

UPDATING AND AUGMENTING THE ECONOMIC VULNERABILITY INDEX¹

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1. INTRODUCTION

The economic vulnerability index (EcVI)⁴ was initially developed to explain the seeming contradiction that a country can be economically vulnerable and yet register a relatively high GDP per capita.⁵ Many versions of the index were produced, principally by Briguglio (1992, 1993, 1995, 1997), the Commonwealth Secretariat⁶ and Crowards (1998 and 1999). The general conclusion that emerged from these studies is the small island developing states, as a group, tend to be more economically vulnerable than other groups of countries.⁷

The characteristics of small island developing states (SIDS) are well documented (see for example, Briguglio, 1995), and include limited ability to exploit economies of scale; lack of natural resource endowments and a high import content (especially of strategic imports such as food and fuel). Other characteristics relate to limitations of diversification possibilities; dependence on a narrow range of exports; limitations on the extent to which domestic competition policy can be applied; inability to influence international prices; and in the case of

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⁴ The term EcVI is being used not to be confused with EVI the term used for the Environmental Vulnerability Index.

⁵ The idea of constructing the vulnerability index first occurred to Lino Briguglio during a conference held in Malta in 1985 on the economic development of small countries, where it was shown that many fragile economies were registering relatively high GDP per capita. The index was actually developed in the run-up of the Barbados Global Conference on the Sustainable Development of Small Island Developing States, as a tool to draw the attention of the international community to the vulnerability of SIDS. When the General Assembly, at its 47th session, resolved to convene this SIDS Global Conference (A/Res/47/189 of 10 March 1993), which was subsequently held in Barbados in April 1994, the Vulnerability Index featured prominently in the Programme of Action (BPoA) for the Sustainable Development of Small Island Developing States (A/CONF.167/9). The BPoA was endorsed by the General Assembly in 1994 in its resolution 49/122 of 19 December 1994, with Paragraphs 113 and 114 calling for the development of a vulnerability index for small island developing States.

⁶ See Atkins et al (1998 and 2001), Easter (1998) Chander (1996) and Wells (1997). All Economic Vulnerability Indices which has been produced so far arrive at the conclusion that small states (most of which are SIDS) are among the most vulnerable countries.

⁷ An expert group meeting held at the United Nations Headquarters in December 1997, after reviewing the vulnerability indices produced until then, also concluded that SIDS, tend to more vulnerable, as a group, than other groups of countries.

island states, high international transport costs and uncertainties of industrial supplies due to insularity and remoteness.

Small size also creates problems associated with public administration, the most important of which is probably the small manpower resource base from which to draw experienced and efficient administrators. Another problem is that many government functions tend to be very expensive per capita when the population is small, due to the fact that certain expenses are not divisible in proportion to the number of users.

2. ECONOMIC VULNERABILITY AND RESILIENCE

There are features which lead to inherent economic vulnerability of SIDS. Such vulnerability arises from the fact that the economies of SIDS are, to a large extent, shaped by forces outside their control, mostly due to their high degrees of economic openness and export concentration, and high dependence on strategic imports.

Although economic vulnerability poses serious constraints, many SIDS have managed to attain relatively high GDP per capita, possibly because they have taken steps to build up resilience in order to cope with and withstand their inherent vulnerability. Thus economic vulnerability need not necessarily lead to poverty or underdevelopment. However economic backwardness may be associated with limited ability to build economic resilience.

Recently, there has been considerable debate on building resilience in SIDS.⁸ This issue is important because it carries the message that these states should not be complacent in the face of their inherent vulnerability. In other words they should adopt measures, possibly supported by the international community, to strengthen their economic, environmental and social resilience.

In addition, the discussion on resilience sheds light as to why a number of vulnerable SIDS have managed to achieve a notable level of economic development in spite of their economic vulnerability. Reference is made here to the "Singapore Paradox" where an inherently economically vulnerable small state has managed to cope with its vulnerability through deliberate economic development policies.

⁸ See proceedings of the "Global Roundtable on Vulnerability and Small Island Developing States: Exploring Mechanisms for Partnerships", Montego Bay, Jamaica, 9-10 May, 2002, particularly the papers Witter, Briguglio, and Bhuglah (2002) and UWICED (2002).

