

# **The evolving dynamics of global economic power in the post-crisis world: Revelations from a new Index of Government Economic Power**

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**Keywords:** comparative index, cross-country, economic power, foreign currency reserves, global economic crisis, government, human capital, revenue, trade

**JEL Codes:** F55 - International Institutional Arrangements, F59 - International Relations and International Political Economy: Other, O57 - Comparative Studies of Countries

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**Foreword**

In the rush to produce urgent policy documents and briefing notes that any government has to do, it is easy to let matters that may not be quite as urgent to go unattended. However, the not-so-urgent often includes matters of great importance for the long-run well-being of the nation and its citizenry. Research papers on topics of strategic economic policy fall in this category. The Economic Division in the Department of Economic Affairs, Ministry of Finance, has initiated this Working Paper series to make available to the Indian policymaker, as well as the academic and research community interested in the Indian economy, papers that are based on research done in the Ministry of Finance and address matters that may or may not be of immediate concern but address topics of importance for India's sustained and inclusive development. It is hoped that this series will serve as a forum that gives shape to new ideas and provides space to discuss, debate and disseminate them.

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**Disclaimer and Acknowledgements**

For comments and criticisms we are grateful to Sanjukta Chakraborty, Monica Sengupta De and Arvind Virmani.

The ideas presented in this paper are personal and do not reflect the views of the Ministry of Finance, Government of India.

**Abstract**

*This paper develops an index for measuring the economic power of governments viewed as entities in themselves. The basic idea is to encapsulate the economic representative power of a nation's government in the international arena in as simple and parsimonious a manner as possible. For this a set of standard data series drawn from internationally accepted data sources is used. The index is composed of four variables: government revenues, foreign currency reserves, export of goods and services, and human capital. These variables broadly reflect aspects that contribute to a government's economic clout, voice and negotiating leverage by capturing elements like its ability to raise resources, its creditworthiness and credibility in international financial markets, its influence on global economic activity and its potential in terms of human resources. The index values are tracked over 10 years (2000-2009) covering 100 economies. The 2009 results show that the top ten ranks are occupied by (1) the United States, (2) China, (3) Japan, (4) Germany, (5) India, (6) Russia, (7) France, (8) Brazil, (9) South Africa and (10) Italy. The index captures the steady rise of the large emerging economies, especially China, India and Brazil, together with the re-emergence of Russia in the new millennium, and the continuing importance of the United States, Germany and Japan. It also reveals the increasing relevance of a group of 'growth markets' the KISMT (Korea (South), Indonesia, South Africa, Mexico and Turkey). In terms of growth rate of index value (from 2000 to 2009) some African nations and transition economies of the former Soviet Union, like Azerbaijan, Belarus, Sudan and Angola have high rankings. Besides South Africa, among the African nations, Tanzania, Angola and Nigeria rose significantly in terms of index rankings.*

## I. Introduction

Individuals have for long been ranked by criteria like income, wealth and human capital attainments. Similarly, nations have over the last century been ranked by indicators like, Gross Domestic Product (GDP), the Human Development Index (HDI) and per capita incomes. This paper develops a method for ranking neither nations, nor the individuals who comprise the nation, but rather governments as entities in themselves. A government's power depends on various indicators of the nation which it governs and the individuals who people the nation, but it is distinct from both. This distinction is important and having a formal concept of 'economic power' of a government is important because government works as an entity in many fora like, the United Nations, the World Bank, in treaty negotiations, and in a variety of informal ways.

The state and state actors have from time immemorial been associated with the concept of power. This power has traditionally been seen and exercised as brute military force, diplomatic leverage or even espionage capabilities. Nevertheless, in modern times, it is the economic abilities of nations and governments that have come to the fore. At one level, we need not use the qualifier 'economic' because, in today's world, the power of a government is its economic power. This economic power gained greater importance following the end of the Cold War, the advent of globalization and the fallout of the recent global economic crisis. While the process of globalization saw government economic power supplementing the forces of the market, the global economic crisis witnessed governments playing a crucial role in stabilizing financial markets and managing to coordinate responses in order to prop up the world economy. In the wake of the crisis, governments continue play a vital role in terms of economic management and welfare oriented activities. Governments also play a critical role as agents of redistributive equity and development (Saeed, 1990). Therefore, the economic power of governments is a matter of great significance. Motivated by the need to develop a set of metrics to encompass this important phenomenon, this paper develops an index of government economic power.<sup>1</sup>

The attempt has been to use a parsimonious collection of standardized data and a relatively simple methodology without sacrificing explanatory ability and relevance. The index has been created for 10 years (2000-2009) covering 100 economies. This gives us a dynamic picture, the relevant aspects of which include:

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<sup>1</sup> Frost (2009) defines economic power "as the ability to control or influence the behaviour of others through the deliberate and politically motivated use of economic assets. National economic power implies that a government is in a position to use, offer, or withhold such assets even when they are in private hands (for example, by mandating trade embargoes or imposing controls on exports to targeted countries).....Economic power can also be thought of as the ability to resist external control or influence because dependence on external suppliers is sufficiently diverse to preclude vulnerability to outside pressure."

- i) the steady rise of the large emerging economies, especially China, India and Brazil, together with the re-emergence of Russia in the new millennium,
- ii) the continuing importance of US and Germany, and also Japan despite its long period of slow economic growth,
- iii) the increasing relevance of a group of 'growth markets' referred to here as the KISMT economies (Korea (South), Indonesia, South Africa, Mexico and Turkey), and
- iv) the advancement of African countries like Angola, Nigeria and Tanzania.

Some of the highlights of this exercise have revealed aspects of global economic power dynamics that we are already aware of like, the importance of the BRIC (Brazil, Russia, India and China) economies. But the analysis also reveals that Korea (South), Indonesia, South Africa, Mexico and Turkey have high rankings in terms of government economic power. Consequently, despite the warning from some experts against popular acronyms and nomenclature 'word games', an entirely serendipitous acronym has arisen in this analysis: KISMT (Korea (South), Indonesia, South Africa, Mexico and Turkey).<sup>2</sup> Interestingly, the BRICs and KISMTs are all part of the G-20 and together they virtually coincide with the recently emergent economies of the G-20.

The concept of national power has a central place in the study of international affairs and geopolitics. Hence, it is not surprising that several indices and measures of national power have arisen out of this literature. Given the importance of economic factors in national power, these indices generally incorporate economic variables. This includes the index developed by Clifford German (1960) which accounts for certain economic factors like, production of steel, coal, oil and electricity together with area and working population. More recent indices have a wider matrix. For instance, the Chinese concept of index of Comprehensive National Power (CNP) as described in Hu and Men (2004) encompasses 8 types of resources: economic resources, human capital, natural resources, knowledge and technological resources, governmental resources, military resources and international resources. These are reflected by 23 indicators. The 'International Futures' computer model uses GDP, defence spending, population and technology to assess national power. It was principally developed by Dr. Barry B. Hughes.<sup>3</sup> Various aspects of measurement of national power in the context of the 'International Futures' model are discussed in a RAND corporation conference proceedings (Treverton and Jones, 2005).

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<sup>2</sup> The word 'kismet' or 'kismet' probably originated from Persian or Turkish and means luck, fate or destiny. It is used in several languages including Hindi and Urdu (<http://dictionary.reference.com>). Rudyard Kipling's character Kim uses it to brilliant and ironic effect in the eponymous novel where his resignation to fate is only a facade considering the resourcefulness and destiny-changing actions of the protagonist. The destinies of these nations are also not mere fortune but the outcome of underlying institutions, policies and investments. See Beattie (2011) for a critique of "geo-economic Scrabble" and Authers (2011) for a description of the risks of such nomenclature-based branding. Incidentally, we do not need to forcibly give advantage to a 'vowel' country as Beattie avers.

<sup>3</sup> For details see <http://www.ifs.du.edu/>

In India, estimates of national economic power based on GDP were carried out by Arvind Virmani (see Virmani, 2005a and 2005b). Virmani's Index of Power Potential uses the parametrized product of GDP at purchasing power parity and per capita GDP normalized to US income and population. The measure of actual power for a given country uses the power potential measure multiplied by the ratio of that particular country's stock of strategic technology relative to the strategic technology stock of the US. The internal assessments carried out by Rakesh Mohan and Sanjay Baru in the first Strategic Defence Review of the National Security Advisory Board used economic indicators like, fiscal and external balances, human development, energy, food and defence expenditure for estimating national power (Baru, 2011).

The concept of government economic power also relates to the discourse regarding the political economy of the Indian state and its evolution vis-à-vis the world at large. In particular, it elucidates India's global standing in terms of the government's economic power and its possible impact on strategic relations. The ability of government economic power to provide an alternative to military recourse in light of globalization is an interesting possibility which according to some authors has not been grasped adequately by the Indian strategic establishment (Baru, 1998; Subrahmanyam, 1999; Bajpai, 2010). If that be the case, the index developed in this paper should contribute to the development of a long-term strategic vision for India as stressed by Ganguly (2010). Furthermore, this index would shed light on the political economy of macroeconomic management in India and its translation into adequate power for the government, an issue highlighted by Kapur (2010).

The disciplines of international economics and development studies on the other hand have conceptualised various other indices comparing nations including the UNDP's Human Development Index (HDI), the World Bank's Doing Business indicators and the World Economic Forum's Global Competitiveness Index (United Nations Development Programme, 2010; The World Bank, 2010; World Economic Forum, 2010). Molero and Pujol (2004) analyse an index of economic power based on the number of times a country occurs in the various issues of "The Economist" periodical. There has also been a substantial literature that endeavours to capture a nation's wellbeing showing special sensitivity to equality and poverty reduction (see, for instance, Sen, 1976; Basu, 2001; Stiglitz, Sen and Fitoussi, 2010; Subramanian, 2009 and 2011). To the best of the authors' knowledge, there is no comprehensive government economic power index that captures the idea of the economic representation that a government brings to a global negotiating table. In this respect, the index developed in this paper should be a contribution of some worth.

