2E06 Institutional Factors Governing Economic Development

— Cross Country Comparison over 25 Nations

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ABSTRACT

In institutional system, economic growth of nation is governed by three big sub-systems such as social economic system, geographical factor, and technological innovation. In this context, geographical position or distance from big market has a substantial importance for economic growth. In the next steps of this study, Turkey's unique geographical position will be mentioned and demonstrated by some analysis methods such as principal component and cluster analysis.

1. INTRODUCTION

In Institutional system, economic growth of nation is governed by three big subsystems;

- Social economic system
- Geographical factor
- Technological innovation

Each of these systems has own sub-factors such as in social economic system; economic system, socio-cultural system, political system, in geographical factor; demographic factor, geological factor, geopolitics/economics, in technological innovation; education, science innovation, and industrial innovation. Each of the sub-systems has relationship between economic growth and institutional development. Simultaneously, economic growth and institutional development has relationship between each other. Fig.1 shows this relationship on these systems.

In the institutional system, economic system of nation has a substantial importance. All society must develop an economic system to answer the basic economic questions. While we usually identify economic systems with a country (the United States has a market oriented system; the former Soviet Union had a command system), it is also possible to identify an economic system at a micro level.

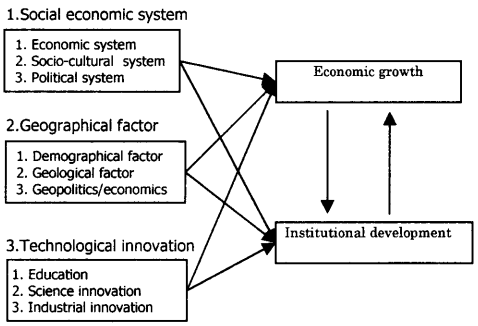

Fig.1. The relationship between sub-systems, and economic growth and institutional development

Socio-cultural system has five basic components;

- Population
- Culture
- Material products
- Social organization
- Social institutions

Tradition is maintained by an intricate interplay among social, cognitive and material dynamics in a socio-cultural system.

The other sub-factor is political system. Each nation has its own political system. The political system of nation refers to the political structure, fundamental laws, rules, regulations and practices. Government has significant functions such as political, legislative, and administrative. The government is the supreme executive and administrative organ of the state.

In education system, literacy rate is an index showing the nations' growth level. Science and industrial innovation could be carried out by well-educated human community. In order to bring any nation to the better growth level, this well-educated human group may have a significant contribution with their global and widespread view.

2. OBJECTIVES

Turkey with a population over 65 million and the sixteenth largest GDP in the world has been undergoing a process of "catching up" on its course to competitiveness in global markets. Turkey locates between Europe and Asia with unique and important geographical position. Fig.2 shows the Turkey's position.

In the last decade information technology (IT) advanced significantly. Since this advancement of IT leads to "the Death of Distance," how to utilize IT is particularly important for Turkey. This in turn provides significant impacts on OECD and European Union (EU).

If we consider the OECD countries, only Turkey is Islamic nation among them. Therefore, this may provide Turkey an additional benefit or advantage on its economic growth.

Among the factors in Institutional system related to the sub-systems, geo-economics factor, particularly distance from big market is decisive for Turkey.

In this context we may mention the objectives such as;

- Identifying governing factors by means of principle components analysis,
- Identifying clusters by means of cluster analysis,
- Identifying institutional positions,
- Analyzing effective measures stimulating institutional system for economic development.

3. METHODOLOGY

In this section, by using principle component analysis and cluster analysis, the institutional positions will be determined and identified.

First, if we try to make a model of this system, we can write it as follows;

3.1 Model Structure

$$V = F(E, G, T)\, H(I)$$
$$= J\,[E(I), G(I), T(I)]$$

where

V: Economic growth

E: Socio economic system

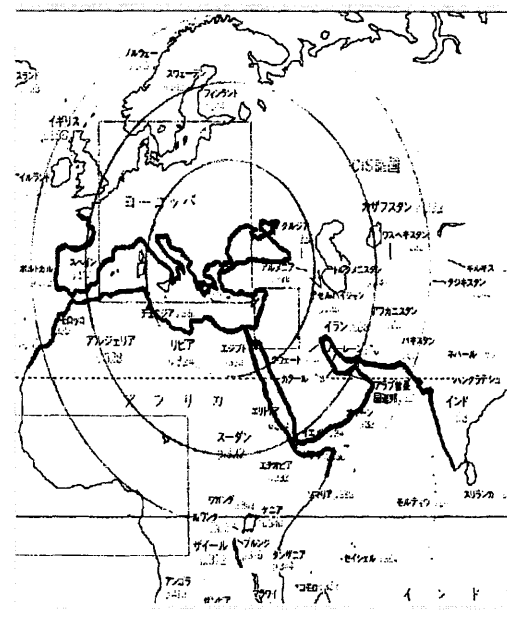

Fig.2 . Turkey's geographical position.

G: Geographical factor

T: Technological innovation

I: Institutional development

3.2 Principle Component Analysis

One of the simplest analyses that produces a new parameter for each instance is the principle component analysis, PCA. In addition, PCA gives an indication of how many significant parameters there are within a set of parameters (under linearly dependency). Basically, from a set of *n* parameters, PCA produces the following information:

(i) New Parameters

The set of new parameters can be used instead of the original. This reduces the complexity of the analysis.

(ii) Redundancy

If the number of parameters produced by PCA is less than the original number of parameters, then this is an indication that there is some redundancy in the parameters, i.e. not all of the parameters are needed..

