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IS DEVELOPMENT REALLY A REGIONAL MATTER IN TURKEY BEFORE THE NEGOTIATIONS WITH THE EUROPEAN UNION

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Abstract

The European Union (EU) has raised the argument that East Anatolia and Southeast Anatolia regions of Turkey contain relatively less developed provinces than the others in its annual progress reports. Regional inequalities are also stressed in the last progress report issued on 6th December 2004 by the EU. In this paper, this argument has been tested by applying multivariate statistical techniques (principal component analysis and cluster analysis) to 26 development indicators grouped as economic, social, educational and health variables. The results of empirical analysis indicated that all provinces in East Anatolia and Southeast Anatolia do not appear as a separate group.

Keywords: Economic development, development indicators, the measurement of development, the European Union.

Öz

Gelişme, Avrupa Birliği ile Müzakerelerden önce Türkiye'de Gerçekten Bölgesel Bir Mesele midir?

Avrupa Birliği, yıllık ilerleme raporlarında Türkiye'nin Doğu ve Güneydoğu Anadolu bölgelerinin diğer bölgelere göre daha az gelişmiş illerden oluştuğu iddiasını ileri sürmüştür. Bölgesel dengesizlikler, 6 Aralık 2004 tarihinde yayınlanan son ilerleme raporunda da vurgulanmıştır. Bu makalede, bu iddia ekonomik, sosyal, eğitim ve sağlık olmak üzere dört grupta toplanan 26 gelişme göstergesi kullanılarak çok değişkenli istatistiksel analiz yöntemleri (temel bileşenler analizi ve kümeleme analizi) yardımıyla test edilmiştir. Ampirik analiz sonuçları Doğu ve Güneydoğu Anadolu bölgelerinde yer alan illerin diğer illerden farlık olarak ayrı bir grupta ortaya çıkmadığını göstermiştir.

Anahtar Sözcükler: Ekonomik kalkınma, kalkınma göstergeleri, ekonomik kalkınmanın ölçülmesi, Avrupa Birliği.

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INTRODUCTION

Scholars have provided different definitions of development. One of the earlier definitions belongs to I. Adelman. She defines development as the "process by which an economy is transformed from one whose rate of growth of per capita income is small or negative to one in which a significant self-sustained rate of increase of per capita income is a permanent long run feature" (Adelman, 1958: 1-2).

Economic development is generally defined as positive structural changes in an economy. Some of these changes are the increase in per capita income, the development in educational indicators and the completion of infrastructural indicators such as roads, dams etc.

Economic development level of the countries differs as a result of historical and geographic reasons. While some countries are called as developed countries, some of them called as developing countries. Development is not only a problem for the countries in the world, but it is also a problem for regions and provinces in the countries. Some regions in industrialized countries such as Wales and Scotland in United Kingdom, south in Italy, south and west in France are relatively less developed.

These regional differences also exit in Turkey. Marmara, Aegean, Mediterranean and some parts of Central Anatolia contains more developed provinces than the others. In contrast, Southeast Anatolia and Eastern Anatolia regions have relatively less developed provinces. However, there are some provinces in Aegean, Mediterranean, Central Anatolia and Black Sea regions which are in similar development level with the provinces in Southeast Anatolia and Eastern Anatolia.

The last annual progress reports prepared by the European Union (EU) on 6 th October 2004 points out that Southeast Anatolia and East Anatolia of Turkey should be developed as they contain relatively less developed provinces than the other regions (CEC, 2004: 51). However, this argument is criticized by some scholars and industrialists for two reasons. Firstly, there are some developed provinces within these two regions. For example, Gaziantep is an industrialized and developed province in Southeast Anatolia. Secondly, there are some less developed provinces in Black Sea region and Central Anatolia in terms of per capita income and other development indicators.

So, the purpose of this article is to test the hypothesis that the provinces in Southeast Anatolia and East Anatolia appear as a separate group than the others. In order to test this hypothesis Turkish provinces with similar

development level will be determined and it will be observed whether the provinces in these two regions are in the same group.

Cluster analysis will be applied to see which provinces look more similar given a set of economic and social indicators. Prior to cluster analysis, principal component analysis will be applied in order to reduce the number of data that will be used in cluster analysis.

Eighty Turkish provinces out of 81 have been included in the analysis. The only province that is not included in the analysis is Düzce because the data for most of the variables is not available for Düzce. Twenty six socio-economic variables chosen from development literature have been used in empirical analysis. Empirical analyses have been done for 2001 as the data for most variables is for the year 2001.

This article is divided into five sections. After this section, section two summarizes the literature on the measurement of development. Section three explains the data and methodology used in empirical analysis. Section four discusses empirical results. Section five concludes the paper.