The index developed herein is particularly relevant in view of the perception that the world is moving towards a new economic order with new power centres and a realignment of the



major global economic actors (Subacchi, 2008). Further, following globalization, national economic power is no longer reliant on resources alone. Rather, it is the result of a complex web of international interactions and dependencies (Frost, 2009). There is also an appreciation of a redefining of international economic relations, including the growth enhancing impact of fast growing Asian economies, like China and India on other developing countries, especially in Sub-Saharan Africa (Kaplinsky and Messner, 2008; Carmody, 2009). Government economic power also has important implications for international coordination for addressing the issues of poverty and inequality (Basu, 2008). Developing a comprehensive index of government economic power would facilitate the analyses of these dynamics, reveal the shifts in the world economy, convey emerging trends and point to new agendas for research.

## **II. Conceptual framework**

The Index of Government Economic Power (IGEP) developed in this paper tries to capture one central concept, to wit a given government's economic prowess in the international arena. The basic idea is to encapsulate the economic representative power of a nation's government in as lucid and parsimonious a manner as possible. The list of factors that feed into government's economic capabilities, inclusive of both the quantitative and the qualitative elements, are numerous and selecting the key ones out of this set to create an index was a challenging proposition. In making this choice we have to bear in mind that our aim is to capture the ability of a government to project itself in the international sphere. The intention is to reflect aspects and parameters that are widely recognized as broad indicators of the potentials and strengths of the government of a national economy and its economic influence in international affairs. The choice of indicators comprising the index is driven by this aim.

In creating the index, we strove to select a few basic indicators which do not overlap much with one another but capture different facets of the economic power of national governments. As it happens, the index is composed of four variables: government revenues, foreign currency reserves, export of goods and services, and human capital. These variables broadly capture a government's command over resource or income, its creditworthiness and credibility in international financial markets, its influence on global economic activity and its potential in terms of human resources. Actually we treat aggregate exports and foreign currency reserves as two components of the same facet of a government's power – economic strength in the arena of global trade and currency movements. To that extent our overall index may be thought of as being created out of three basic constituents.

While revenue generation capacities of governments and the critical role of high quality human capital contributing to the economic soundness of any country is easily recognized, the inclusion of exports and in particular, foreign exchange reserves, is reflective of more

recent trends in evaluating the economic potential of a country. While a variety of strategies including import-substitution in initial stages of development have helped nations to perform well over a few years, the boost to economic growth for many countries (e.g. those of the Asian 'Tigers') resulted from heightened initiatives at export promotion- be it the exports of oil (Saudi Arabia) or of high technology products (Japan) or even services (India). Similarly, it is widely agreed that countries that had substantial reserves of foreign exchange (like, India, Russia and China) were able to withstand the recent global economic crisis better, and are able to exercise greater say in the international arena.

It is pertinent to stress that normalized variables (like, revenue per capita or exports to GDP ratio) have been deliberately avoided with the intention of making the index reflective of comparative cross-country advantages arising from the sheer scale of the values under consideration. In terms of exercise of economic power, the availability of total resources or the leverage arising due to large total exports is likely to be more relevant than the scaled values of these figures. Furthermore, since the paper aims to reflect international implications, the values are not adjusted for purchasing power parity (PPP). As a result, emerging economies may appear to lose out a little in the index that we develop, but in our view that is as it should be in measuring a government's power in the international arena.

GDP has not been taken as a variable since it reflects the total output of the economy including both the public and private sectors. While it does contribute to the power of a government, it is revenue commandeered by the government that is more indicative of state power.

Qualitative and quantitative aspects are both being balanced in the human capital values which is taken as the product of population and 'mean years of schooling' (discussed in detail in section III). The huge population figures for India and China would surely contribute to larger index values for them vis-à-vis other nations. But, higher achievements in 'mean years of schooling' would scale up relatively smaller population figures for countries of Western Europe vis-à-vis those of, say, the African countries. In essence, the idea is to depict government's command over one kind of wealth, to wit, human capital. Effects such as these feeding into the index are desirable since the attempt is to capture the potential benefits which arise for countries like China or India that are expected to enjoy substantive edges emanating from large reserves of human capital. At the same, the qualitative edge lent by 'mean years of schooling' makes up for lower population numbers by having achieved better standards in the delivery of education essential for human capital build-up.

### **III. Data and methods**

In order to ensure the use of standard data, the index has been constructed using three widely accepted datasets; the International Financial Statistics (IFS) and World Economic

Outlook (WEO) of the International Monetary Fund (IMF), and the United National Development Programme's (UNDP's) Human Development Index (HDI). The variables are described below:

### **a. Variables**

For each year and each country  $i$  the following variables have been considered:

(i) *Revenue collected by the general government ( $R_i$ )*

(ii) (a) *Foreign Exchange Reserves ( $f_i$ )*

(b) *Exports of Goods ( $X_i$ ) and Services ( $S_i$ ) (with total exports  $E_i = X_i + S_i$ ).*

(iii) *A measure of aggregate human capital,  $H_i$ , where  $H_i = P_i * (mys_i)$  with  $P_i$  being the population and  $mys_i$  the mean years of schooling (for adults).*

Data on  $R_i$  (measured in millions of the local currency) have been derived from the WEO database of the IMF. It consists of taxes, social contributions, grants receivable and 'other' revenue, all of which increases government's net worth.<sup>4</sup>

Data on  $f_i$  ( in million US dollars) includes claims on non-residents in the form of foreign banknotes, bank deposits, treasury bills, short-term and long-term Government securities and 'other claims' that are 'usable' by the monetary authority in the event of a balance of payments contingency and is derived from the IFS database of the IMF. The IFS is also the source of data for both  $X_i$  and  $S_i$  (from which  $E_i$  has been calculated), both of which are measured in US dollars.

The UNDP's HDI database provides us with the 'mean years of schooling' data. It is available annually for the countries considered in this study over the period 2005 to 2009. Data on this has not been reported between 2001 and 2004. However, since 'mean years of schooling' is a variable that does not undergo wide variations over time, the data for it over 2001 to 2004 have been generated utilizing the endpoint (year 2000 and year 2005) values via interpolation. Data on annual population of nations (in millions), are derived from the IFS.

The data on each variable is on an annual basis over the ten-year period 2000 to 2009 and except  $R_i$  and  $mys_i$ , the source of each variable (including exchange rates) is the IFS. The aim of the exercise is to rank nations based on an index that combines the above variables. For this purpose, there is a need to construct a measure for each of these variables that is unit free. The value of such measures would then be easily combined to generate the Index

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<sup>4</sup>  $R_i$  is converted to US dollar terms using the nominal local currency-US Dollar exchange rate (which is not PPP corrected). The data on these exchange rates are derived from the International Financial Statistics (IFS) database of the IMF.

of Government Economic Power (IGEP) that would allow us to derive rankings for all the countries for a given year. We use a method akin to that used for the Human Development Index (United Nations Development Programme, 2010). This gives us a set of established procedures for creating indices. The construction of the simple unit free measure is discussed subsequently in section III b and c.

### ***b. Goalposts***

The aim is not only to derive country rankings for a given year but compare how countries perform over the years (2000-2009). Comparison *over time* of the simple unit free rankings derived for each particular year (in a manner to be described subsequently) would not be meaningful if the maximum and minimum values of particular variables (that are both utilized in constructing the unit free measure) change from one year to the other, which is naturally expected. Comparability of individual country rankings over time, therefore, necessitates the fixing up of *goalposts* for each variable under consideration. The goalposts would signify both the minimum value that the particular variable has realized for any country over the period under consideration as well as the maximum that can potentially be attained by it in the near future.

These goalposts, once fixed for each variable, would serve as the common range of values within which the individual country realizations of values for each variable would lie over the entire time period. More importantly, once these goalposts are utilized to construct the unit free measure for each of the variables, the changes in the overall index would not be contingent upon how the best and the worst performing economies are doing in particular years, but on how the particular variable is behaving over time for the country in question. This would facilitate comparison of country rankings, over the entire time frame.

There are issues in estimating precise goalposts. The difficulty is particularly acute in fixing the upper one since, accurate forecasts of levels of foreign exchange reserves, government revenue or exports, that a country within our set can attain in the coming years is difficult to carry out. This problem is addressed by fixing the (upper) goalpost by adding to the maximum value realized for a variable  $v_i$  ( $v_{imax}$  over the 2000 to 2009 period observable directly from the data) an additional 25 per cent of this maximum attained. Thus the upper goalpost for variable  $v_i$  is given as:

$$\text{Max } \{v_{ij}\} = v_{imax} + 0.25^* v_{imax} \quad [1]$$

The factor  $(0.25^* v_{imax})$  provides additional leeway for the variable to attain a value higher than the already attained maximum such that the present method of index construction

remains valid for a considerable period of time. The lower goalpost  $Min \{v_i\}$  is simply the minimum value attained by  $v_i$  over the 2000-2009 period.<sup>5</sup>

### ***c. The Unit-free Measure***

Once the goalposts for each variable are fixed, the unit free measure for variable  $v_i$  for country  $k$  in a given year is written as;

$$M_{vk} = [v_{ik} - \min\{v_i\}] / [\max\{v_i\} - \min\{v_i\}] \quad [2]$$

where  $v_{ik}$  is the value realized by country  $k$  for the variable  $v_i$ . The denominator is the range of the goalposts fixed. By definition  $0 < M_{vk} < 1$ . For any given year,  $M_{vk}$  is calculated for each of the variables that we have considered and the countries are ranked as per their performance in each dimension, based on the value realized by this measure.

### ***d. Corrections for Foreign Exchange Reserves***

A comparability issue of economic importance arises while compiling and comparing the figures for foreign exchange reserves of countries individually (as have been reported in the IFS in million US dollars). The vast majority of economies need to hold foreign exchange reserves to service their external commitments and maintain their external credit viability. However, in the case of economies associated with the major international currencies, such a requirement is superfluous. Since these economies can, in effect, print international currencies in their mints, they need not hold large forex reserves. Nevertheless, their ability to control the issue of international currencies gives them considerable leverage in the global economy. For instance, the figure of foreign exchange reserves reported for the United States is much less compared to that of many other nations, including India. Based on this, it would be improper to infer that the economic power enjoyed by the US authorities as reflected by their reserves of foreign exchange is lower vis-à-vis other countries. After all, the US dollar serves as an international reserve currency, and governments and investors the world over willingly hold on to it in several forms. In principle, the same issue assumes importance with respect to those European nations which have the Euro as their national currency and also in the case of the United Kingdom and Japan. Foreign exchange reserves figures reported for these countries cannot therefore be directly compared to the figures of other countries and adjustments need to be carried out before some cross-country comparability is achieved.

