Microeconomics

Determinants of Health Spending Efficiency: a Tobit Panel Data Approach Based on DEA Efficiency Scores

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Abstract: This study aims at identifying the determinants of health expenditure efficiency over the period 2005-2011 using a Tobit Panel Data Approach based on DEA Efficiency Scores. The study was made on 150 countries, where we had 45 high income countries, 40 upper middle income countries, 36 lower middle income countries and 29 low income countries. The estimated results show that Carbon dioxide emission, gross domestic product per capita, improvement in corruption, the age composition of the population, population density and government effectiveness are significant determinants of health expenditure efficiency. Thus, low income countries should promote green growth and all the income groups should intensively fight against poverty.

Keywords: Tobit panel data; DEA; health expenditure efficiency

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1 Introduction

A key policy challenge in developed and developing countries is to improve the performance of education and health systems while containing their cost. Education and health outcomes are critically important for social welfare and economic growth and thus, spending in these areas constitutes a large share of public spending. Douanla and al, (2015), show that government spending on education has a positive effect on economic growth both in short and in long run. But there is concern about the efficiency of such spending. In health for instance, there is concern about the rapid rise of the cost of health care and the impact on competitiveness, as well as trade-offs between the efficiency and equity of health systems.

Across the globe there are great variations on the amount countries spend on health. In high income countries[2], total expenditure on health as a percentage of gross domestic product was 11.9% in 2011, while it was 5.8% in upper middle income countries[3], 4.4% in lower middle income countries[4] and 5.2% in low income

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[2] High income countries are those with a GNI per capita of $12,746 or more.

[3] Upper middle income economies are those with a GNI per capita located between $4,126-$12,745.

[4] Lower middle income economies are those with a GNI per capita between $1.046-$4,125.

countries[1]. There are also differences on Out-of-pocket expenditure as percentage of private expenditure on health in the various income groups. In 2011, it was 37.6% in high income countries, 74.2% in upper middle income countries, 87.1% in lower middle income countries and 76.2% in low income countries (WHO 2014).

There are also great variations in health outcomes across the globe. The average life expectancy at birth in high income countries in 2012 was seventy-nine years, while it was seventy-four years in upper middle income countries, sixty-six in lower middle economies and sixty-two in low income economies. The main objective of this study is therefore to determine the efficiency scores and compare the determinants of health expenditure efficiency in high income countries, upper middle income countries, lower middle income countries and low income countries.

The structure of the article is as follows: section 2 briefly reviews the existing literature; section 3 discusses the methodological issues; section 4 presents the results and discussion of results and finally section 5 emphasizes on conclusion and recommendations.

2. Literature Review

A consensus exists that rising income levels and technological development are among the key drivers of total health spending. However, determinants of public sector health expenditure efficiency are less well understood. A few number of studies have focused on the public sector health expenditure efficiency in developed and developing countries like Cameroon. The results and the methodology vary from one study to the other. Li-Lin Liang and al; (2014), examine a complex relationship across government health expenditure, sociopolitical risks, and international aid, while taking into account the impact of national income and fiscal capacity on health spending. They apply a two-way fixed effects and two-stage least squares regression method to a panel dataset comprising 120 countries for the years 1995 through 2010. Their results show that democratic accountability has a diminishing positive correlation with government health expenditure, and that levels of spending are higher when the government is more stable. Corruption is associated with less spending in developing countries, but with more spending in high-income countries. Furthermore, they find that development assistance for health substitutes for domestically financed government health expenditure. For an average country, a 1 percent increase in total development assistance for health to government is associated with a 0.02 percent decrease in domestically financed government health expenditure. Li-Lin Liang and al; (2014), do not take into consideration the efficiency of government health expenditure in their study.

[1] Low income countries are defined as those with a GNI per capita of $1.045 or less, calculated using the World Bank Atlas method.

Francesco and al; (2013), found that Public health spending is low in emerging and developing economies relative to advanced economies and health outputs and outcomes need to be substantially improved. According to them, simply increasing public expenditure in the health sector, however, may not significantly affect health outcomes if the efficiency of this spending is low. Their paper quantifies the inefficiency of public health expenditure and the associated potential gains for emerging and developing economies using a stochastic frontier model that controls for the socioeconomic determinants of health, and provides country-specific estimates. Their results suggest that African economies have the lowest efficiency. At current spending levels, they could boost life expectancy up to about five years if they followed best practices.