I. LITERATURE ON THE MEASUREMENT OF DEVELOPMENT

It is known that the development level of the regions and countries are different. The information about the relative development of the economic regions is important in planning development policies. So, the determination of the relative development of the countries and regions led the measurement of development. The measurement issue contains the determination of development indicators quantitatively and the comparisons between economic regions.

Relative development of the countries has been measured in the literature in two ways: the measurement with different variables and the measurement with indices.

One of the earlier studies was done by I. Adelman and C. T. Morris (1967) by using a set of 37 economic, political and socio-cultural variables. Another study which uses only five indicators (the share of tax revenue in GDP, primary school enrolment ratio, secondary school enrolment ratio, total population and growth rate of population) was done by M. S. Ahluwalia (1976). N. Hicks and P. Streeten (1979) calculated correlations of fairly comprehensive set of social and economic indicators with GNP per capita. They used seven social indicators. These indicators were expectation of life at birth, calorie

consumption, infant mortality rate, primary enrolment rate, literacy rate, average persons per room and housing units without piped water. The economic indicators they used were newsprint consumption, automobiles, radio receivers, electricity consumption and energy consumption.

Development of the provinces and countries has been measured in most recent literature as well. In 1982, OECD used a list of social indicators in order to measure relative development of the countries by using only social indicators. In OECD's work social indicators of development has been grouped under eight main dimensions: health, education and learning, employment and quality of working life, time and leisure, command over goods and services, physical environment, social environment and personnel safety. Every group contains sub-groups and every sub-group contains different social indicators. For example, the first dimension named as health contains two subgroups, one is the length of life and the other is the healthfulness of life. While length of life sub dimension contains life expectancy and prenatal mortality rate variables, healthfulness of life contains short term disability and long term disability variables.

According to another recent survey of social indicators by K. Land (1999) three types of social indicators can be identified: normative welfare indicators, life satisfaction and/or happiness indicators, and descriptive indicators. S. Damus and K. Liljefors analyzed some indicators of economic development of First Nation and Northern Communities by using the following indicators (Damus and Liljefors, 2004: 9) :

-educational attainment,
-employment earnings,
-employment growth.

Relative development of the countries and regions also measured by indices. A. Sharpe (1999) surveyed of selected indexes of economic and social well-being in his recent work about Canada. The indexes are divided into three main categories (Sharpe, 1999: 10):

i) indexes that provide consistent historical estimates of trends in well-being for Canada,

ii) indexes that provide cross-national estimates of the state of well being for a particular year for many countries,

iii) indexes that provide estimates of trends in well-beings for Canadian and provinces.

Some of the indices in the second group are Level of Living Index, Development Index, Physical Quality of Life Index, Human Development Index, Gender Related Development Index, Gender Empowerment Measure, Human Poverty Index.

Level of Living Index which considered basic needs subdivided into physical needs (nutrition, shelter, health) and cultural needs(education, leisure and security) was created by the United Nations Research Institute for Social Development (UNRISD) during the 1960s. The UNRISD (1972) also created a development index based on 73 indicators. As it was found that most of the development indicators were highly Intercorelated, UNRISD eliminated most of the indicators and reconstructed the index with 18 indicators. Physical Quality of Life Index which combines infant mortality, life expectancy, and literacy was constructed by The Overseas Development Council for 150 countries. Human Development Index, Gender Related Development Index, Gender Empowerment Measure and Human Poverty Index were all developed by the United Nations Development Program.

Differently from the above researches, this study measures the relative development of provinces by using multivariate statistical techniques of principal components and cluster analyses. The purpose of using these analyses is to classify a sample of entities into a small number of groups based on similarities among the entities. These techniques utilize the information provided by the set of development indicators to establish clusters of province groupings in Turkey. So it will be seen which provinces look more similar given a set of economic and social indicators. By determining the provinces with similar development level, it will be observed whether the provinces in Southeast Anatolia and East Anatolia appear as separate group than the others by representing the different development level.

II. METHODOLOGY AND DATA

In the first part of this section statistical techniques used in the empirical analysis will be explained briefly. In the second part of the section variables and data sources will be discussed.

II.1 Methodology

The analysis that is presented in this paper is based on the application of two multivariate analysis techniques, namely principal component analysis and cluster analysis. Each of them can be reviewed briefly as follows.

Principal components analysis is a multivariate statistical technique which is used to reduce the dimensionality of the data. The first principal component Z_1 is constructed as follows:

$$Z_1=a_{11}X_1+a_{12}X_2+\ldots a_1pXp \quad (1)$$

Such that Var $(Z_1)=Z'_1Z_1-a'_1X'X_{a1}$ is maximized.