A resolution of this issue is attempted in the following manner: since a particular currency is held worldwide, we seek to capture by what factor the core reserves held by that country ( $f_i$

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<sup>5</sup> The need for a leeway for the lower variable was not found necessary, since the variables are in general trending upwards and are unlikely to fall below the minimum attained in the period 2000-2009 for the overwhelming majority of countries considered.

as is reported in the IFS) can be augmented in a way concomitant with its international financial stature, such that the final figure gives an idea about the actual manoeuvrability of the economy on the face of international financial shocks. To derive such figures for the major currencies - the US Dollar, the Euro, the Pound Sterling and the Yen - the same exercise must also capture the relative importance of each of these in the international economic order.

In this respect, the currency weights allotted to these in the Special Drawing Rights (SDR) basket, by the IMF, is a reasonable indicator of their relative importance. Furthermore, the Composition of Official Foreign Exchange Reserves (COFER) database of the IMF provides us with figures on the currency-wise breakup of the total official foreign exchange reserves held internationally on both annual and quarterly basis. Conceptually, the aim is to estimate that over and above the direct claims on non-residents that is at the disposal of the monetary authority of the country, what portion of the international reserves (denominated in the currency of that particular country) can be considered to be indirectly contributing to its international economic clout. This additional portion is derived by applying the SDR weight of the currency in question to the international reserves figure denominated in the particular currency derived from the COFER database. Thus, the resultant adjusted foreign exchange reserves figure for the US,  $F_{US}$ , the adjusted foreign exchange reserves figure for the UK,  $F_{UK}$  and the adjusted foreign exchange reserves figure for Japan,  $F_J$  are derived, for any given year, as:

$$F_{US} = f_i^{US} + s^{usd} * IR^{usd} \quad [3a]$$

$$F_{UK} = f_i^{UK} + s^p * IR^p \quad [3b]$$

$$F_J = f_i^J + s^y * IR^y \quad [3c]$$

where, the  $f_i$  s denote the figures of foreign exchange reserves reported in the IFS for the country in question,  $s^{usd}$  denotes the share of the US Dollar in the SDR basket, while  $s^p$  denotes the share of the Pound Sterling in the SDR basket and  $s^y$  denotes the share of the Yen in the SDR basket.  $IR^{usd}$ ,  $IR^p$  and  $IR^y$  denote official international reserves denominated in US Dollars, Pound Sterling and Japanese Yen, respectively.<sup>6</sup>

For the Euro, in contrast, there arises a need to decide on means to allocate the share of international reserves denominated in Euros to those individual countries of the Euro zone considered in our dataset on the basis of their relative economic or political influence in the Euro zone. We consider the vote shares enjoyed by individual member states in the

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<sup>6</sup> As with any notional adjustment, questions may arise regarding the selection of indicators and choice of weights and aggregation methods. We are well aware that a different set of variables, weighting pattern or method would lead to variant results. Conscious of the inescapability of the challenge, we chose to adopt the most accepted international indicators, a straightforward weighting pattern and a simple system of aggregation.

Council of the European Union (EU) to be indicative of the relative importance of one member state vis-à-vis the other and decide to allocate the portion of international Euro-denominated reserves as per these shares. Thus, the resultant foreign exchange figure for the Euro for country  $j$ , for a given year, is derived as:

$$F_{Euro}^j = f_j^j + n_j * s^{Euro} * IR^{Euro} \quad [3d]$$

where  $f_j^j$  denotes foreign exchange reserves of the Euro country  $j$  as reported in the IFS,  $n_j$  denotes its vote share in the council of the EU,  $s^{Euro}$  is the share of the Euro in the SDR basket and  $IR^{Euro}$  denotes official international reserves denominated in Euros.

Conceptually this composite variable represents the currency power of the government with respect to, (a) the foreign currency reserves it holds, and (b) the leverage arising out of having the domestic currency as an international reserve currency. Then analytically this is a combination of two series. The first is simply the foreign exchange reserves as captured by the IFS data. The second is the reserve currency advantage, which has a value of zero for all governments except the ones associated with the major reserve currencies.

#### **e. The Index of Government Economic Power (IGEP)**

In constructing the index, not sacrificing simplicity was a major concern. However, attention was also given to methodological propriety. Therefore, geometric mean was chosen as the mathematical formula for combining the variables. This is driven by the concern that if arithmetic mean is used, a simple substitutability is built in between the variables.<sup>7</sup> The IGEP for country  $k$  is derived as a Geometric Mean (GM) of the unit free measures calculated by combining the variables into three constituents, where we conceptualize  $(M_{fk} * M_{Ek})^{1/2}$  as a single constituent.<sup>8</sup> Thus,

$$IGEP_k = [(M_{Rk}) (M_{fk} * M_{Ek})^{1/2} (M_{Hk})]^{1/3} = (M_{Rk})^{1/3} (M_{fk} * M_{Ek})^{1/6} (M_{Hk})^{1/3} \quad [4]$$

where in accordance with [2] for each country  $k$  ;

$$M_{Rk} = [R_{ik} - \min\{R_{ij}\}] / [\max\{R_{ij}\} - \min\{R_{ij}\}]$$

$$M_{fk} = [f_{ik} - \min\{f_{ij}\}] / [\max\{f_{ij}\} - \min\{f_{ij}\}]$$

<sup>7</sup> Such simple substitutability implies that a country which is (say) receiving huge revenues can make up one-to-one in its aggregate index value for a serious lack of human capital (as captured by our measure) or in any one of the other constituents considered. To prevent such imperfections the simple arithmetic mean has not been opted for. It is true that the geometric mean too imparts one form of substitutability between the measures, but this is not a direct one-to-one substitutability. Therefore, its use over the arithmetic mean is preferred.

<sup>8</sup> In essence, we create a composite constituent representing economic strength in the arena of global trade and currency by using a two variable geometric mean of aggregate exports and foreign currency reserves (as adjusted for international reserve for three components currency power). This composite variable is then combined with government revenues and human capital using the geometric mean method.

$M_{EK} = [E_{ik} - \min\{E_{ij}\}] / [\max\{E_{ij}\} - \min\{E_{ij}\}]$  with  $E_{ik} = X_{ik} + S_{ik}$ ; and

$M_{HK} = [H_{ik} - \min\{H_{ij}\}] / [\max\{H_{ij}\} - \min\{H_{ij}\}]$  with  $H_{ik} = P_{ik} * (mys_{ik})$ .

For the US, UK, Japan and the Euro zone nations adjusted foreign exchange reserves calculated as per the method elaborated in section III d (using equations [3a] to [3d]) have been taken into account while deriving values for  $M_{fk}$ .

Based on these results the economies were ranked.

#### IV. Results and implications

The main results encompass 100 economies from 2000 to 2009.<sup>9</sup> The 2009 results show that the top ten ranks are occupied by (1) the United States, (2) China, (3) Japan, (4) Germany, (5) India, (6) Russia, (7) France, (8) Brazil, (9) South Africa and (10) Italy. In 2000 the top ten places were held by (1) the United States, (2) Japan, (3) China, (4) Germany, (5) France, (6) the United Kingdom, (7) Italy, (8) India, (9) Canada and (10) Brazil. In 2009 the lowest ten spots went to (91) Moldova, (92) Namibia, (93) Nicaragua, (94) Armenia, (95) Mali, (96) Benin, (97) Iceland, (98) Mauritius, (99) Haiti and (100) Brunei Darussalam while in 2000 these places were held by (91) Namibia, (92) Iceland, (93) Georgia, (94) Brunei Darussalam, (95) Moldova, (96) Kyrgyz Republic, (97) Benin, (98) Armenia, (99) Haiti and (100) Mali.

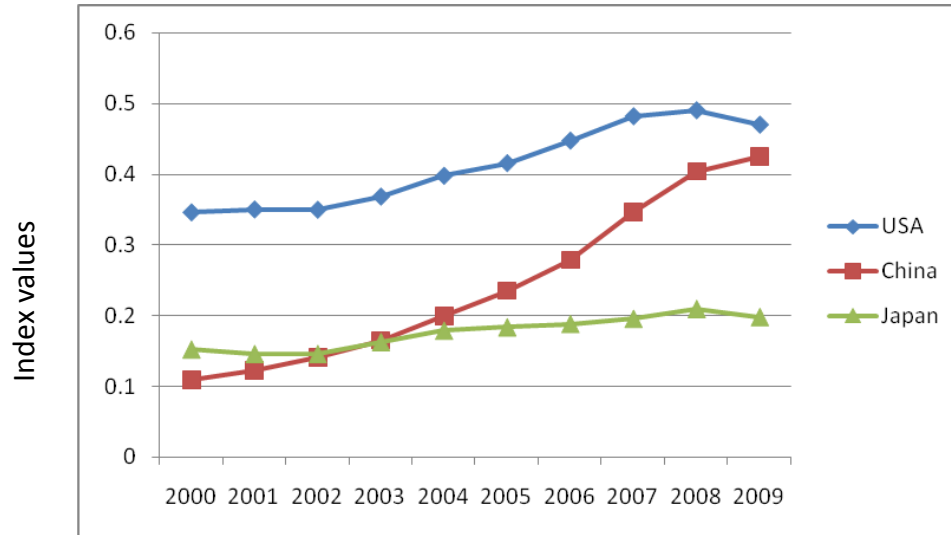
Among the top ranking economies, some of the most dramatic rise in ranks have been Russia's ascent from 15<sup>th</sup> in 2000 to 6<sup>th</sup> in 2009, South Africa's rise from 12<sup>th</sup> to 9<sup>th</sup> across that period, Brazil's climb from 10<sup>th</sup> place in 2000 to 8<sup>th</sup> in 2009 and India's rise from 8<sup>th</sup> position in 2000 to 5<sup>th</sup> in 2009. Japan was replaced by China in the 2<sup>nd</sup> spot in 2003. The United Kingdom went down from 6<sup>th</sup> place in 2000 to 11<sup>th</sup> by 2009. Canada fell from 9<sup>th</sup> in 2000 to 15<sup>th</sup> in 2006 and continued there in 2009. The changing dynamics of global economic power can be further seen if we analyze the index values over time for some of the larger economic entities. If we compare the three top ranking countries of 2000, the US, Japan and China, the US and Japan have risen slowly in terms of the index value, except for the slight fall in 2009. In contrast, China has risen steadily and after surpassing Japan in 2003 is slightly below the US in 2009 (see Figure 2).