Etibar and al; (2008), analyzed not only Government Spending on Health Care efficiency in Croatia, but also Government Spending on education efficiency. Using the so-called Data Envelopment Analysis, Their analysis finds evidence of significant inefficiencies in Croatia’s spending on health care and education, related to inadequate cost recovery, weaknesses in the financing mechanisms and institutional arrangements, weak competition in the provision of these services, and weaknesses in targeting public subsidies on health care and education. These inefficiencies suggest that government spending on health and education could be reduced without undue sacrifices in the quality of these services.

Gupta and al; (2007) adopt another popular non-parametric technique, DEA, to assess the efficiency of health and education spending for a sample of 50 low-income countries. The inputs for the model are per capita health expenditure in PPP dollars, while the outcomes are indicators that are used to monitor progress toward the Millennium Development Goals (infant mortality, child mortality, and maternal mortality). Their results suggest that countries with the lowest income per capita have the lowest efficiency scores and that there is significant room for increasing spending efficiency. A correlation analysis between the efficiency scores and other variables is performed, along with multivariate truncated regression analysis. The authors argue that countries with better governance and fiscal institutions, better outcomes in the education sector, and lower prevalence of HIV/AIDS tend to achieve greater efficiency in health spending.

Evans and al; (2000), perform an analysis on a panel dataset of 191 countries (including advanced economies) for the 1993–97 period by using a fixed-effects panel data estimator and corrected ordinary least squares. Two dependent variables are employed: disability adjusted life expectancy and a composite index of disability adjusted life expectancy including dispersion of the child survival rate, responsiveness of the health care system, and inequities in responsiveness, and fairness of financial contribution. The input variables are health expenditure and years of schooling, with the addition of country fixed effects. The authors propose a ranking of countries and check its robustness by changing the functional form of the translog regressions. They argue that income per capita should not directly affect health outcomes, but rather should impact the ability to purchase better care or better education, which are proxies by the other independent variables.

Jacob (2015), using the two-stage Data Envelopment Analysis (DEA) to compute efficiency scores and a Tobit model to examine the determinants of efficiency of health expenditure for 45 countries in Sub-Saharan Africa during the period 2005 to 2011. The results show that health expenditure efficiency was low with average scores of approximately 0.5. The results also show that high corruption and poor public sector institutions reduced health expenditure efficiency. The findings also emphasize the fact that, while increased health spending is necessary, it is also important to ensure efficiency in resource use across Sub-Saharan Africa countries.

Xu Ke and al; (2011), study the determinants of health expenditure using panel data from 143 countries over 14 years, from 1995 to 2008. Their results suggest that health expenditure in general does not grow faster than GDP after taking other factors into consideration. Income elasticity is between 0.75 and 0.95 in their fixed effect model while, it is much smaller in their dynamic model. They found no difference in health expenditure between tax-based and insurance based health financing mechanisms. Their study also confirms the existence of fungibility, where external aid for health reduces government health spending from domestic sources. However, the decrease is much small than a dollar to dollar substitution. Their study also finds that government health expenditure and out-of-pocket payments follow different paths and that the pace of health expenditure growth is different for countries at different levels of economic development.

3. Methodology

3.1. The Data Envelopment Analysis Model

The empirical methods employed in this study to determine the efficiency scores follow Fare et al. (1994) and Alexander et al. (2003) using non-parametric linear programming techniques. The empirical analysis starts by finding out the achievable health outcome of a particular country, given its expenditure on health. This optimization problem is solved by constructing a 'best practice' frontier, which is a piece-wise linear envelopment of the health expenditure-health outcome data for the sample countries. The estimated frontier describes the most efficient performance conditions within the countries and therefore forms a benchmark for comparison. The health systems of countries that are operating on (and determine) the frontier are termed efficient while countries with health systems operating off the frontier are considered to be relatively inefficient. Inefficiency in this case should be understood to mean that better health outcomes could be attained from the observed health expenditure, were performance similar to that of 'best-practice' countries (Alexander et al., 2003).

DEA allows the calculation of technical efficiency measures that can be either input or output oriented. The purpose of an input-oriented study is to evaluate by how much input quantity can be proportionally reduced without changing the output quantities. Alternatively, and by computing output-oriented measures, one could also try to assess how much output quantities can be proportionally increased without changing the input quantities used. The two measures provide the same results under constant returns to scale but give different values under variable returns to scale. Nevertheless, and since the computation uses linear programming, not subject to statistical problems such as simultaneous equation bias and specification errors, both output and input-oriented models will identify the same set of efficient/inefficient producers or Decision Making Units (DMUs).