2.1 Some definitions

It is important to define terms at this stage, because there is a certain degree of confusion as to what constitute economic vulnerability.

Economic vulnerability

For the purpose of this paper, the term "economic vulnerability" refers to inherent, permanent or quasi-permanent features of a country which render that country exposed to a very high degree to economic forces outside its control.

It should be noted here, that economic vulnerability can also be policy-induced and therefore not inherent or permanent. For the purpose of this paper, policy induced vulnerability is being treated as the obverse of "resilience" in the sense that countries adopting policies which exacerbate their inherent vulnerability, render themselves less resilient.

Economic resilience

The term "economic resilience" as used in this paper, refers to a country's ability to economically cope with or withstand its inherent vulnerability, as a result of some deliberate policy. As is the case of vulnerability, resilience may also be inherent or nurtured. The inherent aspect of resilience may be considered as the obverse of vulnerability, in the sense that countries that inherently lack economic resilience are economically vulnerable. Nurtured resilience on the other hand, is that which can be developed and managed, often as a result of deliberate policy.

Four Possible Scenarios

On the basis of these definitions, we can therefore consider 4 possible scenarios with regard to vulnerability and resilience as follows:

	Countries that adopt policies to withstand vulnerability	Countries that adopt policies that exacerbate vulnerability
Inherently vulnerable countries	The "self-made" scenario	Worst case scenario
Inherently resilient countries	Best case scenario	The "prodigal son" scenario

This method of defining vulnerability in terms of inherent features and resilience in terms of policy measures has a number of advantages, including:

- (1) the vulnerability measurement would refer to features on which a state has little or not control and therefore cannot be attributed to bad governance. In other words, a country with high inherent vulnerability score cannot be blamed that it has self-inflicted vulnerability.
- (2) The resilience component would refer to what a country can do. In this regard, the international donor community can be a source of support to enable vulnerable countries build up their resilience.

2. What constitutes economic vulnerability?

The principal variables which have been used as components of the EcVI in the context of SIDS are (a) economic openness, (b) export concentration (c) peripherality and (d) dependence on strategic imports.

Economic openness

Economic openness captures the degree to which a state is susceptible to economic conditions in the rest of the world. It is often measured as the ratio of exports or imports, or an average of both, as a percentage of GDP. In the computation which follows, the openness index takes an average of imports and exports.

Dependence on a narrow range of exports

The range of exports captures the extent to which a country lacks export diversification, a condition exacerbating the degree of economic openness. This is usually measured by the export concentration index devised by UNCTAD, which only covers merchandise. Briguglio (1997) argued that export concentration can also be observed in the trade in services, especially in tourism and financial services, and he devised a concentration index with services exports included. In the computation which follows, the concentration index covers goods and services.

Peripherality

Peripherality is associated with insularity and remoteness, leading to high transport costs and marginalization from main commercial centres. This again exacerbates the problem of high dependence on international trade. The problem with the peripherality variable is that it cannot

be measured directly by taking the number of kilometres from a main commercial centre, or from the nearest island or from the nearest continent. In the case of certain islands, a relatively large proportion of international trade is directed to and from their ex-colonizing powers, even though other centres of commercial activity could be more proximate. In other words measuring remoteness by taking distance in kilometres may convey the wrong sort of information regarding insularity and remoteness, for economic purposes. Two variables which may reflect the effects of remoteness are (1) the ratio of FOB/CIF factors and (2) the ratio of transport and freight costs to imports. In the computation which follows, the second ratio was used, since it has been considered to be more meaningful.

Dependence on strategic imports

This variable is intended to measure the extent to which a country's viability depends on imports. There are obvious vulnerability connotations when a country depends heavily on imported energy and industrial supplies for production and on imported food for consumption. Various indices have been used for this purpose. Briguglio (1997) suggested that this variable can be measured as average imports of commercial energy as a percentage of domestic energy production, and this is the index used in the computation presented below.

2.3 Standardising the components

The summation of the variables making up the composite index poses sum problems.⁹ The approach taken by Briguglio and Cowards is to standardise the observations, as follows:

- i. Subtract the minimum value of a range of observations of a given variable from each observed value.
- ii. Subtract the minimum value from the maximum value of the same range of observations.
- iii. Divide the result of (i) by the result of (ii).
- iv. Repeat this procedure for all observations of variable X.