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<sup>9</sup> We began with a set of 112 economies for which continuous data was available across the sample period. To ensure stable results we focused on the top 100 ranks as per the 2009 index values and tracked these from 2000.

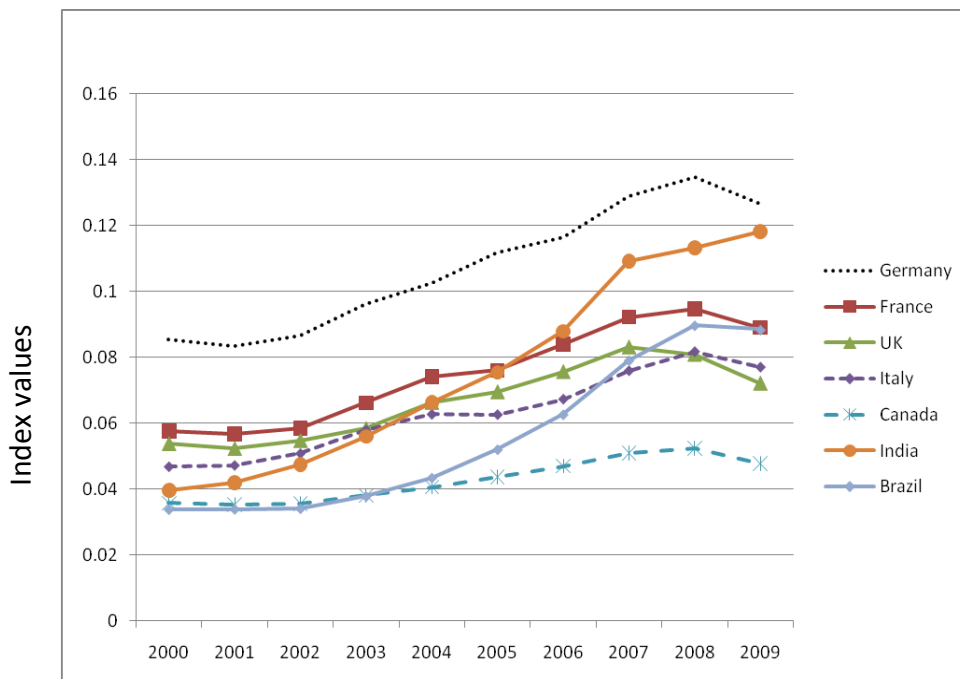


**Figure 2: Index values for United States, Japan and China (2000-2009).**



On an analysis of the countries holding the 4<sup>th</sup> to 10<sup>th</sup> positions in 2000, most countries reveal a slow rise with a fall after 2008, except in the case of India. India moves from an index value just below Italy in 2000 to one close to Germany by 2009 (Figure 3). Among the large economies, China and India also demonstrate remarkable robustness by not having the index values decline in 2009 unlike all the other countries occupying the top ten positions in 2000.

**Figure 3: Index values for Germany, France, the United Kingdom, Italy, (Republic of) Korea, Canada and India (2000-2009).**



Besides the original bloc of BRIC economies, a further group of potent emerging countries is revealed by the index. From the list of top 20 countries in 2009 in terms of index value, if we remove the traditionally wealthy nations, like the industrialized countries and Saudi Arabia, we are left with the BRIC countries and another group of nations. We name this second group the KISMT economies (Korea (South), Indonesia, South Africa, Mexico and Turkey). Barring South Africa, they coincide with the “growth markets”, highlighted by Jim O’Neill of Goldman Sachs (Hughes, 2011). In the 2009 list, all these “growth markets” rank in the top 20 with South Korea 12<sup>th</sup>, Mexico ranking 14<sup>th</sup>, Indonesia 16<sup>th</sup> and Turkey 17<sup>th</sup>. The results indicate that South Africa (9<sup>th</sup> rank in 2009), though not identified by Jim O’Neill, also holds great promise. This leads us to classify the KISMT group as a significant set of economic powers holding substantial potential. Interestingly, once the BRICs and KISMTs are accounted for, all the other governments in the 2009 top 20 are associated with established ‘high income’ countries. Argentina is the only G-20 country not figuring in the top 20 list of 2009 (it has a rank of 26). Conversely, Spain and the Netherlands are the only countries in the top 20 of 2009 that are not represented separately in the G-20 (the European Union and the European Central Bank are represented in the G-20). Therefore, the economic power of governments as captured by the index is reflected in recent alignments in the international economic stage.

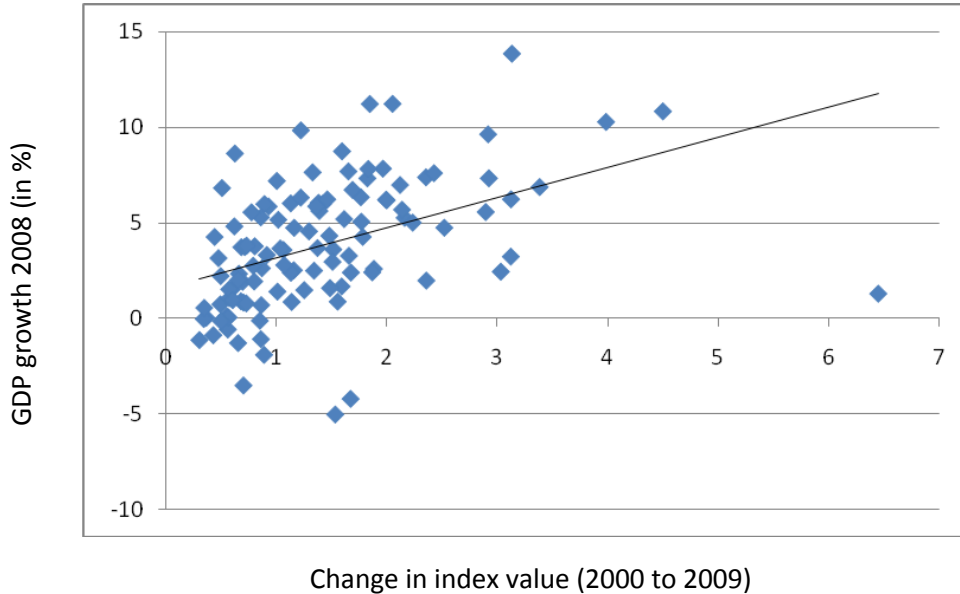
In terms of the velocity of index growth from 2000 to 2009 (the growth rate in terms of index value across time:  $[IGEP_{k2009} - IGEP_{k2000}] / IGEP_{k2000}$ ) the list holds a few surprises in terms of the rapid increase in index value shown by some African nations and transition economies of the former Soviet Union. The top rankings here go to (1) Azerbaijan, (2) Belarus, (3) Sudan, (4) Angola, (5) Kazakhstan, (6) Georgia, (7) China, (8) Kyrgyz Republic, (9) Ukraine and (10) Romania. India stands at 16<sup>th</sup> position.

To account for the combination of sheer size and speed, the index momentum (velocity multiplied by index value in 2009:  $\{[IGEP_{k2009} - IGEP_{k2000}] / IGEP_{k2000}\} * IGEP_{k2009}$ ) is also calculated. The top ranking countries (for 2009) in terms of momentum are (1) China, (2) India, (3) Russia, (4) the United States, (5) Brazil, (6) South Africa, (7) Germany, (8) Saudi Arabia, (9) Japan and (10) Italy. This mixed bag has some established industrial and economic powerhouses and some of the major emerging economies (the new BRICS, that is BRIC + South Africa) demonstrating the changing equilibrium of the global economic order. Our study therefore endorses the recent decision to add South Africa to the erstwhile BRIC cluster. Besides South Africa, among the African nations, Tanzania and Angola show dramatic rise. In terms of index value, the former moves from 69<sup>th</sup> place to 64<sup>th</sup> place while the latter jumps from 59<sup>th</sup> rank to 53<sup>rd</sup> between 2000 and 2009. Nigeria’s ascent from 30<sup>th</sup> to 28<sup>th</sup> rank across the same period is also noteworthy.

The index also shows an interesting aspect of the robustness of economies in the face of the global financial crisis. It appears that there is a positive correlation between the growth in government economic power (as measured by the change in the index value between

2000 and 2009) and GDP growth across the crisis period (that is in 2008). However, this correlation should not be interpreted as causal link in either direction (Figure 4).

**Figure 4: Change in Index values (2000-2009) and GDP growth in 2008**



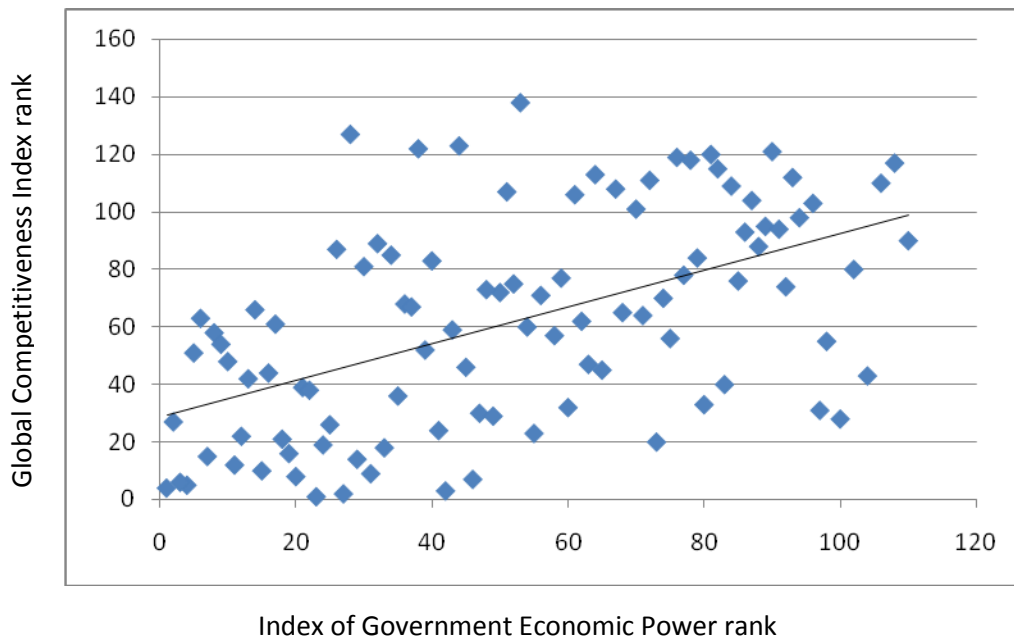
Furthermore, for these countries there is a positive correlation between the growth in government economic power (as measured by the percentage change in the index value between 2000 and 2009) and GDP growth in the post-crisis period (that is in 2009) indicating some possible link between growth in economic power as measured by the index and the ability to recover from the crisis. Once again, this is by no means indicative of a direct causal relationship between the two variables (Figure 5).

