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Ranking of developing countries Based on the Economic Freedom Index

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ABSTRACT

In this paper we've ranked developing countries based on the Economic Freedom index. Therefore we are trying to do the analysis how this ranking is done using numerical taxonomic methodology. To do this, by estimating the effects of the determinants of FDI in 123 developing countries from 1997 to 2010, results showed that with regard to the degree of economic freedom or Economic openness, attract foreign direct investment in each country is different. In this study china, Equator, Liberia, Azerbaijan, Angola, Turkmenistan, Cape Verde, Kazakhstan, Panama, Vietnam, Bulgaria, Congo, Maldives, Bahrain, Cambodia, Jordan, Malaysia, Mongolia, Sudan, Trinidad, Belarus, Lesotho, Russian are the top 23 countries have been successful in attracting foreign direct investment thanks to appropriate economic and structures policies.

***Keywords*:** Developing countries, FDI, Economic Freedom, Numerical Taxonomy.

JEL Classification: F21, M21, P33

1. INTRODUCTION

The Index of Economic Freedom is a series of 10 economic measurements created by the Heritage Foundation and Wall Street Journal. The Index's definition of economic freedom is the following; "Economic freedom is the fundamental right of every human to control his or her own labor and property. In an economically free society, individuals are free to work, produce, consume, and invest in any way they please, with that freedom both protected by the state and unconstrained by the state. In economically free societies, governments allow labor, capital and goods to move freely, and refrain from coercion or constraint of liberty beyond the extent necessary to protect and maintain liberty itself. The index scores nations on 10 broad factors of economic freedom using statistics from organizations like the World Bank, the International Monetary Fund and the Economist Intelligence Unit:

- Business freedom
- Trade freedom

- Monetary freedom
- Government size
- Fiscal freedom
- Property rights
- Investment freedom
- Financial freedom
- Freedom from corruption
- Labor freedom

The 10 factors are averaged equally into a total score.

Business Freedom: Business freedom is a quantitative measure of the ability to start, operate, and close a business that represents the overall burden of regulation as well as the efficiency of government in the regulatory process.

Trade Freedom: Trade freedom is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. Different imports entering a country can, and often do, face different tariffs.

Monetary Freedom: Monetary freedom combines a measure of price stability with an assessment of price controls. Both inflation and price controls distort market activity. Price stability without microeconomic intervention is the ideal state for the free market.

Government Size/Spending: This component considers the level of government expenditures as a percentage of GDP. Government expenditures, including consumption and transfers, account for the entire score.

Fiscal Freedom: Fiscal freedom is a measure of the tax burden imposed by government.

Property Rights: The property rights component is an assessment of the ability of individuals to accumulate private property, secured by clear laws that are fully enforced by the state.

Investment Freedom: In an economically free country, there would be no constraints on the flow of investment capital. Individuals and firms would be allowed to move their resources into and out of specific activities internally and across the country's borders without restriction.

Financial Freedom: Financial freedom is a measure of banking efficiency as well as a measure of independence from government control and interference in the financial sector.

Freedom from Corruption: Corruption erodes economic freedom by introducing insecurity and uncertainty into economic relationships. The higher the level of corruption, the lower the level of overall economic freedom and the lower a country's score.

Labor Freedom: The labor freedom component is a quantitative measure that looks into aspects of the legal and regulatory framework of a country's labor market.

However, a number of indicators of economic freedom have been proposed. They differ in the methods by which they have been constructed, the purposes to which they have been put and the conception of economic freedom they embody.

The foundations of economic freedom are personal choice, voluntary exchange, and open markets. As Adam Smith, Milton Friedman, and Friedrich Hayek have stressed, freedom of exchange and market coordination provide the fuel for economic progress. Without exchange and entrepreneurial activity coordinated through markets, modern living standards would be impossible.

After introducing the economic freedom index, we ranked countries according to the Index of Economic Freedom. A ranking of countries or states based on the number and intensity of government regulations on wealth-creating activity. Metrics that an economic freedom index evaluates include international trade restrictions, government spending relative to GDP, occupational licensing requirements, private property rights, minimum wage laws and other government-controlled factors that affect people's ability to earn a living and keep what they earn. Such indexes are usually produced by economic think tanks[1].

There are several non-governmental organizations that publish and maintain assessments of the state of freedom in the world, according to their own various definitions of the term, and rank countries as being free, partly free, or unfree using various measures of freedom, including political rights, economic rights, and civil liberties.

In this part, we are trying to do the analysis how this ranking is done using numerical taxonomic methodology. Indeed Numerical taxonomy analysis is one of the best methods of grading, classifying and comparing countries or different regions according to their development levels and modernity, that it can be used for different grading too.