The formula for standardising a given observation in an array of observed values for a given variable is therefore:

$$(X_i - \text{Min } X) / (\text{Max } X - \text{Min } X)$$

Where:

X_i is an observed value in an array of observed values for a given variable.

Max X is the highest value in the same array.

Min X is the lowest value in the same array.

⁹ See Briguglio (1995) and (1997).

The range of standardised values of variable X will this be between 0 and 1.¹⁰

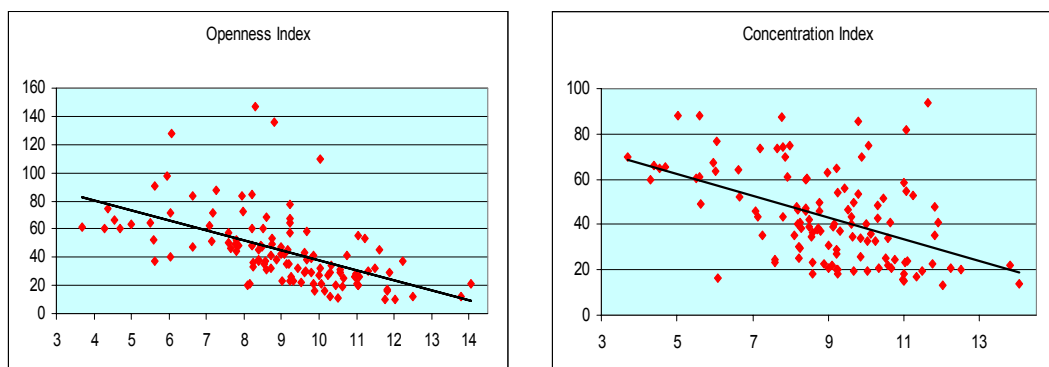
3. UPDATED COMPUTATION OF THE VULNERABILITY INDEX

Below, we present an updated computation of the EcVI, building on Briguglio (1995) and Briguglio (1997). The results again confirm that SIDS, when compared to other groups of countries tend to:

- be more exposed to international trade
- have higher export concentration indices
- are more dependent on strategic imports, and
- have relatively higher transport costs than other groups of countries.

These tendencies are shown in Figures 1. The diagrams show the relationships¹¹ between the variables just described and population size.¹²

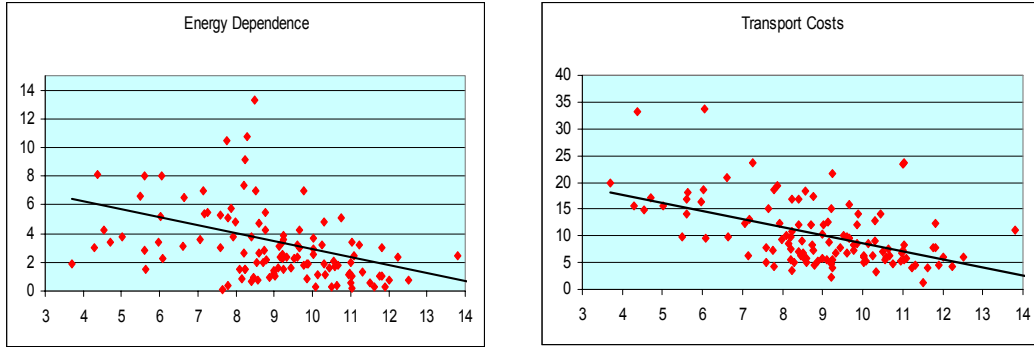
Figure 1: Population Size and Economic Vulnerability Features



¹⁰ The Commonwealth Secretariat opted for a different approach, which is based on the Least Square Method, essentially leading to summing the different components of the index using varying weights, represented by the estimated coefficients on the individual components.

¹¹ In all cases, the relationship is statistically significantly different from zero

¹² SIDS generally have a small population. In the diagram, a population of about 1 million is represented by a value of 7 on the horizontal axis. Log values of the population are used to compress the population values, which range from a few thousand to more than 1 billion.



These four variables were averaged out, to compute a composite EcVI, and the results obtained are shown in Figure 2 based on the data shown in Appendix 1.