**Figure 5: Change in Index values (2000-2009) and GDP growth in 2009**



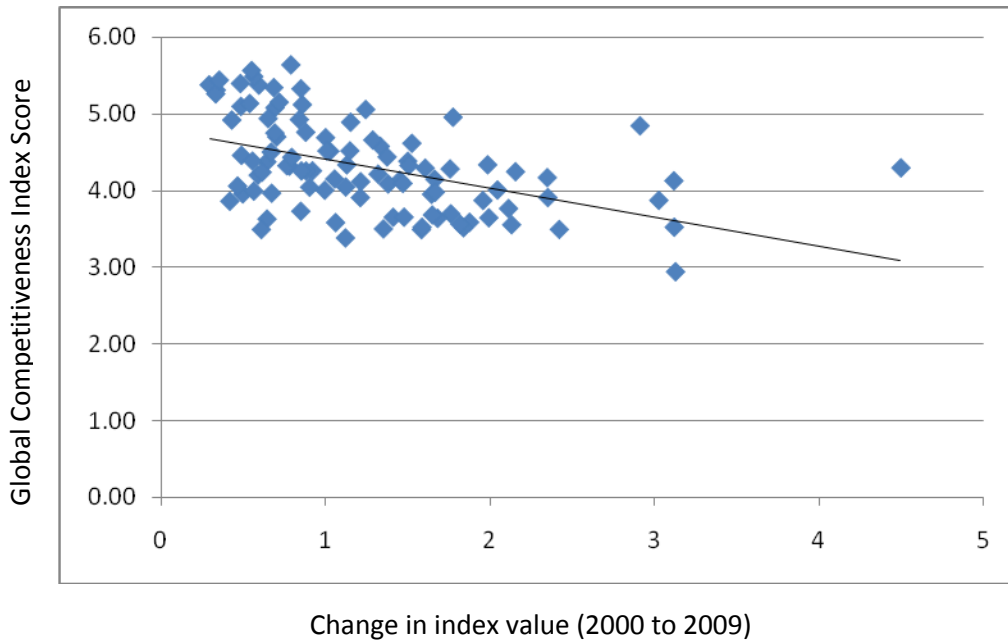
A comparison of the index values with the values of other ranking exercises like, the World Economic Forum's (2010) Global Competitiveness Index gives interesting insights. There is a positive albeit weak correlation between the IGEP rankings and the Global Competitiveness Index rankings for the 95 countries/economies for which data is available in both indices (Figure 6).

**Figure 6: Global Competitiveness Index (2010-11) rank and Index (IGEP) rank (2009)**



However, curiously enough, the change in the IGEP value across the 2000-2009 period has a distinct inverse relation with the Global Competitiveness Index (for 100 countries/economies for which data is available in both indices). While again no causal link should be drawn between the two, this may be related to large growing fiscal and socio-economic needs or significant regulatory requirements of powerful governments (Figure 7). Equally, it may be reflecting the essential dichotomy between the state and the market, with governments that grow in terms of economic power leaving comparatively less leeway for market forces to act in a *laissez faire* manner during the phase of growth. No normative conclusions should be drawn from this since the economic power of government is often a function of socio-economic imperatives. After all, as seen above (Figures 4 and 5), there is a positive correlation between growth in the IGEP and GDP growth in 2008 and 2009. As a corollary, the GDP growth in 2009 has a negative correlation with the GCI (2010-11). These may just be reflections of the changing nature and importance of government and its regulatory and stabilizing role in the post-crisis world.

**Figure 7: Global Competitiveness Index (2010-11) Score and change in Index (IGEP) values (2000-2009)**



## V. Caveats and conclusions

The process of creating rankings is a hazardous activity. This is one area where one is acutely aware that there is no such thing as the best. As far as possible, the attempt has been to keep the methodology simple without compromising on explanatory capabilities or relevance. Needless to say, a differently conceived notion of government economic power will throw up a different set of rankings. There are caveats galore in choosing particular economic variables, combining them to construct an index and then, interpreting what the value of the index comes about to signify. But at the same time, the general picture that emerges from the combination of such widely accepted indicators of economic importance into a single index (which is then used to rank nations) has its own significance. It provides us with an interesting benchmark as to how economies and governments stand vis-à-vis each other on the basis of some common goalposts that are derived from the data itself.

The test of the resulting output, therefore, lies in the extent to which it is able to capture the present trends in the world economy, like the extent of China's rise or the impact of disturbances in the Euro zone (apart from providing an answer the supposedly innocuous curiosity in the form of 'Who is now the Number 1?'). The usefulness of the results lie in imparting a general idea about which governments are on the ascendant in the international arena, which ones are holding steady and which ones do not seem to be doing too well. As the discussions above show, the index does seem to capture some

relevant aspects of the global shift of economic power witnessed in recent times. Salient among these are:

- i) the impact of the global financial crisis on the industrialized economies,
- ii) the rise of large emerging economies including, BRICS (Brazil, Russia, India, China and South Africa)
- iii) the economic power of governments in 'growth markets' which we refer to as the KISMT (Korea (South), Indonesia, South Africa, Mexico and Turkey).

It is true that questions can still be raised on the suitability of the choice of the variables and suggestions regarding an alternative set can ensue. It is here that the balance between simplicity on the one hand, and relevance and usefulness, on the other, assumes importance. In the same spirit in which the HDI is constructed, which is not necessarily the ideal (but is nevertheless an important) measure of how countries are faring on the human development front, the IGEP too attempts to capture the complex attribute of 'government economic power' through an index that should not turn out to be too complex to conceptually figure out.

But then, why not consider variables like government spending on social sectors or defence or share of the public sector in a given economy or the fiscal leeway available to governments that are also indicative of the economic power a government can wield? The answer to this lies in the primary aim of our exercise. We are not interested in assessing the economic power of the government *within* the confines of its own economy. The quest is to form an idea about how the government of economy *x* fares with respect to economic power in the international arena, vis-à-vis another economy *y*. Such a comparison can be better carried out by comparing such variables which, to a considerable extent, determine the assessment of the economic strength of the country by the international economic community (including international investors). Furthermore, these variables also reflect to a certain extent other aspects of economic power like availability of natural resources, national productive capacity, foreign investor confidence and competitiveness of national industries and services. For instance, the large foreign exchange reserves and exports of Saudi Arabia reflect its vast petroleum resources and put it in a relatively high spot despite its small population size. Therefore, adding other variables, many of which would be correlated with the ones used in this index, may amount to double counting.

Nevertheless, utmost care needs to be exercised in interpreting the results of the exercise and we must not commit the folly of over-interpretation. Performance of countries, especially the emerging ones, doing well on the basis of the constructed index should be lauded keeping in mind the associated caveat that there do exist several issues like poverty and inequality, which need to be effectively addressed and are not captured by the broad economic fundamentals considered here. Similarly, persistence of good rankings for an economy over the years should tell us that, a plethora of challenges notwithstanding, there

exists huge potential for the economy maintaining such rankings to sustain its economic engine and emerge stronger in the coming years compared to ones who have not been able to stick to their positions over time. Thus, barring very few countries, just as a good rank should not be interpreted as indicative of 'all is well' for that economy, it should *not* be dismissed as signifying little about the potential of the country to address effectively the problems that it faces.

An associated positive externality emanating from an exercise having such a broad canvas is in its potential to throw up research agendas, which can be further pursued to gain insights on specific issues via more rigorous micro exercises in the future. These include analyses of region-wise performances, correlations between the scores of countries or regions linked by trade or investment ties, and the relation between the IGEP and international economic negotiation outcomes. These aspects, interesting as they are, lie well beyond the scope of this paper.