(iii) Degree of Significance

With each new parameter is a value which specifies to which degree the new parameter(or set of new

parameters) mimic the original set. In other words, if these parameters would be used, how much error would be expected.

(iv) Vector Space Rotation

By rotating the vector space, the set of *n* parameters is transformed to a set of *m* parameters, where $m <= n$, which are linearly independent.

(v) Linear Independence

The fact that the parameters produced are linearly independent can be an advantage (in some methods like, for example, regression).

3.3 Cluster Analysis

Cluster analysis is an exploratory data analysis tool for solving classification problems. Its object is to sort cases (people, things, events, etc) into groups, or clusters, so that the degree of association is strong between members of the same cluster and weak between members of this description may be abstracted through different clusters. Each cluster thus describes, in terms use from data collected, the class to which its members belong; and the particular to the general class or type.

Cluster analysis is thus a tool of discovery. It may reveal associations and structure in data which, though not previously evident, nevertheless are sensible and useful once found. The results of cluster analysis may contribute to the definition of a formal classification scheme, such as a taxonomy for related animals, insects or plants; or suggest statistical models with which to describe populations; or indicate rules for assigning new cases to classes for identification and diagnostic purposes; or provide measures of definition, size and change in what previously were only broad concepts; or find exemplars to represent classes.

4. RESULTS

25 countries including Turkey has been analyzed with respect to governing factors to economic growth in institutional system. The analyzed factors with respect to each country is shown in table 1. After analyzed governing factors to economic growth with respect to each country, the result of the cluster analysis demonstrates Turkey's unique geographical position for its economic development locating between Asia and Europe. This analysis is shown in Fig.3..

Table1 Basic factors governing economic development in 25 countries

ABC order		Social economic system			Geographiucal factor			Technological innovation		
		1	2	3	1	2	3	1	2	3
	GDP (billion 95 US$)	Infrastructure quality	After adjusting Jini scale	Governance	Populatoion (million)	Climate	Distance to the market	Literacy rate	Science research center	Excelence of technovation
Australia	451	6.1	2.84	4.7	19.16	0.1573382	7800	2	5.9	5.7
Brazil	788.03	3.8	1.65	3.4	170.41	0.0593558	7700	1.93	4.4	4.1
China	1040.31	2.9	2.48	3.9	1262.46	0.3001927	2100	1.92	4.5	3.7
Colombia	96.86	2.7	1.75	2.9	42.3	0	4030	1.96	3.7	2.9
France	1755.62	6.8	3.06	4.5	60.43	0.992823	440	2	6.2	6
Germany	2686.5	6.8	3.33	4.5	82.17	0.9499923	240	2	5.9	6.3
India	466.68	2.6	2.65	3.6	1015.92	0	5860	1.76	5.2	4.5
Indonesia	209.1	3	3.15	3	210.42	0	5800	1.94	3.7	3.3
Italy	1204.87	3.9	3.66	3.9	57.73	0.968937	1270	1.99	4.6	4.3
Japan	5660.57	6	4.02	4	126.92	1	140	2	5.7	6.4
Korea	617.51	4.8	3.16	3.5	47.28	0.5495638	1150	1.99	4.9	4.9
Netherlands	496.95	6.2	3.07	5.1	15.92	1	140	2	6.2	6.3
New Zealand	68.72	5.7	2.84	4.6	3.83	0.8877461	9280	2	5.6	4.8
Norway	170.45	5.5	3.88	4.5	4.49	0.8369805	1000	2	5.4	5.5
Philippines	88.23	2.4	2.16	3.1	75.58	0	3010	1.98	4	3.4
Poland	163.35	4	3.16	3.7	38.65	0.9649544	1130	2	4.5	3.9
Russia	357.32	2.6	2.05	3.2	145.56	0.8868572	2220	2	4.7	3.2
Singapore	113.43	6.8	4.02	5.9	4.02	0	5300	1.97	5.6	5.9
Sweden	277.94	6.5	4	4.9	8.87	0.9429989	1200	2	6	6.6
Switzerland	335.86	6.9	3.02	5	7.19	0.4413013	600	2	6.3	6.4
Taiwan	343.55	4.9	4.02	4.1	22.22	0.4147727	2130	2	5.4	5.5
Thailand	170.34	4.6	2.42	3.9	60.73	0	4620	1.98	4.2	3.8
Turkey	205.07	3.7	2.41	3.3	66.84	0.8049026	2520	1.93	3.5	3.3
UK	1303.75	5.6	2.72	4.7	59.76	1	320	2	6.1	6
USA	8986.9	6.6	2.45	4.6	275.42	0.8530736	140	2	6.7	6.8

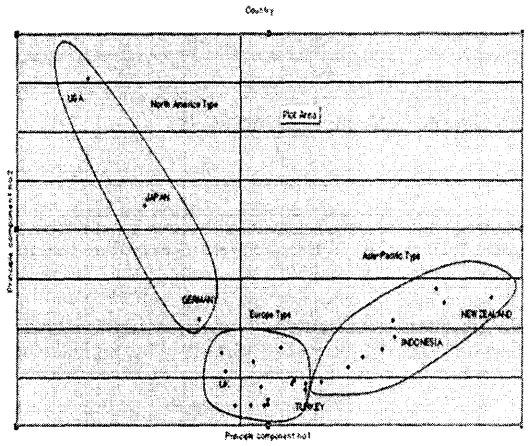

Fig.3. Result of the cluster analysis

5. CONCLUSION

In the result of the cluster analysis, Turkey seems between Europe and Asia type, and shows both Asia and Europe property with respect to the basic factors governing economic development. Even though Japan is an Asia country, it seems in the North America Type because of the similarity in economic growth with USA. We may say here, Japan is an exception.

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