2. RESEARCH METHODOLOGY

The Numerical Taxonomy that first was proposed by Adamson in 1763 was developed by Polish mathematician in the early 1950s. Hell Wing offered this method to UNESCO[2]. Capabilities of this method lead to its being employed in economics, social, agricultural and medical sciences to name a few.

Today the Numerical Taxonomy is employed for activities, economic sectors, towns, regions, countries ranking with respect to several different or sometimes contrasting economic and social factor indices. There are many evidences in implementation of this method in the entire world. The ranking process of countries by this method is carried on through several stages, generally explained with a bit of variation in different resources:

The first stage is related to data matrix formation, matrix X, in which x shows the elements of the i, j matrix. In this study, i stand on the rows of the matrix, pertaining to the countries. The columns of this matrix relates to the indices. Thus, for ranking the developing countries with respect to 7 indices, the data matrix has 123 rows and 7 columns.

The second stage is related to standardization of the primary data that are measured with different units. To eliminate the effect of such disparity, matrix Z, the standard matrix of X is calculated as follows:

$$E(X) = ((\sum_{i=1}^{123} Xij)/123) \quad (1)$$

$$Sj = \sqrt{(\sum_{i=1}^{123}(Xij - E(X))^2)/123} \quad (2)$$

$$Zij = (\mathrm{Xij - E(X)})/\mathrm{Sj} \quad (3)$$

1. An economic think tank is an organization whose mission it is to study and reflect on economic issues. Economic think tanks are essentially economic policy institutes that work to develop and propose economic strategies and policies to benefit the overall economy. Economic think tanks can be privately funded, and as such can be under scrutiny for being biased towards the needs or special interests of the donor(s).

2. United Nations Educational, Scientific and Cultural Organization (UNESCO)

E(x) stands on the average of different indices, s_j the standard error, z the elements of Z. To test the homogeneity of the countries, the distance matrix of indices for countries from each other is calculated in the **third stage**. This matrix that is yielded through equation (4) is a symmetric matrix. Since the indices of countries from itself, it is equal to zero.

$$d_{ab} = \sum_{i=1}^{7} (z_{aj} - z_{bj})^2 \tag{4}$$

Thus, $d_{a,b}$ shows the standardized indices of country a from country b. With respect to the results of the third stage, the limits of homogeneity of the countries are calculated. To this end, the shortest distance vector is made from the smallest elements of distance matrix rows:

$$\mathrm{D} = \min[\mathrm{d_{ij}}] = [\mathrm{d1}, \mathrm{d2}, \ldots, \mathrm{dn}] \;\; , \mathrm{j} = 1, 2, \ldots\ldots 7 \;\; , \mathrm{j} \neq \mathrm{i} \tag{5}$$

$$E(d) = ((\sum_{i=1}^{123} di)/123) \tag{6}$$

$$S_d = \sqrt{(\sum_{i=1}^{123} (di - E(d))^2)/123} \tag{7}$$

$$\mathrm{d1} = E(d) - 2S_d \, , d2 = E(d) - 2S_d \tag{8}$$

In the fourth stage D denotes the vector that contains the shortest distance ,E(d) and S_d the average and standard error of d_i elements of vector D, respectively and finally L_1 and L_2 the up and down limits of homogeneity domain of the countries, respectively. Countries that have shorter distance with the other ones are in this domain. Those countries which are homogenous can be compared with each other, with respect to the concerned indices.

The fifth stage pertains ranking among the homogenous countries. To this end, a standard matrix is calculated for the homogenous countries. To rank the countries with respect to related indices, the maximum value of columns is selected as the ideal value (relationship (9)). Using the relationship (10), the distance of the countries is calculated from the ideal value of the countries is calculated from ideal value of the columns.

$$\mathrm{Z_{mj}} = Max(Zij, i = 1, 2, \ldots, n) \tag{9}$$

$$d_{im} = \sqrt{(\sum_{i=1}^{7} (Zij - Zmi)^2} \tag{10}$$

Z_{mj} refers to the maximum value of index j and d_{im} the distance of the i^{th} country from the ideal value for indices. A smaller value for d_{im} indicates that the country has less distance from the ideal value of indices and as a result, is located in a better rank. Thus the countries are ranked based on these distances.

The results of Table show that; China, Equator, Liberia, Azerbaijan, Angola, Turkmenistan, Cape Verde, Kazakhstan, Panama, Vietnam, Bulgaria, Congo, Maldives, Bahrain, Cambodia, Jordan, Malaysia, Mongolia, Sudan, Trinidad, Belarus, Lesotho, Russian are the top 23 countries have been successful in attracting foreign direct investment thanks to appropriate economic and structures policies. Therefore, we can say with regard to the degree of Economic openness, attract foreign direct investment in each country is different.