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**Table 1: Rankings and index values for 2000**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.3459	34	Egypt	0.0082	67	Yemen, Republic of	0.0010
2	Japan	0.1527	35	Venezuela, Rep. Bol.	0.0078	68	Guatemala	0.0010
3	China	0.1088	36	Greece	0.0078	69	Tanzania	0.0010
4	Germany	0.0853	37	Singapore	0.0075	70	Belarus	0.0009
5	France	0.0578	38	Colombia	0.0067	71	Luxembourg	0.0009
6	United Kingdom	0.0540	39	Portugal	0.0065	72	Bolivia	0.0009
7	Italy	0.0469	40	Czech Republic	0.0062	73	Botswana	0.0008
8	India	0.0396	41	Finland	0.0062	74	Azerbaijan, Rep. of	0.0008
9	Canada	0.0357	42	Hungary	0.0058	75	Latvia	0.0007
10	Brazil	0.0339	43	Chile	0.0058	76	Jamaica	0.0007
11	Korea, Republic of	0.0330	44	Ireland	0.0053	77	Cameroon	0.0007
12	South Africa	0.0317	45	Ukraine	0.0048	78	Cyprus	0.0007
13	Mexico	0.0309	46	Pakistan	0.0044	79	Ethiopia	0.0007
14	Spain	0.0301	47	Peru	0.0043	80	Uganda	0.0006
15	Russian Federation	0.0300	48	Vietnam	0.0042	81	Paraguay	0.0006
16	Netherlands	0.0188	49	Romania	0.0039	82	Estonia	0.0006
17	Turkey	0.0184	50	New Zealand	0.0030	83	Trinidad & Tobago	0.0006
18	Australia	0.0175	51	Bangladesh	0.0030	84	Sudan	0.0006
19	Poland	0.0153	52	Slovak Republic	0.0030	85	Cambodia	0.0005
20	Indonesia	0.0147	53	Morocco	0.0029	86	Zambia	0.0004
21	Argentina	0.0138	54	Kazakhstan	0.0020	87	Senegal	0.0004
22	Sweden	0.0131	55	Croatia	0.0020	88	Albania	0.0004
23	Belgium	0.0125	56	Bulgaria	0.0019	89	Nicaragua	0.0004
24	Saudi Arabia	0.0121	57	Tunisia	0.0016	90	Mauritius	0.0003
25	Switzerland	0.0120	58	Sri Lanka	0.0016	91	Namibia	0.0003
26	Thailand	0.0116	59	Angola	0.0016	92	Iceland	0.0003
27	Austria	0.0104	60	Slovenia	0.0015	93	Georgia	0.0003
28	Norway	0.0097	61	Kenya	0.0015	94	Brunei Darussalam	0.0003
29	Malaysia	0.0097	62	Uruguay	0.0013	95	Moldova	0.0003
30	Nigeria	0.0091	63	Dominican Republic	0.0012	96	Kyrgyz Republic	0.0002
31	Philippines	0.0090	64	Lithuania	0.0011	97	Benin	0.0002
32	Denmark	0.0087	65	Jordan	0.0011	98	Armenia	0.0002
33	Israel	0.0083	66	Costa Rica	0.0011	99	Haiti	0.0002
						100	Mali	0.0002

*Note:* Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 2: Rankings and index values for 2001**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.3503	34	Egypt	0.0078	67	Costa Rica	0.0011
2	Japan	0.1463	35	Singapore	0.0070	68	Tanzania	0.0011
3	China	0.1230	36	Colombia	0.0070	69	Guatemala	0.0011
4	Germany	0.0833	37	Greece	0.0070	70	Yemen, Republic of	0.0010
5	France	0.0568	38	Venezuela, Rep.	0.0068	71	Luxembourg	0.0009
6	United Kingdom	0.0525	39	Portugal	0.0068	72	Bolivia	0.0008
7	Italy	0.0473	40	Czech Republic	0.0067	73	Jamaica	0.0008
8	India	0.0420	41	Finland	0.0062	74	Cameroon	0.0008
9	South Africa	0.0355	42	Hungary	0.0061	75	Latvia	0.0008
10	Canada	0.0352	43	Ukraine	0.0060	76	Azerbaijan, Rep. of	0.0008
11	Brazil	0.0340	44	Chile	0.0056	77	Botswana	0.0008
12	Russian Federation	0.0334	45	Ireland	0.0055	78	Ethiopia	0.0007
13	Mexico	0.0330	46	Pakistan	0.0051	79	Cyprus	0.0007
14	Korea, Republic of	0.0320	47	Vietnam	0.0045	80	Uganda	0.0007
15	Spain	0.0307	48	Romania	0.0043	81	Trinidad and Tobago	0.0007
16	Netherlands	0.0187	49	Peru	0.0043	82	Estonia	0.0006
17	Australia	0.0170	50	Morocco	0.0033	83	Paraguay	0.0006
18	Poland	0.0161	51	Bangladesh	0.0030	84	Cambodia	0.0005
19	Indonesia	0.0157	52	New Zealand	0.0030	85	Sudan	0.0005
20	Turkey	0.0152	53	Slovak Republic	0.0030	86	Albania	0.0004
21	Belgium	0.0132	54	Kazakhstan	0.0023	87	Senegal	0.0004
22	Argentina	0.0124	55	Croatia	0.0022	88	Zambia	0.0004
23	Sweden	0.0122	56	Bulgaria	0.0020	89	Nicaragua	0.0004
24	Switzerland	0.0119	57	Tunisia	0.0017	90	Georgia	0.0003
25	Thailand	0.0118	58	Sri Lanka	0.0016	91	Mauritius	0.0003
26	Saudi Arabia	0.0117	59	Slovenia	0.0016	92	Namibia	0.0003
27	Malaysia	0.0103	60	Belarus	0.0016	93	Iceland	0.0003
28	Austria	0.0103	61	Kenya	0.0016	94	Moldova	0.0003
29	Norway	0.0095	62	Dominican Republic	0.0014	95	Brunei Darussalam	0.0003
30	Nigeria	0.0093	63	Angola	0.0013	96	Kyrgyz Republic	0.0003
31	Denmark	0.0089	64	Uruguay	0.0013	97	Benin	0.0003
32	Philippines	0.0087	65	Lithuania	0.0012	98	Armenia	0.0003
33	Israel	0.0082	66	Jordan	0.0011	99	Mali	0.0002
						100	Haiti	0.0002

*Note:* Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 3: Rankings and index values for 2002**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.3496	34	Czech Republic	0.0079	67	Costa Rica	0.0012
2	Japan	0.1465	35	Egypt	0.0079	68	Guatemala	0.0011
3	China	0.1411	36	Greece	0.0078	69	Yemen, Republic of	0.0011
4	Germany	0.0867	37	Portugal	0.0075	70	Luxembourg	0.0010
5	France	0.0587	38	Colombia	0.0071	71	Cameroon	0.0009
6	United Kingdom	0.0549	39	Ukraine	0.0069	72	Azerbaijan, Rep. of	0.0009
7	Italy	0.0509	40	Singapore	0.0069	73	Uruguay	0.0009
8	India	0.0476	41	Finland	0.0066	74	Ethiopia	0.0008
9	South Africa	0.0401	42	Hungary	0.0065	75	Latvia	0.0008
10	Russian Federation	0.0370	43	Pakistan	0.0064	76	Cyprus	0.0008
11	Canada	0.0356	44	Venezuela, Rep.	0.0063	77	Jamaica	0.0008
12	Korea, Republic of	0.0348	45	Ireland	0.0060	78	Bolivia	0.0008
13	Mexico	0.0348	46	Chile	0.0056	79	Botswana	0.0008
14	Brazil	0.0342	47	Romania	0.0050	80	Sudan	0.0008
15	Spain	0.0339	48	Vietnam	0.0049	81	Estonia	0.0007
16	Netherlands	0.0198	49	Peru	0.0046	82	Uganda	0.0007
17	Australia	0.0182	50	Slovak Republic	0.0036	83	Trinidad and Tobago	0.0006
18	Indonesia	0.0170	51	Morocco	0.0035	84	Cambodia	0.0006
19	Poland	0.0170	52	New Zealand	0.0034	85	Zambia	0.0006
20	Turkey	0.0163	53	Bangladesh	0.0034	86	Paraguay	0.0005
21	Belgium	0.0143	54	Kazakhstan	0.0025	87	Senegal	0.0005
22	Sweden	0.0131	55	Croatia	0.0024	88	Albania	0.0005
23	Switzerland	0.0130	56	Bulgaria	0.0022	89	Nicaragua	0.0004
24	Thailand	0.0127	57	Slovenia	0.0019	90	Georgia	0.0004
25	Saudi Arabia	0.0116	58	Tunisia	0.0018	91	Mauritius	0.0004
26	Malaysia	0.0109	59	Belarus	0.0018	92	Iceland	0.0003
27	Norway	0.0105	60	Sri Lanka	0.0017	93	Moldova	0.0003
28	Austria	0.0104	61	Kenya	0.0016	94	Namibia	0.0003
29	Denmark	0.0100	62	Lithuania	0.0014	95	Armenia	0.0003
30	Philippines	0.0089	63	Angola	0.0013	96	Kyrgyz Republic	0.0003
31	Nigeria	0.0086	64	Jordan	0.0012	97	Brunei Darussalam	0.0003
32	Argentina	0.0083	65	Tanzania	0.0012	98	Benin	0.0003
33	Israel	0.0080	66	Dominican Republic	0.0012	99	Mali	0.0003
						100	Haiti	0.0002

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 4: Rankings and index values for 2003**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.3681	34	Greece	0.0085	67	Yemen, Republic of	0.0012
2	China	0.1648	35	Ukraine	0.0084	68	Guatemala	0.0012
3	Japan	0.1630	36	Israel	0.0083	69	Luxembourg	0.0012
4	Germany	0.0960	37	Portugal	0.0080	70	Sudan	0.0011
5	France	0.0663	38	Egypt	0.0078	71	Cameroon	0.0010
6	United Kingdom	0.0585	39	Hungary	0.0076	72	Azerbaijan, Rep. of	0.0010
7	Italy	0.0581	40	Pakistan	0.0076	73	Uruguay	0.0010
8	India	0.0561	41	Finland	0.0074	74	Dominican Republic	0.0010
9	Russian Federation	0.0447	42	Colombia	0.0072	75	Ethiopia	0.0010
10	South Africa	0.0394	43	Singapore	0.0072	76	Latvia	0.0010
11	Korea, Republic of	0.0392	44	Venezuela, Rep	0.0071	77	Cyprus	0.0009
12	Canada	0.0381	45	Ireland	0.0067	78	Botswana	0.0009
13	Brazil	0.0380	46	Chile	0.0059	79	Estonia	0.0009
14	Mexico	0.0366	47	Romania	0.0059	80	Bolivia	0.0009
15	Spain	0.0364	48	Vietnam	0.0058	81	Jamaica	0.0008
16	Netherlands	0.0229	49	Peru	0.0049	82	Uganda	0.0008
17	Australia	0.0220	50	Slovak Republic	0.0044	83	Trinidad and Tobago	0.0008
18	Turkey	0.0199	51	Morocco	0.0041	84	Senegal	0.0006
19	Indonesia	0.0190	52	New Zealand	0.0041	85	Paraguay	0.0006
20	Poland	0.0186	53	Bangladesh	0.0040	86	Cambodia	0.0006
21	Belgium	0.0159	54	Kazakhstan	0.0031	87	Albania	0.0006
22	Sweden	0.0150	55	Croatia	0.0029	88	Zambia	0.0005
23	Switzerland	0.0147	56	Bulgaria	0.0027	89	Nicaragua	0.0004
24	Thailand	0.0144	57	Slovenia	0.0022	90	Mauritius	0.0004
25	Saudi Arabia	0.0136	58	Tunisia	0.0021	91	Iceland	0.0004
26	Malaysia	0.0122	59	Belarus	0.0020	92	Georgia	0.0004
27	Denmark	0.0117	60	Sri Lanka	0.0019	93	Moldova	0.0004
28	Norway	0.0116	61	Kenya	0.0019	94	Namibia	0.0004
29	Austria	0.0115	62	Lithuania	0.0017	95	Mali	0.0004
30	Argentina	0.0101	63	Angola	0.0016	96	Armenia	0.0003
31	Nigeria	0.0096	64	Jordan	0.0014	97	Benin	0.0003
32	Philippines	0.0092	65	Tanzania	0.0014	98	Kyrgyz Republic	0.0003
33	Czech Republic	0.0090	66	Costa Rica	0.0013	99	Brunei Darussalam	0.0003
						100	Haiti	0.0002