Subject to the normalization constraint

$$a^2_{11}+ a^2_{12}+\ldots a^2_{1p}=1$$

The second principal component is

$$Z_2= a_{21}X_1+a_{22}X_2+\ldots+a_{2p}X_p \quad (2)$$

Such that Var (Z_2) is maximized, subject to normalization and orthegonality constraints,

$$a^2_{21}+a^2_{22}+\ldots+a^2_{2p}=1$$

$$Z'_2Z1=0$$

Further principal components are defined in the same way.

The second statistical technique is cluster analysis. The purpose of the analysis is to classify a sample of entities into a small number of groups based on similarities among the entities (Romesbourg, 1984: 10).

II.2. Statistical Data

The literature review conducted in section two has been useful in determining the choice of the development indicators that will be utilized in empirical analysis. The indicators used in empirical analysis are conveniently grouped as (i)demographic variables, (ii)economic variables, (iii)educational variables, (iv)health variables (See Table 1).

Table-1: Development Indicators Used in Empirical Analysis

Demographic Variables
Population density per km^2
Annual growth rate of population, (‰)
Average number of children born alive
Mortality rate, (‰)
Proportion of city population, (%)
Infant mortality rate, (‰)
Economic Variables
Gross domestic product per head, (US dollar)
The share of industrial production in gross domestic product, (%)
Electricity consumption per head (Kw/hour),
Population per automobile,
Employment share of male population in agriculture, (%)
Employment share of female population in agriculture, (%)
Employment share of male population in industry, (%)
Employment share of female population in industry, (%)
Employment share of male population in services, (%)
Employment share of female population in services, (%)
Educational Variables
Literacy rate of male population at age six and above, (%)
Literacy rate of female population at age six and above, (%)
Tertiary enrolment ratio, (%)
Secondary enrolment ratio, (%)
Health Variables
Population per specialist doctor
Population per practitioner doctor
Population per dentist
Population per nurse
Population per health officer
Population per midwife

The data for the indicators in Table 1 is received State Institute of Statistics (SIS) Prime Ministry of Republic of Turkey (SIS, 2003; SIS, 2004). As it was stated earlier empirical analysis has been done for 2001.

III. EMPRICAL RESULTS

In this section, whether the group of provinces in East and Southeast Anatolia emerges naturally as the most coherent one among all the combinations of 80 provinces is investigated. The analysis is conducted on the basis of the 26 structural variables described in the previous section.

The statistical technique best suited for our purpose is cluster analysis, which permits to single out K groups of homogenous units from a set of N>K units. In this case, it is attempted to construct groups or clusters of provinces within a set of 80 provinces, which are homogenous from the point of view of 26 socio-economic characteristics. However, instead of creating clusters of provinces in a 80 dimension space, a more limited number of axes corresponding to a few principal components is studied.

The main objective of the principal component analysis is to reduce the original 26 variables to a smaller set of orthogonal indicators. First five principal components have been selected since they explain 77.9 % of the total variation in the original data (See Table 2).

Table-2: Principal Component Analysis Results

	First Principal Component	Second Principal Component	Third Principal Component	Fourth Principal Component	Fifth Principal Component
Eigenvalue	11.591	4.380	1.790	1.386	1.118
Proportion	44.580	16.845	6.883	5.331	4.301
Cumulative	44.580	61.424	68.308	73.639	77.940

In the final part of the empirical analysis the results of a cluster analysis with a view to identifying similar provinces within the sample from the characteristics they possess have been shown. Applying cluster analysis to first five principal components, seven groups of homogenous provinces are obtained (See Table 3). Group numbers do not represent the relative development of provinces. These numbers have been assigned to distinguish different clusters of provinces. The first aspect to notice is that two out of the seven clusters are monoprovinces. These provinces split from the rest. Group one (comprising Bursa, Tekirdağ, Yalova, İzmir, Bilecik, Kırklareli, Kocaeli, Ankara, Eskişehir and İstanbul) consists of most industrialized Turkish provinces. Cluster one consists of seven provinces from Marmara Region (Bursa, Tekirdağ, Yalova, Kırklareli, Kocaeli, İstanbul, Bilecik), one province from Aegean Region (İzmir), and two from Central Anatolia (Ankara, Eskişehir).

Group two consists of provinces from Southeast Anatolia (Diyarbakır, Batman, Siirt, Şanlıurfa, Mardin, Şırnak) and Eastern Anatolia (Bitlis, Ağrı, Hakkari, Muş, Van). It is observed from Table 3, group two and group three are monoprovinces. Although Ardahan and Tunceli are in Eastern Anatolia, they never join the other groups that contain provinces from this region as their relative development is lower than the others.