To illustrate the procedures described above, let S^t be the technology that transforms health expenditure into health outcomes. This technology can be modelled by the output possibility set:

$$p^t\left(x^t\right) = \left\{y^t : \left(x^t, y^t\right) \in s^t\right\} \quad t = 1,....,T \tag{1}$$

Where $p^t\left(x^t\right)$ denotes the collection of health output vectors that consume no more that the bundle of resources indicated by the resource vector x^t , during period t. The best practice frontier can be empirically estimated as the upper bound of the output possibility set, $p^t\left(x^t\right)$. The output possibility set, $p^t\left(x^t\right)$, can be estimated empirically by assuming that the sample set is made up of observations on j=1,...J countries' health systems, each using n=1,...N resources, x^t_{jn}, during period t, to generate m=1,..., M population health outcomes, y^t_{jm}, in period t. Accordingly, $p^t\left(x^t\right)$ is estimated from the observed set of health expenditures, and health outcomes for all the countries of the sample.

The empirical construction of the piece-wise linear envelopment of the input possibility set is given by:

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$$p^t\left(x^t\right) = \left\{y^t : x_n^{\ t} \le \sum_{j=1}^{j} z_j\, x_{jn}^{\ t},\ n = 1....N\right.$$

$$\sum_{j=1}^{j} z_j\, y_{jm}{}^{t} \geq\ y_m{}^{t},\ m= 1,...., M$$

$$\sum_{j=1}^{j} z_j\ = 1 \qquad (2)$$

$$z_j \geq 0,\ j = 1,....,j\}$$

Where z_j is a variable indicating the weighting of each of the health systems. The output-based efficiency score for each country's health system for period t can be derived as

$$F^t{}_0(x_j{}^t,\ y_i{}^t) = \max\{\theta \text{ such that } \theta y^t \in p^t\ \left(x^t\right)\} \text{ where } F^t{}_0(x_j{}^t,\ y_i{}^t) \geq 1 \quad (3)$$

This suggests that a county's health outcomes vector, y^t, will be located on the efficiency frontier when equation (3) has a value of one. However, if equation (3) produces a value less than one, the health system must be classified as inefficient relative to best-observed practice. This measure can be computed for country j as the solution to the linear programming problem

$$F^t{}_0(x_j{}^t,\ y_i{}^t) =\ \max\theta \qquad (4)$$

With θ, z such that

$$\sum_{j=1}^{j} z_j\, y_{jm}{}^{t} \geq\ \theta y_{jm}{}^{t},\ m= 1,...,M,$$

$$\sum_{j=1}^{j} z_j\, x_{jn}{}^{t} \leq x_{jn}{}^{t},\ n = 1,..., N, \qquad (5)$$

$$\sum_{j=1}^{j} z_j\ = 1,$$

$$z_j\ \geq 0,$$

Where the restrictions on the weighting variables, zj, imply a variable returns to scale assumption in regard to the underlying technology of health production.

3.2. Choice of Inputs and Outputs

In what concerns this study, our source of data is the world development indicators CD-ROM 2013. Instead of using quantity explanatory variables such as the number of doctors, of nurses and of in-patient beds per thousand habitants as inputs, this study uses a financial variable which is per capita health expenditure in purchasing power parities. Life expectancy at birth and infant mortality rate were used as health outputs. However, as noted by Afonso and Aubyn (2005), efficiency measurement techniques suggest that outputs are measured in such a way that "more is better". Therefore consistent with practice in the literature, various transformations were performed on the mortality variable so that it is measured in survival rates. For instance, infant mortality rate (IMR) is measured as [(number of children who died before 12 months)/ (number of children born)] X 1000. This implies that an infant survival rate (ISR) can be computed as follows;

$$ISR = \frac{(1000\text{-}IMR)}{IMR} \quad (6)$$

This shows the ratio of children that survived the first year to the number of children that died and this increases with better health status. Similar transformations were performed for the under-five mortality rate.