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 5: Rankings and index values for 2004**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.3975	34	Philippines	0.0096	67	Yemen, Republic of	0.0014
2	China	0.1991	35	Greece	0.0090	68	Guatemala	0.0014
3	Japan	0.1789	36	Venezuela, Rep. Bol.	0.0088	69	Luxembourg	0.0013
4	Germany	0.1026	37	Israel	0.0088	70	Costa Rica	0.0013
5	France	0.0742	38	Hungary	0.0088	71	Dominican Republic	0.0013
6	United Kingdom	0.0664	39	Egypt	0.0088	72	Azerbaijan, Rep. of	0.0012
7	India	0.0664	40	Portugal	0.0087	73	Cameroon	0.0012
8	Italy	0.0628	41	Colombia	0.0085	74	Uruguay	0.0012
9	Russian Federation	0.0568	42	Finland	0.0082	75	Ethiopia	0.0011
10	South Africa	0.0461	43	Singapore	0.0081	76	Latvia	0.0011
11	Korea, Republic of	0.0441	44	Pakistan	0.0076	77	Cyprus	0.0011
12	Brazil	0.0435	45	Romania	0.0075	78	Estonia	0.0010
13	Canada	0.0406	46	Ireland	0.0073	79	Botswana	0.0010
14	Spain	0.0388	47	Chile	0.0071	80	Bolivia	0.0010
15	Mexico	0.0385	48	Vietnam	0.0066	81	Uganda	0.0010
16	Netherlands	0.0249	49	Peru	0.0056	82	Trinidad and Tobago	0.0009
17	Australia	0.0249	50	Slovak Republic	0.0050	83	Jamaica	0.0009
18	Turkey	0.0232	51	New Zealand	0.0047	84	Paraguay	0.0008
19	Indonesia	0.0208	52	Morocco	0.0047	85	Senegal	0.0007
20	Poland	0.0206	53	Bangladesh	0.0043	86	Cambodia	0.0007
21	Belgium	0.0173	54	Kazakhstan	0.0042	87	Albania	0.0007
22	Saudi Arabia	0.0168	55	Bulgaria	0.0032	88	Zambia	0.0007
23	Sweden	0.0167	56	Croatia	0.0032	89	Georgia	0.0006
24	Switzerland	0.0162	57	Slovenia	0.0025	90	Nicaragua	0.0005
25	Thailand	0.0162	58	Belarus	0.0024	91	Iceland	0.0005
26	Malaysia	0.0140	59	Tunisia	0.0024	92	Moldova	0.0005
27	Nigeria	0.0133	60	Angola	0.0021	93	Mauritius	0.0004
28	Norway	0.0131	61	Kenya	0.0020	94	Namibia	0.0004
29	Denmark	0.0128	62	Sri Lanka	0.0020	95	Kyrgyz Republic	0.0004
30	Austria	0.0126	63	Lithuania	0.0019	96	Mali	0.0004
31	Argentina	0.0121	64	Jordan	0.0016	97	Armenia	0.0004
32	Czech Republic	0.0102	65	Sudan	0.0016	98	Benin	0.0004
33	Ukraine	0.0102	66	Tanzania	0.0016	99	Brunei Darussalam	0.0003
						100	Haiti	0.0002

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 6: Rankings and index values for 2005**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.4153	34	Venezuela, Rep. Bol.	0.0111	67	Azerbaijan, Rep. of	0.0016
2	China	0.2350	35	Philippines	0.0106	68	Slovak Republic	0.0015
3	Japan	0.1836	36	Egypt	0.0103	69	Luxembourg	0.0015
4	Germany	0.1119	37	Greece	0.0097	70	Guatemala	0.0015
5	France	0.0761	38	Colombia	0.0096	71	Costa Rica	0.0014
6	India	0.0755	39	Hungary	0.0095	72	Cyprus	0.0014
7	Russian Federation	0.0716	40	Israel	0.0093	73	Cameroon	0.0013
8	United Kingdom	0.0696	41	Romania	0.0091	74	Uruguay	0.0013
9	Italy	0.0627	42	Finland	0.0091	75	Latvia	0.0013
10	South Africa	0.0532	43	Singapore	0.0088	76	Bolivia	0.0012
11	Brazil	0.0521	44	Pakistan	0.0088	77	Trinidad and Tobago	0.0012
12	Korea, Republic of	0.0484	45	Portugal	0.0085	78	Estonia	0.0012
13	Canada	0.0437	46	Chile	0.0083	79	Ethiopia	0.0012
14	Mexico	0.0435	47	Vietnam	0.0076	80	Botswana	0.0011
15	Spain	0.0417	48	Ireland	0.0075	81	Uganda	0.0011
16	Saudi Arabia	0.0277	49	Peru	0.0064	82	Jamaica	0.0009
17	Australia	0.0276	50	Kazakhstan	0.0052	83	Zambia	0.0008
18	Turkey	0.0276	51	New Zealand	0.0052	84	Paraguay	0.0008
19	Netherlands	0.0263	52	Morocco	0.0050	85	Cambodia	0.0008
20	Indonesia	0.0249	53	Bangladesh	0.0045	86	Senegal	0.0008
21	Poland	0.0235	54	Bulgaria	0.0034	87	Albania	0.0007
22	Belgium	0.0183	55	Croatia	0.0033	88	Georgia	0.0007
23	Sweden	0.0177	56	Angola	0.0032	89	Nicaragua	0.0006
24	Thailand	0.0174	57	Belarus	0.0029	90	Iceland	0.0005
25	Nigeria	0.0173	58	Tunisia	0.0025	91	Moldova	0.0005
26	Switzerland	0.0155	59	Kenya	0.0023	92	Armenia	0.0005
27	Norway	0.0150	60	Sri Lanka	0.0023	93	Namibia	0.0005
28	Malaysia	0.0150	61	Lithuania	0.0021	94	Mauritius	0.0004
29	Argentina	0.0138	62	Sudan	0.0021	95	Kyrgyz Republic	0.0004
30	Ukraine	0.0133	63	Yemen, Republic of	0.0018	96	Mali	0.0004
31	Austria	0.0132	64	Dominican Republic	0.0018	97	Brunei Darussalam	0.0004
32	Denmark	0.0131	65	Tanzania	0.0017	98	Benin	0.0004
33	Czech Republic	0.0115	66	Jordan	0.0017	99	Slovenia	0.0003
						100	Haiti	0.0003

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 7: Rankings and index values for 2006**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.4471	34	Philippines	0.0125	67	Jordan	0.0019
2	China	0.2788	35	Czech Republic	0.0125	68	Tanzania	0.0019
3	Japan	0.1883	36	Egypt	0.0122	69	Slovak Republic	0.0017
4	Germany	0.1166	37	Romania	0.0108	70	Bolivia	0.0016
5	India	0.0879	38	Colombia	0.0106	71	Latvia	0.0016
6	Russian Federation	0.0874	39	Greece	0.0106	72	Costa Rica	0.0016
7	France	0.0841	40	Hungary	0.0101	73	Luxembourg	0.0016
8	United Kingdom	0.0757	41	Singapore	0.0100	74	Guatemala	0.0016
9	Italy	0.0674	42	Chile	0.0099	75	Cyprus	0.0015
10	Brazil	0.0628	43	Israel	0.0099	76	Trinidad and Tobago	0.0015
11	South Africa	0.0612	44	Pakistan	0.0098	77	Uruguay	0.0014
12	Korea, Republic of	0.0535	45	Finland	0.0091	78	Zambia	0.0014
13	Mexico	0.0474	46	Portugal	0.0091	79	Estonia	0.0014
14	Spain	0.0471	47	Vietnam	0.0090	80	Botswana	0.0012
15	Canada	0.0470	48	Ireland	0.0082	81	Ethiopia	0.0012
16	Saudi Arabia	0.0326	49	Peru	0.0076	82	Uganda	0.0012
17	Turkey	0.0304	50	Kazakhstan	0.0074	83	Jamaica	0.0010
18	Australia	0.0303	51	Morocco	0.0057	84	Paraguay	0.0010
19	Indonesia	0.0294	52	New Zealand	0.0055	85	Cambodia	0.0009
20	Netherlands	0.0287	53	Bangladesh	0.0051	86	Georgia	0.0009
21	Poland	0.0260	54	Angola	0.0048	87	Albania	0.0008
22	Thailand	0.0198	55	Bulgaria	0.0039	88	Senegal	0.0008
23	Nigeria	0.0197	56	Croatia	0.0037	89	Mali	0.0006
24	Belgium	0.0193	57	Belarus	0.0032	90	Iceland	0.0006
25	Sweden	0.0189	58	Tunisia	0.0029	91	Nicaragua	0.0006
26	Malaysia	0.0170	59	Kenya	0.0027	92	Moldova	0.0006
27	Norway	0.0168	60	Sri Lanka	0.0025	93	Armenia	0.0006
28	Switzerland	0.0161	61	Lithuania	0.0025	94	Namibia	0.0005
29	Argentina	0.0158	62	Azerbaijan, Rep. of	0.0023	95	Kyrgyz Republic	0.0005
30	Ukraine	0.0152	63	Sudan	0.0022	96	Brunei Darussalam	0.0005
31	Austria	0.0139	64	Cameroon	0.0022	97	Mauritius	0.0004
32	Denmark	0.0133	65	Yemen, Republic of	0.0021	98	Benin	0.0004
33	Venezuela, Rep. Bol.	0.0128	66	Dominican Republic	0.0020	99	Haiti	0.0004
						100	Slovenia	0.0003

