585)
10%	0.3671	0.2174	0.1524	0.2650	0.2977
	(0.0821)	(0.0658)	(0.0563)	(0.0497)	(0.0407)
15%	0.2315	0.1940	0.1900	0.2198	0.2219
	(0.0675)	(0.0520)	(0.0460)	(0.0384)	(0.0329)
20%	0.1272	0.2705	0.2857	0.2400	0.2153
	(0.0534)	(0.0468)	(0.0411)	(0.0334)	(0.0290)
25%	0.1516	0.2484	0.2864	0.2962	0.2363
	(0.0513)	(0.0427)	(0.0357)	(0.0302)	(0.0257)
30%	0.2341	0.3153	0.3071	0.2688	0.2241
	(0.0454)	(0.0389)	(0.0328)	(0.0271)	(0.0232)

Figure 1 shows the behavior of the estimated mean Multidimensional Development Index for different percentage of samples and number of bootstrap resamples. It can be observed that as the sample size increases, the difference of the estimated mean from the pseudo mean gets smaller. Thus, the bias of the estimated mean approaches zero as the sample size increases (see Figure 2). Based on this, the proposed index is “consistent” as shown graphically.

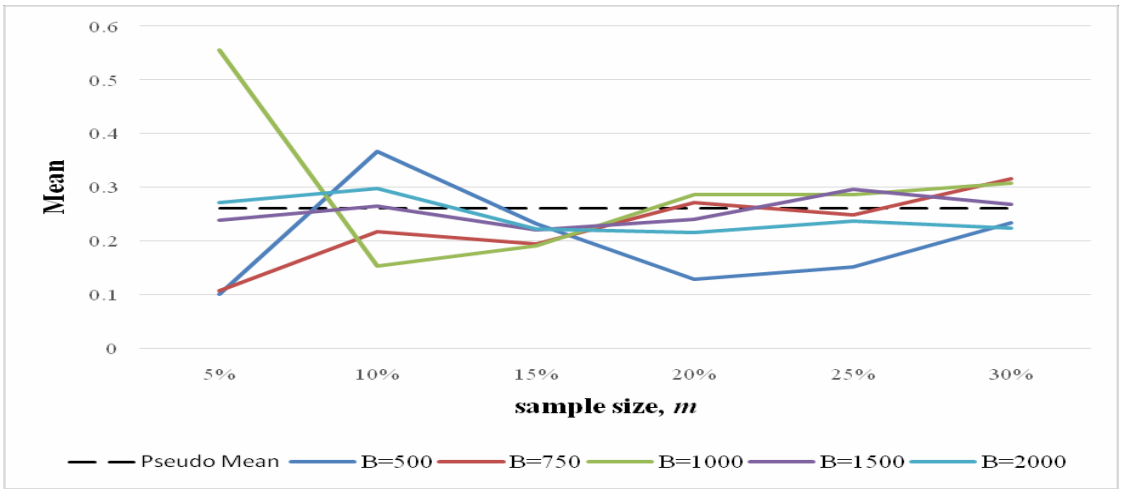

Fig. 1. Estimated mean Multidimensional Development Index as the number of samples, *m*, increases at different number of bootstrap resamples, *B*

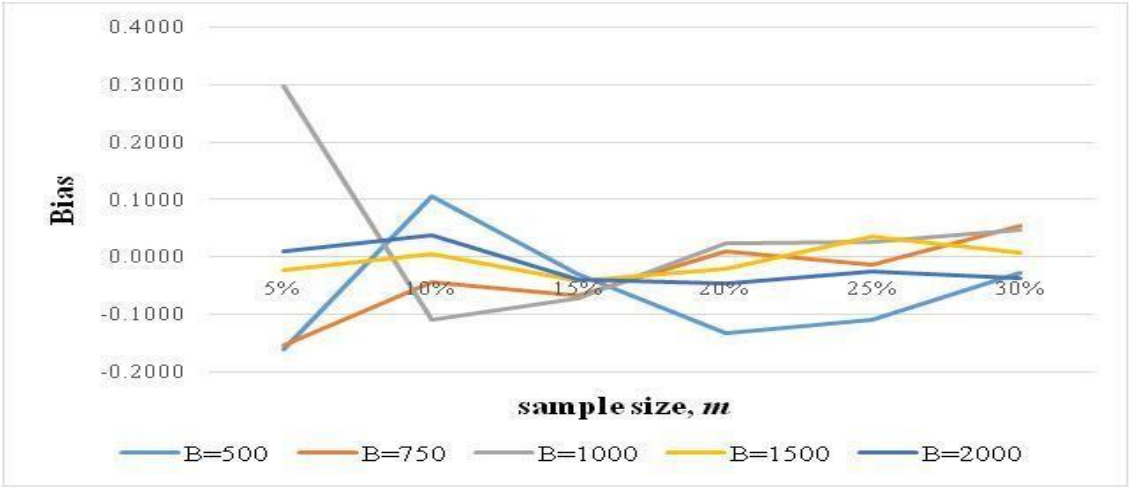

Fig. 2. Bias of the estimated mean Multidimensional Development Index as the number of samples, *m*, increases at different number of bootstrap resamples, *B*