Table1. Ranking of developing countries Based on the index of Economic Freedom.

Rank	Ranking standard	Countries	Row	Rank	Ranking standard	Countries	Row	Rank	Ranking standard	Countries	Row
13	0.84	Tunisia	43	10	0.81	Lesotho	22	1	0.54	China	1
14	0.85	Brazil	44	10	0.81	Russian	23	2	0.63	Equator	2
14	0.85	Lao PDR	45	11	0.82	Bosnia a	24	3	0.68	Liberia	3
14	0.85	Mauritius	46	11	0.82	Chad	25	4	0.7	Azerbaijan	4
14	0.85	Ukraine	47	11	0.82	Chile	26	5	0.73	Angola	5
14	0.85	Zambia	48	11	0.82	India	27	6	0.75	Turkmenistan	6
15	0.86	Egypt	49	11	0.82	Thailand	28	7	0.77	Cape Ver.	7
15	0.86	Gambia	50	12	0.83	Belize	29	7	0.77	Kazakhstan	8
15	0.86	Ghana	51	12	0.83	Botswana	30	7	0.77	Panama	9
15	0.86	Guyana	52	12	0.83	Georgia	31	7	0.77	Vietnam	10
15	0.86	Kyrgyz R	53	12	0.83	Lithuania	32	8	0.79	Bulgaria	11
15	0.86	Namibia	54	12	0.83	Mexico	33	8	0.79	Congo	12
15	0.86	Philippi	55	12	0.83	Switzerland	34	8	0.79	Maldives	13
15	0.86	Uganda	56	12	0.83	Tajikistan	35	9	0.8	Bahrain	14
16	0.87	Albania	57	13	0.84	Armenia	36	9	0.8	Cambodia	15
16	0.87	Bahamas,	58	13	0.84	Costa Rica	37	9	0.8	Jordan	16
16	0.87	Bolivia	59	13	0.84	Dominica	38	9	0.8	Malaysia	17
16	0.87	Ethiopia	60	13	0.84	Honduras	39	9	0.8	Mongolia	18
16	0.87	Kuwait	61	13	0.84	Latvia	40	9	0.8	Sudan	19
16	0.87	Macedonia	62	13	0.84	Mozambique	41	9	0.8	Trinidad	20
16	0.87	Mauritania	63	13	0.84	Saudi Arabia	42	10	0.81	Belarus	21

Table 1 (continue). Ranking of developing countries Based on the Economic Freedom.

Rank	Ranking standard	countries	Row	Rank	Ranking standard	countries	Row	Rank	Ranking standard	countries	Row
21	0.92	El Salvador	106	19	0.9	Afghanis	85	16	0.87	Nicaragua	64
21	0.92	Iran, Is	107	19	0.9	Algeria	86	16	0.87	Nigeria	65
21	0.92	Jamaica	108	19	0.9	Barbados	87	16	0.87	Papua Ne	66
21	0.92	Kenya	109	19	0.9	Colombia	88	16	0.87	Peru	67
21	0.92	Yemen, R	110	19	0.9	Ecuador	89	16	0.87	Sri Lank	68
22	0.93	Burkina	111	19	0.9	Guatemala	90	16	0.87	Tanzania	69
22	0.93	Niger	112	19	0.9	Libya	91	17	0.88	Argentine	70
23	0.94	Tonga	113	19	0.9	Malawi	92	17	0.88	Bangladesh	71
24	0.96	Haiti	114	19	0.9	Pakistan	93	17	0.88	Djibouti	72
24	0.96	Kiribati	115	19	0.9	Serbia	94	17	0.88	Indonesia	73
25	0.97	Bermuda	116	19	0.9	Sierra L	95	17	0.88	Mali	74
25	0.97	Comoros	117	19	0.9	South Africa	96	17	0.88	Morocco	75
25	0.97	Timor-Le	118	20	0.91	Cameroon	97	17	0.88	Paraguay	76
26	0.98	Burundi	119	20	0.91	Gabon	98	17	0.88	Romania	77
26	0.98	Suriname	120	20	0.91	Guinea	99	17	0.88	Syrian A	78
27	1	Guinea-B	121	20	0.91	Madagascar	100	17	0.88	Turkey	79
28	1.01	Zimbabwe	122	20	0.91	Nepal	101	18	0.89	Fiji	80
29	1.02	Micronesia	123	20	0.91	Togo	102	18	0.89	Montenegro	81
				20	0.91	Uruguay	103	18	0.89	Senegal	82
				21	0.92	Benin	104	18	0.89	Uzbekistan	83
				21	0.92	Congo ,	105	18	0.89	Venezuela	84

Source: Computing research (DATA 1997-2010)
Note: raw data from; data.worldbank.org /data-catalog/world-development-indicators

Table 2. Grouping of developing countries based on the rank of Economic Freedom.