The results indicate that there is negative relationship¹³ between population size and economic vulnerability, as measured by the variables described above.

Fig. 2. The Economic Vulnerability Index (117 Countries)

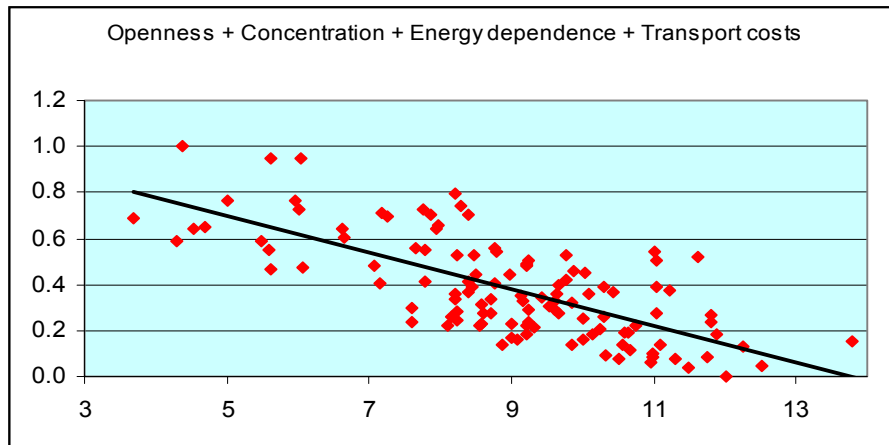


Table 1 shows the vulnerability scores classified by population size, where it is clear that smaller countries tend to have higher vulnerability scores than larger ones. This tendency is true for developed as well as for developing countries.

¹³ Again here the relationships in statistically significant at the 95% level.

Table 1: Vulnerability score classified by Population Size

Population (millions)	Number of Countries	Vulnerability Score
0-1	17	.492
1-2	6	.359
2-5	21	.323
5-20	35	.237
20 – 50	17	.184
50 - 100	11	.182
100 – 200	6	.177
200+	4	.089
Total	117	

Table 2 shows the vulnerability score, classified by category of countries. It can be seen that SIDS register the highest vulnerability score. Other small developing states (OSDS) also register high scores. Large developing states (LDS), on the other hand, register relatively low vulnerability scores. The smallest scores as registered by large advanced states (LAS). Of interest, is that small advanced states (SAS) also register higher scores than LDS.

Table 2: Vulnerability scores classified by Different Categories of Countries

Category	Number of Countries	Vulnerability Score
SIDS	19	.470
OSDS	20	.354
LDS	56	.220
SAS	5	.258
LAS	17	.148
Total	117	

4. ECONOMIC RESILIENCE

There are many factors that could strengthen economic resilience of vulnerable countries, including:

- improving the competitiveness of the economy
- building a sound macroeconomic environment
- improving governance
- diversifying the economy to reduce excessive reliance on a narrow range of exports¹⁴
- strengthening the transport and communications infrastructure

¹⁴ This, however, is not an easy task since there are major constraints with regard to diversification in small states, principally because this could lead to excessive fragmentation and loss of efficiency.

It would be useful to construct a resilience index, to complement the EcVI, and to assess the degree to which economically vulnerable countries, as a group or individually, are moving ahead or otherwise, in coping with or withstanding economic vulnerability.

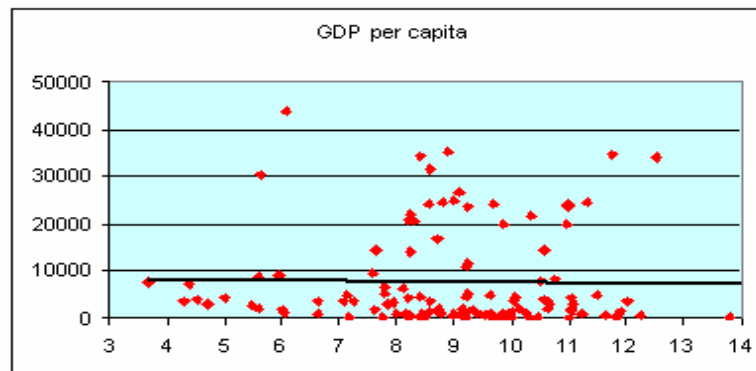
Such an index could also be useful for SIDS to identify their weak points with regard to resilience-building and serve as a monitoring tool in this regard.