3.3. Econometric Model

Following Mc Donald (2009) and Jacob (2015), a tobit model was used to estimate the relationship between dependent variable y_i (efficiency scores) and a vector of explanatory variables x_i (Determinants of health expenditure efficiency). For the ith Decision Making Unit (DMU), the Tobit model for panel data can be defined as follows:

$$y_{it}^* = x_{it}\beta + \varepsilon_{it} \quad (7)$$

$$y_{it} = \begin{cases} 0 \text{ if } y^*_{it} \le 0 \\ 1 \text{ if } y^*_{it} \ge 1 \\ y^*_{it} \text{ if } 0 < y^*_{it} < 1 \end{cases} \quad (8)$$

Where y_{it}^* is an unobservable latent variable, ε_{it} is normally, identically and independently distributed with zero mean and variance σ^2. x_{it} is a vector of explanatory variables and β, a vector of unknown coefficients.

The following equation is specified for the purposes of estimation in high, upper middle, lower middle and low income countries.

$Effi_{it} = \upsilon_i + \beta_1 Cod_{it} + \beta_2 Gdp_{it} + \beta_3 Polista_{it} + \beta_4 Corrup_{it} + \beta_5 Agepop_{it} + \beta_6 Popden_{it} + \beta_7 Gov_{it} + \varepsilon_{it}$ (9)

Where i and t represent country and time, respectively, while υ_i is the individual fixed effect and ε_{it} is the error term.

3.4. Definition of Variable and Data

The dependent variable in equation (9) above is the efficiency scores ($Effi_{it}$), obtained using Data Envelopment Analysis (DEA). This variable was also used by Gupta and al; (2007) as dependent variable in their study. The independents variables, include the following:

- *CO2 emissions* (in metric tons per capita): in equation (9) it is noted Cod_{it}. Carbon dioxide makes up the largest share of the greenhouse gases contributing to global warming and climate change. This variable capture the incidence of air pollution. Data concerning this variable are extracted from the World Development Indicator2013 (WDI).

- Real gross domestic product per capita measured in constant 2005 international dollars (Gdp_{it}): this variable is often use to capture monetary poverty. This variable was also used by Jacob (2015), when assessing the determinants of health spending efficiency in Africa. The data are extracted from the World Development Indicator2013 (WDI).

- *Political stability* ($Polista_{it}$): this variable reflects perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. Estimate of this variable ranges from approximately -2.5 (weak) to 2.5 (strong). The Worldwide Governance Indicators 2013 (WGI) is the data source for this variable.

- *Corruption* ($Corrup_{it}$): this variable reflects perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Estimate of this variable ranges from approximately -2.5 (weak) to 2.5 (strong). The Worldwide Governance Indicators 2013 (WGI) is also the data source for this variable.

- *Population ages 65 and above expressed as percentage of the total population* (Agepop): this variable captures the effect of an ageing population. This study do not take into consideration Population age group between 15 and 64 years because of correlations problems. Data concerning this variable are extracted from World Development Indicator2013 (WDI).

- *Population density (people per sq. km of land area)*: in equation (9) it is noted $Popden_{it}$. This variable captures the effect of the intensity of land use in a country. Data concerning this variable are extracted from World Development Indicator2013 (WDI).
- *Government Effectiveness (Gov)*: this variable captures the perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. This variable ranges from approximately -2.5 (weak) to 2.5 (strong). The Worldwide Governance Indicators 2013 (WGI) is also the data source for this variable.

4. Presentation and Discussion of Results

4.1. Efficiency Scores

From the results in appendix1, it is possible to conclude that four countries are located on the possibility production frontier of high income countries: Chile, Japan, Oman and Singapore. Their average health expenditure per capita for the period 2005-2011 are respectively: 1052.777593$; 2857.290061$; 684.4467923$ and 2296.917869$. The country which has the highest health expenditure per capita is United States, but occupy the thirty eighth position with an average efficiency score of 0.93642857. In the upper middle income countries sample, also four countries are located on the possibility production frontier: Albania, Costa Rica, Fiji and Malaysia. The worst performing country in upper middle income which is Botswana is having a greater average health expenditure per capita than Albania, Fiji and Malaysia.

Based on appendix2 table, it is possible to conclude that three countries are located on the production possibility frontier of lower middle income countries: Pakistan, Sri Lanka and Vietnam. Their average health expenditure per capita for the period 2005-2011 are respectively: 71.43463846$; 164.1679493$ and 178.9865303$. In low income countries sample, also three countries are located on the possibility production frontier: Bangladesh, Eritrea and Nepal. These countries are not the ones having the highest health outcomes, but they are having good health outcomes without wasting resources.