Groups	Rank	Countries
1	1-6	China, Equatorial Guinea, Liberia, Azerbaijan, Angola, Turkmenistan
2	7-10	Cape Verde, Kyrgyzstan, Panama, Vietnam, Bulgaria, Democratic Congo, Maldives, Bahrain, Cambodia, Jordan, Malaysia, Mongolia, Sudan, Trinidad and Tobago, Belarus, Lesotho, Russia
3	11-15	Bosnia, Chad, Chile, India, Thailand, Belize, Botswana, Georgia, Lithuania, Mexico, Switzerland, Tajikistan, Armenia, Costa Rica, Dominican, Honduras, Latvia, Mozambique, Saudi Arabia, Tunisia, Brazil, Laos, Mauritius, Ukraine, Zambia, Egypt, Gambia, Ghana, Guyana, Kyrgyzstan, Namibia, the Philippines, Uganda
4	16-18	Albany, The Bahamas, Bolivia, Ethiopia, Kuwait, Macedonia, Mauritania, Nicaragua, Nigeria, Papua, Peru, Syrlanka, Tanzania, Argentina, Bangladesh, Djibouti, Indonesia, Mali, Morocco, Paraguay, Romania, Syria, Turkey, Fiji, Montenegro Senegal, Uzbekistan, Venezuela
5	19-20	Afghanistan, Algeria, Barbados, Colombia, Ecuador, Gvtmala, Libya, Malawi, Pakistan, Serbia, Siri Alyvn, South Africa, Cameroon, Gabon, Guinea, Madagascar, Nepal, Togo, Uruguay
6	21-29	Benin, Republic of Congo, El Salvador, Iran, Jamaica, Kina, Niger, Tonga, Haiti, Kiribati, Yemen, Burkina Faso, Bermuda, Comoros, Timor, Burundi, Suriname, Guinea-Bissau, Zimbabwe, Micronesia**.**

Source: Computing research

3. SUMMARY AND CONCLUSION

Because of the importance of economic freedom in attracting foreign investment, we have studied the conditions in order to attract foreign investment in developing countries. This issue examined with economic freedom indexes and countries were ranked using a Numerical Taxonomy. Results showed that China, Equator, Liberia, Azerbaijan, Angola, Turkmenistan, Cape Verde, Kazakhstan, Panama, Vietnam, Bulgaria, Congo, Maldives, Bahrain, Cambodia, Jordan, Malaysia, Mongolia, Sudan, Trinidad, Belarus, Lesotho, Russian are the top 23 countries have been successful in attracting foreign direct investment thanks to appropriate economic and structures policies. But in countries such as Benin, Republic of Congo, El Salvador, Iran, Jamaica, Kina, Niger, Tonga, Haiti, Kiribati, Yemen, Burkina Faso, Bermuda, Comoros, Timor, Burundi, Suriname, Guinea-Bissau, Zimbabwe, Micronesia foreign investment is extraordinary low.

The most important barriers appear to be such as Oil-dependent economy, Economic sanctions, excessively complex administrative procedures, required to establish, and operate a business, the delays associated with securing land access, and obtaining building permits, etc.

APPENDIX: A LIST OF THE COUNTRIES STUDIED

Afghanistan, Albania, Algeria, Angola, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bermuda, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Chad, Chile, China, Colombia, Comoros, Democratic Congo, Republic of the Congo, Costa Rica, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Guatemala, Guinea , Guinea Bissau, Guyana, Haiti, Honduras, India, Indonesia, Iran, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyz Republic, Laos, Latvia, Lesotho, Liberia, Libya, Lithuania, Macedonia, Madagascar, Malawi, Malaysia , Maldives, Mali, Mauritania, Mauritius, Mexico, Micronesia, Mongolia, Montenegro, Morocco, Mozambique, Namibia, Nepal, Nicaragua, Niger, Nigeria, Pakistan, Panama, Papua, New Guinea, Paraguay, Peru, Philippines, Romania, Russia, Saudi Arabia, Senegal, Serbia, Sierra Leone, South Africa, Sri Lanka, Sudan, Suriname, Switzerland, Syria, Tajikistan, Tanzania, Thailand, Timor, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, Uruguay , Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

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