Such a resilience index does not exist, and in its absence, we propose that a proxy indicator could be GDP per capita. This variable may capture a country's ex-post material success or otherwise to cope with its inherent vulnerability.¹⁵

Although we have not tested the relationship between the resilience factors outlined above and GDP per capita index, we are assuming that they are closely related.¹⁶ GDP per capita is an attractive index as it is readily available, and can be adjusted for purchasing power standards.

Figure 3 shows that there is no correlation between size and GDP per capita. On average, however, SIDS register a higher GDP per capita than larger developing countries. This average however masks many variations, as there some SIDS with a very GDP per capita.

Figure 3. GDP PER CAPITA

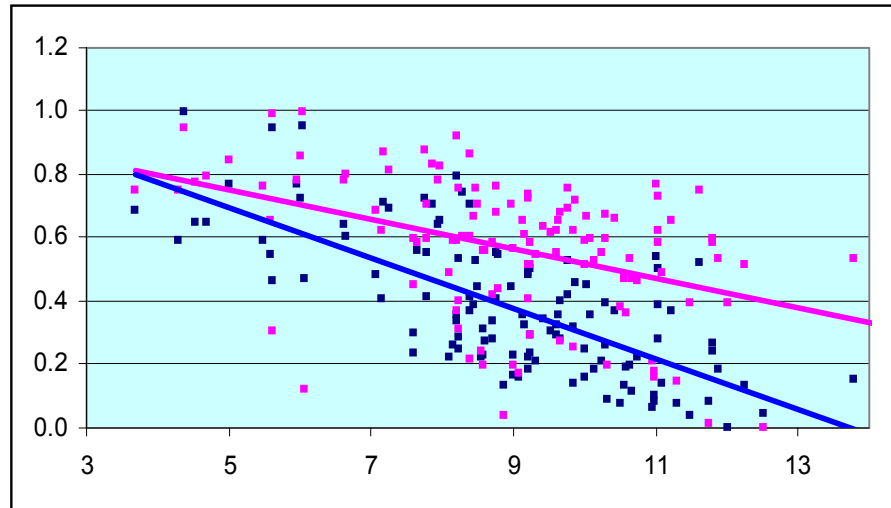


We have constructed an index, which combines the EcVI with the GDP per capita index (standing for economic resilience component, on the basis of data given in Appendix 1), calling it EVIAR (Economic Vulnerability Index Augmented by Resilience). This result is shown graphically in Figure 4, which is based on the data given in Appendix 1.

¹⁵ This is not a new idea. Briguglio(1995) used this approach to construct the VADI (Vulnerability Adjusted Development Index). Atkins et al (2001) used total GDP as a form of resilience index.

¹⁶ This calls for further study on this issue. A priori, it is plausible to assume that sound macroeconomic management, economic competitiveness and good governance are indeed correlated with GDP per capita.

Figure 3. The EcVI (Blue line) and the EVIAR (Red line)



The figure reproduces the EcVI, so as to compare it with the EVIAR. It can be seen that the gradient of the EVIAR is lower than that of the EcVI. This results from the fact that many vulnerable states have a relatively high GDP per capita.

For example, Singapore ranks 7th on the EcVI, but because it has a high GDP per capita, it ranks 54th in the EVIAR out of 117 countries. Similarly Malta ranks 5th on the EcVI and 17th on the EVIAR. This is true of SIDS with a relatively high GDP per capita.

As argued earlier, vulnerability need not result in poverty. There are inherently vulnerable small states which have adopted policies to withstand their vulnerability. As stated, this suggests that vulnerable states should not accept their condition as a *fait accompli* as it is possible to build up resilience to cope with inherent vulnerability.

This fact that some SIDS have strengthened their resilience to withstand vulnerability would seem to be paradoxical, as SIDS are likely to have very limited resources to build economic resilience. In reality, these SIDS may have been able to register high GDP per capita in the past partly due to a number of "props" they enjoyed, including preferential trade arrangements, attractive incentive packages to attract FDI¹⁷, and development assistance from the former colonising powers. However, contrary to some other states, these SIDS would seem to have

¹⁷ SIDS have a number of inherent disadvantages, related to transport costs and limited manpower base, and the incentive package was probably necessary to attract FDI. There is the danger that with the WTO rules, this tendency could be reversed.

used these “props” well, to such an extent that such external support may no longer be needed.