4.2. Random Effect Tobit Estimation Results

Table 1. Estimation results

Variables	High income Countries	Upper-middle income Countries	Lower-middle income Countries	Low income Countries
co2	.00267485* (.0013676)	.00312813** (.0013402)	-.0013624 (.0157482)	-.20009864** (.0943132)
Gdp	-1.095e-06 (1.25e-06)	3.385e-06*** (1.10e-06)	.00001461** (7.23e-06)	.00011518*** (.0000433)
Polista	-.02749578 (.0163592)	.00153229 (.0057245)	.01544694 (.0104075)	-.01707905 (.0115952)
Corrupt	.05432484** (.0237756)	.01279156 (.0078151)	-.02332062 (.0182786)	-.02176885 (.0239838)
Agepop	.04922602**** (.0039391)	.01559285**** (.0017565)	.06564341**** (.0118163)	.20819491**** (.0184193)
Popden	.00018817**** (.0000283)	.00069158**** (.0000116)	.00168786**** (.0004076)	.00071899*** (.0002578)
Gov	.04265536 (.0259444)	-.02468261** (.0102615)	-.0001572 (.0191707)	.01461595 (.0283099)
/sigma_u	.37204131**** (.0471619)	.78910992**** (.0975021)	.45279518**** (.0635221)	.18601323**** (.0294639)
/sigma_e	.03693587**** (.0019605)	.01383743**** (.000808)	.02761296**** (.0016424)	.03056744**** (.002022)
rho	0.99	0.9997	0.996	0.974
Wald chi2(7)	504.79	8224.32	223.99	560.15
Prop>chi2	**0.0000**	**0.0000**	**0.0000**	**0.0000**

SOURCE: Author using Stata11.0

Legend: *p<.1; ** p<.05; *** p<.01; **** p<.001; ( ) is standard error

From the table above, we can observed that the independent variables together are significant determinants of the level of efficiency of health expenditure in all the income groups. This can be seen from the highly significant chi-square test statistic at 0.1% significance level. The sigma's represent the variances of the two error terms μ_i and ε_{it}. Their relationship is described by the variable rho, which informs us about the relevance of the panel data nature. If this variable is zero, the panel-level variance component is irrelevant, but as can be seen from the results in Table 1, the panel data structure of the model has to be taken into account

It is also possible to notice that Carbon dioxide emission has a positive and significant effect on health expenditure efficiency in high and upper middle income countries while the effect in low income countries is negative and significant. More precisely, a unitary increase in Carbon dioxide emission per capita will lead to 0.0027 unit increase of efficiency scores, 0.003 unit increase of efficiency scores and 0.2 decrease of efficiency scores in high, upper middle and low income countries respectively.

The gross domestic product per capita has a positive and significant effect on health expenditure efficiency in upper middle, lower middle and low income countries. But this effect is more important in low income countries since the marginal effect is the highest.

The table above also shows that the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism do not have a significant effect on health expenditure efficiency in high, upper middle, lower middle and low income countries.

The results show a positive and significant relationship between improved corruption and efficiency in high income countries. This implies that corruption plays a critical role in determining health expenditure efficiency and countries with relatively improved corruption levels are likely to have better efficiency performance.

The results also show that elderly population has a positive and significant effect on health expenditure efficiency in high, upper middle, lower middle and low income countries. This result is similar to that of David and al; (2008), who argued that in the health sector, the share of the younger population does not seem to matter much and that an older population obviously correlates with higher life expectancy.

The table above shows that the increase in population density has a positive and significant effect on health expenditure efficiency in high, upper middle, lower middle and low income countries. This effect is more important lower and low income countries. This result is also similar to that of David and al; (2008), who argued that higher population density can be expected to improve public sector performance and efficiency by reducing the cost of service provision through economies of scale and lower transportation and heating costs.

The results above show that improvement in government effectiveness has a negative and significant effect on health expenditure efficiency in upper middle income countries. This variable has no effect in high, lower middle and low income countries. This result can be explained by the fact that the quality of policy formulation and implementation during the period of study was not improving health outcomes in upper middle income countries.

5. Conclusion and Recommendations

The study sought to identify the determinants of health expenditure efficiency in high income countries, upper middle income countries, lower middle income counties and low income countries. Before estimation, the efficiency scores were determined using DEA method where health expenditure per capita was considered as input and infant survival rate and life expectancy at birth were considered as outputs. The results provided evidence that Carbon dioxide emission, gross domestic product per capita, improvement in corruption, the age composition of the population, population density and government effectiveness are significant determinants of health expenditure efficiency. The results also showed that effect of these determinants varied according to the various income groups.