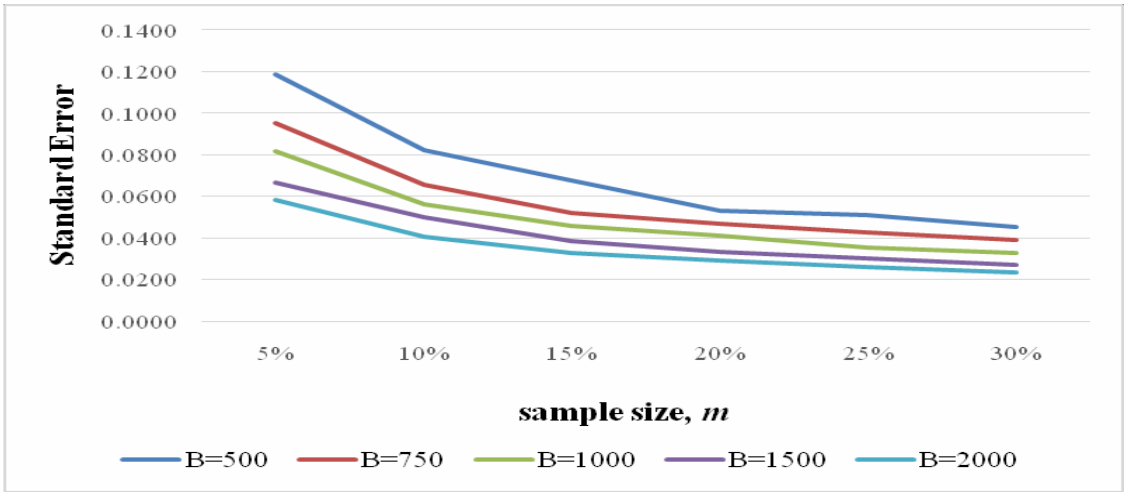

Fig. 3. Standard error of the estimated mean Multidimensional Development Index as the number of samples, *m*, increases at different number of bootstrap resamples, *B*

To measure the precision of the estimated means, standard error of each mean Multidimensional Development Index was computed. As seen in Figure 3, the standard error decreases as the sample size increases, which tend to approach to 0.

IV. CONCLUSION

This study was employed to construct a statistical index which could serve as a measure of a country"s multidimensional development using the Indicators that measure Millennium Development Goals. Principal Component Analysis was used to determine the weights of the indicators included in the study.

Based on the factor loadings, *improved sanitation facilities (% of population with access), internet users (per 100 people), improved water source (% of population with access), telephone lines (per 100 people), GDP per person employed (constant 1990 PPP $), mobile cellular subscriptions (per 100 people), prevalence of undernourishment (% of population), adolescent fertility rate (births per 1,000 women ages 15-19), maternal mortality ratio (per 100,000 live births, and mortality rate, infant (per 1,000 live births)*, and *forest area (% of land area)* were used in the construction of Multidimensional Development Index.

The Multidimensional Development Index values range from -18.45922 to 12.65043 and the lowest index value of -18.45922. The index has a mean of 0.2611 and a standard deviation of 7.4304. Moreover, fifty percent of the constructed indices are at most 1.5731. Sweden tops the list with an index value of 12.6503, followed by Finland (12.0564), and Luxembourg (11.8064). On the other hand, Niger, Sierra Leone, and Chad are the countries with the lowest development. The top 20 countries are dominated by European countries and the bottom 20 countries are dominated by African countries.

The proposed composite index as a measure of multidimensional development index were compared to some of the existing indicators which aim to correct shortcomings of other measures of economic growth alone. Spearman rank correlation analysis was performed to determine the association of rankings using the proposed index with that of the existing ones. Based on the analysis, there is a very strong positive association between the ranking of countries using the proposed index with that of using HDI and MPI.

Statistical properties of the index were then assessed using bootstrap resampling technique. Bootstrap resamples, *B*, of size 500, 750, 1000, 1500, and 2000 and different sample sizes of 5%, 10%, 15%, 20%, 25%, and 30% were considered in the study. It was observed that as the sample size increases, the difference of the estimated mean from the pseudo mean gets smaller. Thus, the bias of the estimated mean approaches zero as the sample size increases. Based on this, the proposed index is sowmehat "consistent". To measure the precision of the estimated means, standard error of each mean Multidimensional Development Index was computed. The standard error decreases as the sample size increases, which tend to approach to 0.