The findings in this paper suggests also that SIDS which currently register relatively low GDP per capita, and are therefore vulnerable and poor, merit special attention and support by the donor community, to enable them to strengthen their resilience sustainably.

CONCLUDING CONSIDERATIONS

A number of considerations emerge from the findings presented in this paper.

1. The updated Economic Vulnerability Index produced above has confirmed that SIDS, as a group, tend to be more economically vulnerable than other groups of countries.
2. Many SIDS are coping well with their inherent vulnerability, possibly due to the wise governance practices and sound economic management they have adopted in the past.
3. Building of economic resilience to cope with and withstand economic vulnerability should take centre stage in the sustainable development strategy of vulnerable states, particularly those SIDS with a low GNP per capita.
4. Towards this end, the donor community may consider stepping up their assistance to SIDS, so as to enable them to sustainably accelerate their resilience-building.
5. In addition, international organisations may consider granting special treatment to such states. The WTO in particular should give serious thought to the possibility of allowing a longer transition period than normal for SIDS, with regard to removal of trade preferences and dismantling of incentive packages to attract FDI.

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APPENDIX 1

	Log of Population	Vulnerability index Standardised	GDP per capita Standardised	EVIAR
ST KITTS AND NEVIS	3.689	0.685	0.827	0.756
DOMINICA	4.295	0.588	0.920	0.754
SEYCHELLES	4.382	1.000	0.837	0.919
GRENADA	4.536	0.645	0.909	0.777
ST VINCENT & GRENADINES	4.700	0.647	0.934	0.790
ST LUCIA	5.011	0.765	0.901	0.833
BELIZE	5.494	0.588	0.937	0.762
BARBADOS	5.598	0.549	0.796	0.672
MALDIVES	5.611	0.948	0.956	0.952
ICELAND	5.623	0.465	0.310	0.387
MALTA	5.958	0.765	0.790	0.778
SURINAME	6.024	0.724	0.963	0.844
CAPE VERDE	6.052	0.950	0.972	0.961
LUXEMBOURG	6.072	0.471	0.000	0.235
CYPRUS	6.625	0.643	0.917	0.780
GUYANA	6.646	0.605	0.982	0.793
MAURITIUS	7.068	0.484	0.915	0.699
TRINIDAD AND TOBAGO	7.147	0.408	0.893	0.651
GAMBIA	7.182	0.708	0.995	0.851
ESTONIA	7.247	0.695	0.918	0.807
SLOVENIA	7.594	0.235	0.781	0.508
MACEDONIA, FYR	7.601	0.296	0.963	0.629
KUWAIT	7.654	0.560	0.675	0.617
MAURITANIA	7.762	0.725	0.992	0.858
OMAN	7.796	0.413	0.846	0.630
LATVIA	7.798	0.550	0.886	0.718
JAMAICA	7.861	0.706	0.935	0.820
PANAMA	7.935	0.640	0.923	0.782
CONGO REPUBLIC OF	7.984	0.654	0.983	0.819
URUGUAY	8.106	0.221	0.857	0.539
ALBANIA	8.149	0.263	0.980	0.622
COSTA RICA	8.202	0.334	0.906	0.620
MOLDOVA	8.202	0.794	0.994	0.894
LITHUANIA	8.212	0.357	0.521	0.439
IRELAND	8.229	0.284	0.494	0.389
ARMENIA	8.242	0.531	0.991	0.761
NEW ZEALAND	8.245	0.245	0.682	0.464
SINGAPORE	8.294	0.743	0.528	0.635
NORWAY	8.403	0.416	0.214	0.315
CROATIA	8.407	0.368	0.899	0.633
TOGO	8.407	0.704	0.995	0.850
PAPUA NEW GUINEA	8.445	0.389	0.985	0.687
KYRGYZ REPUBLIC	8.483	0.526	0.996	0.761
NICARAGUA	8.504	0.442	0.988	0.715
FINLAND	8.550	0.219	0.444	0.332
DENMARK	8.580	0.311	0.277	0.294
PARAGUAY	8.587	0.227	0.968	0.598