*Note:* Due to rounding off some countries appear to have identical index values but are ranked as per the precise values



**Table 8: Rankings and index values for 2007**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.4814	34	Czech Republic	0.0142	67	Dominican Republic	0.0022
2	China	0.3466	35	Egypt	0.0141	68	Jordan	0.0021
3	Japan	0.1954	36	Romania	0.0131	69	Slovak Republic	0.0020
4	Germany	0.1289	37	Venezuela, Rep. Bol.	0.0130	70	Latvia	0.0020
5	India	0.1092	38	Colombia	0.0126	71	Cameroon	0.0020
6	Russian Federation	0.1063	39	Greece	0.0122	72	Bolivia	0.0019
7	France	0.0923	40	Singapore	0.0120	73	Costa Rica	0.0019
8	United Kingdom	0.0831	41	Hungary	0.0116	74	Luxembourg	0.0019
9	Brazil	0.0792	42	Pakistan	0.0110	75	Guatemala	0.0018
10	Italy	0.0760	43	Vietnam	0.0108	76	Cyprus	0.0018
11	South Africa	0.0702	44	Israel	0.0106	77	Uruguay	0.0016
12	Korea, Republic of	0.0594	45	Chile	0.0105	78	Estonia	0.0016
13	Spain	0.0521	46	Finland	0.0102	79	Trinidad and Tobago	0.0015
14	Mexico	0.0510	47	Portugal	0.0102	80	Uganda	0.0015
15	Canada	0.0509	48	Ireland	0.0093	81	Ethiopia	0.0014
16	Saudi Arabia	0.0349	49	Peru	0.0090	82	Botswana	0.0013
17	Turkey	0.0346	50	Kazakhstan	0.0084	83	Zambia	0.0013
18	Indonesia	0.0327	51	Morocco	0.0067	84	Moldova	0.0012
19	Netherlands	0.0316	52	New Zealand	0.0063	85	Paraguay	0.0012
20	Poland	0.0307	53	Angola	0.0059	86	Georgia	0.0011
21	Australia	0.0290	54	Bangladesh	0.0056	87	Cambodia	0.0011
22	Thailand	0.0226	55	Bulgaria	0.0047	88	Jamaica	0.0010
23	Belgium	0.0215	56	Belarus	0.0045	89	Senegal	0.0010
24	Nigeria	0.0207	57	Croatia	0.0042	90	Albania	0.0010
25	Sweden	0.0206	58	Tunisia	0.0033	91	Armenia	0.0008
26	Malaysia	0.0193	59	Azerbaijan, Rep. of	0.0032	92	Iceland	0.0007
27	Argentina	0.0190	60	Kenya	0.0032	93	Nicaragua	0.0007
28	Norway	0.0182	61	Lithuania	0.0029	94	Kyrgyz Republic	0.0007
29	Ukraine	0.0182	62	Sri Lanka	0.0027	95	Namibia	0.0007
30	Switzerland	0.0177	63	Slovenia	0.0026	96	Benin	0.0006
31	Austria	0.0160	64	Sudan	0.0025	97	Mali	0.0005
32	Philippines	0.0146	65	Tanzania	0.0023	98	Mauritius	0.0005
33	Denmark	0.0144	66	Yemen, Republic of	0.0022	99	Brunei Darussalam	0.0005
						100	Haiti	0.0005

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

Table 9: Rankings and index values for 2008

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.4898	34	Denmark	0.0157	67	Jordan	0.0025
2	China	0.4040	35	Philippines	0.0157	68	Bolivia	0.0024
3	Japan	0.2092	36	Czech Republic	0.0156	69	Slovak Republic	0.0023
4	Germany	0.1348	37	Romania	0.0145	70	Cameroon	0.0022
5	Russian Federation	0.1171	38	Colombia	0.0141	71	Dominican Republic	0.0022
6	India	0.1133	39	Hungary	0.0132	72	Latvia	0.0021
7	France	0.0948	40	Greece	0.0132	73	Luxembourg	0.0020
8	Brazil	0.0897	41	Singapore	0.0129	74	Uruguay	0.0020
9	Italy	0.0818	42	Vietnam	0.0126	75	Costa Rica	0.0020
10	United Kingdom	0.0810	43	Israel	0.0121	76	Guatemala	0.0019
11	South Africa	0.0805	44	Chile	0.0110	77	Trinidad and Tobago	0.0018
12	Korea, Republic of	0.0557	45	Finland	0.0109	78	Estonia	0.0017
13	Mexico	0.0552	46	Portugal	0.0108	79	Uganda	0.0015
14	Spain	0.0535	47	Pakistan	0.0101	80	Ethiopia	0.0015
15	Canada	0.0525	48	Peru	0.0101	81	Paraguay	0.0015
16	Saudi Arabia	0.0461	49	Kazakhstan	0.0099	82	Cyprus	0.0014
17	Turkey	0.0372	50	Ireland	0.0095	83	Zambia	0.0014
18	Indonesia	0.0364	51	Angola	0.0079	84	Cambodia	0.0013
19	Netherlands	0.0340	52	Morocco	0.0075	85	Botswana	0.0013
20	Poland	0.0336	53	Bangladesh	0.0064	86	Georgia	0.0013
21	Australia	0.0318	54	New Zealand	0.0058	87	Albania	0.0011
22	Thailand	0.0253	55	Bulgaria	0.0052	88	Jamaica	0.0011
23	Nigeria	0.0247	56	Azerbaijan, Rep. of	0.0051	89	Senegal	0.0010
24	Belgium	0.0224	57	Belarus	0.0049	90	Moldova	0.0009
25	Argentina	0.0218	58	Croatia	0.0045	91	Kyrgyz Republic	0.0008
26	Sweden	0.0211	59	Tunisia	0.0038	92	Armenia	0.0008
27	Ukraine	0.0209	60	Kenya	0.0034	93	Nicaragua	0.0008
28	Malaysia	0.0207	61	Lithuania	0.0032	94	Iceland	0.0007
29	Norway	0.0193	62	Sudan	0.0030	95	Namibia	0.0007
30	Switzerland	0.0192	63	Slovenia	0.0029	96	Benin	0.0006
31	Austria	0.0168	64	Sri Lanka	0.0028	97	Brunei Darussalam	0.0006
32	Venezuela, Rep. Bol.	0.0160	65	Yemen, Republic of	0.0027	98	Mali	0.0006
33	Egypt	0.0160	66	Tanzania	0.0025	99	Mauritius	0.0006
						100	Haiti	0.0005

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values

**Table 10: Rankings and index values for 2009**

Rank	Country	Value	Rank	Country	Value	Rank	Country	Value
1	United States	0.4695	34	Philippines	0.0150	67	Bolivia	0.0025
2	China	0.4254	35	Czech Republic	0.0146	68	Jordan	0.0025
3	Japan	0.1979	36	Colombia	0.0139	69	Yemen, Republic of	0.0024
4	Germany	0.1267	37	Romania	0.0130	70	Dominican Republic	0.0022
5	India	0.1183	38	Venezuela, Rep. Bol.	0.0126	71	Uruguay	0.0021
6	Russian Federation	0.0947	39	Hungary	0.0124	72	Cameroon	0.0020
7	France	0.0891	40	Greece	0.0122	73	Luxembourg	0.0020
8	Brazil	0.0884	41	Israel	0.0119	74	Latvia	0.0020
9	South Africa	0.0794	42	Singapore	0.0118	75	Costa Rica	0.0019
10	Italy	0.0772	43	Vietnam	0.0116	76	Ethiopia	0.0019
11	United Kingdom	0.0722	44	Pakistan	0.0113	77	Guatemala	0.0019
12	Korea, Republic of	0.0546	45	Portugal	0.0102	78	Uganda	0.0017
13	Spain	0.0503	46	Finland	0.0100	79	Trinidad and Tobago	0.0016
14	Mexico	0.0492	47	Chile	0.0099	80	Estonia	0.0016
15	Canada	0.0478	48	Peru	0.0096	81	Paraguay	0.0015
16	Indonesia	0.0348	49	Ireland	0.0090	82	Zambia	0.0014
17	Turkey	0.0342	50	Kazakhstan	0.0082	83	Cyprus	0.0014
18	Saudi Arabia	0.0337	51	Bangladesh	0.0073	84	Cambodia	0.0013
19	Australia	0.0326	52	Morocco	0.0070	85	Botswana	0.0012
20	Netherlands	0.0318	53	Angola	0.0065	86	Georgia	0.0012
21	Poland	0.0308	54	Slovak Republic	0.0057	87	Senegal	0.0011
22	Thailand	0.0250	55	New Zealand	0.0056	88	Albania	0.0011
23	Switzerland	0.0215	56	Bulgaria	0.0047	89	Jamaica	0.0010
24	Belgium	0.0212	57	Belarus	0.0045	90	Kyrgyz Republic	0.0008
25	Malaysia	0.0208	58	Azerbaijan, Rep. of	0.0042	91	Moldova	0.0008
26	Argentina	0.0208	59	Croatia	0.0042	92	Namibia	0.0008
27	Sweden	0.0203	60	Tunisia	0.0037	93	Nicaragua	0.0008
28	Nigeria	0.0194	61	Kenya	0.0036	94	Armenia	0.0007
29	Norway	0.0168	62	Sri Lanka	0.0030	95	Mali	0.0007
30	Egypt	0.0164	63	Lithuania	0.0028	96	Benin	0.0007
31	Denmark	0.0162	64	Tanzania	0.0027	97	Iceland	0.0006
32	Ukraine	0.0160	65	Slovenia	0.0027	98	Mauritius	0.0006
33	Austria	0.0154	66	Sudan	0.0026	99	Haiti	0.0006
						100	Brunei Darussalam	0.0005

Note: Due to rounding off some countries appear to have identical index values but are ranked as per the precise values