The proposed index, the Multidimensional Development Index (MDI), was found to possess desirable characteristics of an estimator. This index serves as an alternative measure of a country"s development by looking on aspects other than economic growth. Multidimensional Development Index encompasses development through eradicating extreme poverty and hunger, reducing child mortality, improving maternal health, ensuring environmental sustainability, and developing a global partnership for development.

V. LITERATURE CITED

Albacea, Z.V.J. 2010. Measuring the Degree of Happiness of UPLB Faculty Using a Statistical Index. 2010 UPLB Faculty, Students and Staff Professorial Chair Lecture.

De Muro, P., Mazziotta, M., and Pareto, A. 2009. Composite Indices for Multidemensional Development and Poverty: An Application to MDG Indicators.

Freudenberg, M. 2003. Composite Indicators of Country Performance: A Critical Assessment. OECD DSTI Working Paper Series.

Noorbakhsh, F. 1998. The Human Development Index: Some Technical Issues and Alternative Indices. Journal of International Development, 10, pp. 589-605.

Pink, B. 2011. Socio-Economic Indexes for Areas (SEIFA). A Technical Paper. Australian Bureau of Statistics.

Ramirez, G.M. 2008. Construction of Happiness Index Among UPLB Undergraduate Students. Unpublished Master"s Thesis, Institute of Statistics, University of the Philippines Los Baños.

Ynion, J.C. 2011. Application of Bootstrap Resampling Technique in the Assessment of Statistical Properties of an Index. Unpublished Master"s Thesis, Institute of Statistics, University of the Philippines Los Baños.

VI. APPENDIX

Appendix A. Comparison of Countries" Ranks using MDI, HDI, and MPI

Country	MDI	Rank of Country			Country	MDI	Rank of Country		
		MDI	HDI	MPI			MDI	HDI	MPI
Sweden	12.65043	1	9	-	Czech Republic	7.864012	31	28	3
Finland	12.05635	2	16	-	Lithuania	7.835744	32	44	0
Luxembourg	11.80638	3	24	-	Croatia	7.814654	33	51	18
Korea	11.54021	4	12	-	Malta	7.657488	34	33	-
Austria	11.14391	5	25	-	Serbia	7.476141	35	60	12
Switzerland	11.06934	6	13	-	Malaysia	7.433895	36	57	-
Germany	10.71250	7	10	-	Belarus	7.392163	37	61	4
France	10.60489	8	14	-	Bosnia and Herzegovina	7.253760	38	68	11
Japan	10.56217	9	11	-	Poland	7.019497	39	41	-
Slovenia	10.40945	10	29	2	Hungary	6.917318	40	36	10
Estonia	10.16343	11	34	37	Bulgaria	6.537485	41	58	-
Norway	9.992999	12	1	-	Trinidad and Tobago	6.407038	42	59	31
United States	9.868635	13	4	-	Cyprus	6.171644	43	35	-
Canada	9.750610	14	8	-	Macedonia	5.698814	44	-	20
United Kingdom	9.738764	15	26	-	Barbados	5.518071	45	42	-
Belgium	9.71579	16	18	-	Saudi Arabia	5.501121	46	55	-
Denmark	9.669542	17	19	-	Brunei	4.917130	47	37	-
Iceland	9.567798	18	17	-	Suriname	4.895134	48	94	41
Italy	9.551594	19	23	-	Chile	4.837561	49	45	-
Netherlands	9.475440	20	7	-	United Arab Emirates	4.715801	50	32	6
Spain	9.344745	21	20	-	Qatar	4.607255	51	38	-
Ireland	9.270381	22	5	-	Uruguay	4.599208	52	52	15
Australia	9.242685	23	2	-	Romania	4.551409	53	50	-
New Zealand	8.861836	24	3	-	Argentina	4.533190	54	46	27
Portugal	8.410578	25	40	-	Brazil	4.014109	55	73	39
Greece	8.339190	26	22	-	Ukraine	3.906577	56	69	19
Montenegro	8.276567	27	49	17	Costa Rica	3.854337	57	62	-
Latvia	8.150253	28	48	5	Bahrain	3.795551	58	39	-
Israel	7.938986	29	15	-	Oman	3.770369	59	-	-
Slovak Republic	7.938227	30	31	1	Venezuela	3.733535	60	75	-