SLOVAK REPUBLIC	8.594	0.273	0.917	0.595
ISRAEL	8.719	0.339	0.617	0.478
EL SALVADOR	8.725	0.277	0.956	0.617
HONDURAS	8.753	0.409	0.982	0.696
JORDAN	8.762	0.555	0.974	0.764
HONG KONG	8.796	0.546	0.443	0.494
SWITZERLAND	8.873	0.136	0.191	0.164
AZERBAIJAN	8.980	0.447	0.990	0.718
AUSTRIA	8.999	0.166	0.430	0.298
BOLIVIA	9.005	0.229	0.979	0.604
SWEDEN	9.089	0.159	0.390	0.274
SENEGAL	9.136	0.355	0.991	0.673
TUNISIA	9.154	0.326	0.954	0.640
PORTUGAL	9.206	0.185	0.753	0.469
HUNGARY	9.217	0.225	0.895	0.560
BELARUS	9.218	0.488	0.977	0.733
NIGER	9.220	0.484	0.999	0.741
BELGIUM	9.233	0.294	0.458	0.376
CZECH REPUBLIC	9.238	0.236	0.881	0.559
GREECE	9.247	0.501	0.737	0.619
GUATEMALA	9.314	0.211	0.963	0.587
ECUADOR	9.426	0.345	0.973	0.659
CAMEROON	9.527	0.304	0.987	0.646
KAZAKHSTAN	9.614	0.327	0.973	0.650
CHILE	9.617	0.290	0.887	0.588
MADAGASCAR	9.649	0.356	0.997	0.676
NETHERLANDS	9.668	0.279	0.444	0.361
COTE D'IVOIRE	9.669	0.401	0.987	0.694
YEMEN, REPUBLIC OF	9.780	0.526	0.994	0.760
GHANA	9.782	0.420	0.994	0.707
AUSTRALIA	9.850	0.141	0.545	0.343
SRI LANKA	9.855	0.318	0.983	0.650
UGANDA	9.881	0.457	0.995	0.726
NEPAL	10.015	0.250	0.997	0.624
ROMANIA	10.020	0.158	0.964	0.561
MALAYSIA	10.031	0.449	0.921	0.685
VENEZUELA	10.074	0.356	0.898	0.627
PERU	10.136	0.186	0.953	0.570
MOROCCO	10.249	0.208	0.974	0.591
SUDAN	10.302	0.260	0.994	0.627
KENYA	10.309	0.391	0.994	0.693
CANADA	10.326	0.089	0.504	0.297
TANZANIA	10.443	0.368	0.997	0.682
ARGENTINA	10.507	0.077	0.821	0.449
POLAND	10.562	0.134	0.909	0.522
SPAIN	10.582	0.192	0.670	0.431
COLOMBIA	10.635	0.194	0.954	0.574
SOUTH AFRICA	10.668	0.113	0.933	0.523
KOREA	10.755	0.225	0.812	0.518
ITALY	10.962	0.062	0.547	0.305
FRANCE	10.984	0.099	0.460	0.279
UNITED KINGDOM	10.992	0.081	0.447	0.264

ETHIOPIA	11.000	0.543	1.000	0.771
THAILAND	11.030	0.278	0.958	0.618
EGYPT	11.045	0.504	0.970	0.737
IRAN, ISLAMIC REP	11.047	0.389	0.905	0.647
TURKEY	11.083	0.140	0.934	0.537
PHILIPPINES	11.231	0.371	0.981	0.676
GERMANY	11.316	0.076	0.436	0.256
MEXICO	11.496	0.035	0.887	0.461
NIGERIA	11.620	0.518	0.992	0.755
JAPAN	11.749	0.081	0.211	0.146
PAKISTAN	11.809	0.267	0.992	0.630
BANGLADESH	11.810	0.240	0.995	0.617
RUSSIA	11.890	0.184	0.965	0.575
BRAZIL	12.013	0.001	0.917	0.459
INDONESIA	12.243	0.133	0.988	0.561
UNITED STATES	12.516	0.046	0.221	0.134
INDIA	13.794	0.154	0.992	0.573
CHINA, P.R.: MAINLAND	14.051	0.000	0.984	0.492