The findings imply that, low income countries should promote green growth since Carbone dioxide is harmful for health expenditure efficiency. The findings also imply that upper middle income countries, lower middle income countries and low income countries should also fight against poverty in order to improve health expenditure efficiency. High income countries should put more effort in fighting corruption.

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7. Appendices

Appendix 1. Average efficiency scores in high and upper middle income countries (rank in descending order)

High income countries			**Upper middle income countries**		
Countries	Average Scores	Average per capita health expenditures	Countries	Average Scores	Average per capita health expenditures
Chile	1	1052.777593	Albania	1	474.7569606
Japan	1	2857.290061	Costa Rica	1	1028.557977
Oman	1	684.4467923	Fiji	1	177.7571511
Singapore	1	2296.917869	Malaysia	1	538.0865288
Israel	0.99957143	1958.054793	China	0.99971429	297.7303605
Estonia	0.998	1179.156201	Bosnia and Herzegovina	0.99814286	759.640796
Luxembourg	0.98857143	6252.401202	Hungary	0.998	1536.058331
Korea, Rep.	0.98557143	1743.609824	Belarus	0.99414286	707.7511922
Switzerland	0.984	4797.517123	Thailand	0.99228571	298.8029556
Sweden	0.98271429	3512.148128	Tonga	0.99228571	250.6871462
Italy	0.98014286	2892.599073	Maldives	0.98857143	538.7967765
Uruguay	0.97742857	993.0889379	Ecuador	0.97657143	563.9560419
Australia	0.97714286	3400.763429	Panama	0.97457143	949.9683564
Bahrain	0.97642857	932.8872429	Mexico	0.97271429	866.3828431
Spain	0.97614286	2817.823001	Tunisia	0.96828571	498.3676545
Saudi Arabia	0.97571429	817.6429442	Macedonia, FYR	0.96785714	709.1374504
Norway	0.97457143	5066.011761	Iraq	0.96785714	228.1628905
France	0.97428571	3749.518218	Belize	0.96657143	368.821274
Cyprus	0.97357143	1972.025427	Montenegro	0.966	1033.350103
Poland	0.97228571	1179.915149	Peru	0.96557143	417.2835642

Malta	0.96928571	2158.104923	Jordan	0.95685714	458.2552377
Canada	0.968	4036.010479	Venezuela, RB	0.953	661.5853382
New Zealand	0.96785714	2654.946252	Dominican Republic	0.94942857	436.4271786
Netherlands	0.96428571	4494.891414	Colombia	0.94628571	573.4963816
Finland	0.96242857	3040.098208	Algeria	0.94228571	305.21105
United Arab Emirates	0.96128571	1312.260736	Mauritius	0.941	666.4701476
Greece	0.96071429	2882.265464	Romania	0.93842857	739.7021964
Slovenia	0.96014286	2297.612891	Turkey	0.93771429	899.1584446
Belgium	0.96	3665.649143	Seychelles	0.93728571	777.9415148
Germany	0.95942857	3936.934084	Grenada	0.93242857	656.5029151
United Kingdom	0.95814286	3138.435448	Iran, Islamic Rep.	0.93171429	736.9741852
Croatia	0.95728571	1400.838639	Bulgaria	0.93142857	915.4469926
Ireland	0.95628571	3531.149469	Brazil	0.92557143	873.1567538
Portugal	0.95542857	2504.911147	Azerbaijan	0.91714286	438.0943445
Czech Republic	0.95471429	1758.883202	Kazakhstan	0.88214286	447.2184009
Qatar	0.95085714	1899.520115	Gabon	0.80514286	439.4355712
Denmark	0.94585714	4008.95967	Namibia	0.79314286	398.2068213
Kuwait	0.938	1139.077976	Angola	0.69914286	204.7722241
United States	0.93642857	7701.217035	South Africa	0.67757143	837.7305182
Slovak Republic	0.91928571	1746.046036	Botswana	0.59642857	747.4372014
Lithuania	0.91771429	1167.483901			
Latvia	0.91657143	1094.934768			
Russian Federation	0.88485714	1011.262742			
Trinidad and Tobago	0.869	1338.054181			
Equatorial Guinea	0.79671429	1029.527524			

Source: The author