Country	MDI	Rank of Country			Country	MDI	Rank of Country		
		MDI	HDI	MPI			MDI	HDI	MPI
Albania	3.732186	61	64	13	Morocco	0.52265	91	114	56
Armenia	3.665159	62	76	21	Ecuador	0.50001	92	77	24
Turkey	3.572654	63	83	38	Honduras	0.41335	93	106	58
Georgia	3.451581	64	74	9	El Salvador	0.12414	94	90	-
Panama	3.255191	65	54	-	Bhutan	-0.12813	95	-	-
Kazakhstan	3.231668	66	66	7	Algeria	-0.15314	96	84	-
Maldives	2.989376	67	107	0	Kyrgyz Republic	-0.24443	97	109	30
Seychelles	2.941749	68	-	0	Guatemala	-0.47756	98	116	54
Thailand	2.928576	69	92	16	South Africa	-0.60417	99	110	28
Tunisia	2.832289	70	81	26	Philippines	-0.61213	100	97	48
Moldova	2.806114	71	99	-	Indonesia	-0.61312	101	108	53
Mauritius	2.789976	72	72	-	Uzbekistan	-0.71996	102	102	23
Lebanon	2.514688	73	-	-	Dominican Republic	-0.98397	103	88	42
Mexico	2.206159	74	56	29	Vanuatu	-1.21685	104	-	-
Vietnam	2.199774	75	113	50	Cabo Verde	-1.38537	105	118	-
Fiji	2.188364	76	86	-	Gabon	-1.39911	106	93	59
Colombia	2.143303	77	79	40	Mongolia	-1.78481	107	100	47
Belize	2.121309	78	78	35	Turkmenistan	-2.27507	108	87	-
Jordan	2.057116	79	82	25	Botswana	-2.50859	109	98	-
Iran	2.056172	80	70	-	Bolivia	-3.03058	110	95	61
Guyana	1.886174	81	104	43	Solomon Islands	-3.19425	111	123	-
Peru	1.809255	82	63	51	Nicaragua	-3.57026	112	115	64
China	1.336897	83	89	44	São Tomé and Principe	-3.60060	113	127	66
Egypt	1.276969	84	101	36	Myanmar	-3.80323	114	132	52
Jamaica	1.214304	85	80	-	Iraq	-4.14808	115	-	45
Azerbaijan	1.120342	86	67	33	India	-4.29553	116	119	73
Sri Lanka	1.080518	87	91	32	Cambodia	-4.52723	117	124	67
Syrian Arab Republic	1.017633	88	111	34	Lao PDR	-4.57432	118	122	68
Paraguay	0.887265	89	96	46	Nepal	-5.06095	119	138	81
Cuba	0.700707	90	-	-	Tajikistan	-5.12425	120	112	49

Country	MDI	Rank of Country			Country	MDI	Rank of Country		
		MDI	HDI	MPI			MDI	HDI	MPI
Namibia	-5.34251	121	105	63	Zambia	-9.82903	143	150	79
Senegal	-5.35073	122	144	85	Uganda	-9.87600	144	143	-
Pakistan	-5.91657	123	125	69	Kenya	-9.95718	145	128	75
Bangladesh	-6.04361	124	129	72	Nigeria	-10.0656	146	167	84
Ghana	-6.15340	125	130	57	Burkina Faso	-10.4097	147	161	100
Swaziland	-6.28988	126	121	62	Malawi	-10.5050	148	153	86
Timor-Leste	-7.00494	127	120	-	Burundi	-10.6852	149	166	99
Benin	-7.21850	128	134	89	Liberia	-10.8284	150	162	94
Papua New Guinea	-7.44351	129	137	-	Haiti	-11.0949	151	145	76
Congo	-7.53328	130	126	87	Tanzania	-11.1704	152	148	83
Equatorial Guinea	-7.78709	131	117	-	Togo	-11.2972	153	139	71
Yemen	-7.87012	132	133	70	Guinea	-11.5205	154	156	96
Rwanda	-7.88917	133	152	91	Afghanistan	-11.6277	155	155	-
Zimbabwe	-8.00027	134	169	60	Angola	-11.7245	156	146	92
Comoros	-8.56250	135	140	88	Mali	-12.1342	157	160	101
Cameroon	-8.70661	136	131	74	Madagascar	-12.3106	158	135	90
Lesotho	-9.04026	137	141	65	Mozambique	-12.3346	159	165	93
Guinea-Bissau	-9.36480	138	164	-	Ethiopia	-12.9835	160	157	102
Sudan	-9.46752	139	154	-	Central African Republic	-14.1309	161	159	97
Mauritania	-9.48917	140	136	82	Niger	-15.1498	162	167	103
Côte d'Ivoire	-9.67340	141	149	77	Sierra Leone	-15.7811	163	158	95
Eritrea	-9.76203	142	-	-	Chad	-18.4592	164	163	80

Source: Alkire, S., and Santos, M.E. 2010. Multidimensional Poverty Index: 2010 Data. Oxford Poverty and Human Development Initiative.
Klugman, J. and Human Development Report 2010 Team . The Real Wealth of Nations: Pathways to Human Development.