Table-3: Results of The Cluster Analysis

Cluster Number	Provinces Included in the Cluster	Region
Group 1	İstanbul, Bursa, Tekirdağ, Yalova, Kırlareli, Kocaeli, Bilecik,	Marmara
	Ankara, Eskişehir	Central Anatolia
	İzmir	Aegean
Group 2	Diyarbakır, Batman, Siirt, Şanlıurfa, Mardin, Şırnak,	Southeast Anatolia
	Bitlis, Ağrı, Hakkari, Muş, Van	Eastern Anatolia
Group 3	Ardahan	Eastern Anatolia
Group 4	Tunceli	Eastern Anatolia
Group 5	Bingöl, Kars, Erzurum, Iğdır	Eastern Anatolia
	Sinop, Tokat, Ordu, Bartın, Bayburt,	Black Sea Coast
	Yozgat, Aksaray,	Central Anatolia
	Kahramanmaraş,	Mediterranean
	Adıyaman,	Southeast Anatolia
Group 6	Afyon, Kütahya, Uşak,	Aegean
	Erzincan, Elazıg, Malatya,	Eastern Anatolia
	Niğde, Nevşehir, Sivas, Konya, Çankırı, Karaman,	Central Anatolia
	Gümüşhane, Giresun, Amasya, Samsun, Çorum, Kastamonu, Artvin, Trabzon,	Black Sea Coast
	Isparta,	Mediterranean
Group 7	Aydın, Manisa, Denizli, Muğla,	Aegean
	Kayseri, Kırşehir, Kırıkkale,	Central Anatolia
	İçel, Osmaniye, Antalya, Adana, Osmaniye, Burdur, Hatay,	Mediterranean
	Balıkesir, Çanakkale, Edirne, Sakarya,	Marmara
	Gaziantep	Southeast
	Zonguldak, Karabük, Rize, Bolu,	Black Sea Coast

Differently than the earlier groups, group five contains provinces from five different geographic regions (Eastern Anatolia, Black Sea Coast, Central Anatolia, Mediterranean, Southeast Anatolia). It should be noted that there is not any provinces from Aegean and Marmara regions in this group.

Groups six and seven are similar to Group five as they contains provinces from various geographic regions.

These statistical findings indicated that all provinces in Eastern Anatolia and Southern Anatolia do not exist as a homogenous groups. One exception to this is group two. This group contains some provinces from these two regions, but not all provinces in Southeast and East Anatolia. So it should be stated that some provinces from Southeast and East in group two have a different development level, perhaps have a lower development level than the others, but not all provinces from these two regions have lower development levels than other Turkish provinces.

CONCLUSION

Using data from State Institute of Statistics Prime Ministry Republic of Turkey, this paper examined the question whether the development is a regional matter in Turkey as stated by the EU in progress reports.

On the basis of development criteria, empirical analysis suggests that provinces in Turkey can be divided into seven clusters. This means that Turkish provinces present seven different development levels. As we stated earlier, the group numbers that we assigned do not represent the relative development of clusters in comparison with each other. But, these numbers distinguish the group of provinces in different development levels.

As a result of our empirical analysis we did not find any group of provinces that contain all provinces from Southeast Anatolia and East Anatolia. However, Group two contains some provinces from these two regions. In another words, some provinces from these two regions differs than that of the others as they comprised by group two. But, not all of them. Also group five, group six and group seven contain provinces from different regions, as well as provinces from Southeast Anatolia and East Anatolia . So it should be noted that the development is not a regional problem in Turkey as stated by the EU.

REFERENCES

Adelman, I. (1958) **Theories of Economic Growth and Development**, Palo Alto: Stanford Press.

Adelman, I. and C.T. Morris (1967) **Society Politics and Economic Development: A Quantitative Approach**, Baltimore: John Hopkins University Press.

Ahluwalia, M. S. (1976) "Inequality, Poverty and Development", **Journal of Development Economics**, 3 (2), 307-342.

Commission of the European Communities (2004) **Regular Report on Turkey's Progress Towards Accession**, Brussels: CEC.

Damus, S. And K. Liljefors (2004) **Analysis of Some Indicators of Economic Development of First Nation and Northern Communities**, Canada: Institute on Governance. http://www.iog.ca/publications/fn_dev_indicators.pdf.

Hicks, N. and P. Streeten (1979) "Indicators of Development: The Search for A Basic Needs Yardstick", **World Development**, 7(4), 567-580.

Land, K. (1999) "Social Indicators" in E. F. Borgatto and R. V. Montgomery (ed.), **Enclopedia of Sociology**, New York: McGraw-Hill, Inc.,18-19.

Organization for Economic Cooperation and Development (1982) **The OECD List of Social Indicators**, Paris: OECD.

Romesbourg, C. (1984) **Cluster Analysis for Researchers**, Belmont: Lifetime Learning Publications.

Sharpe, A. (1999) **A Survey of Indicators of Economic and Social Well-Being**, Canada: Centre For the Living Standards. http://www.csls.ca/reports/paper3a.pdf.

SIS (2003) **Social and Economic Characteristics of Population**, Ankara. http://www.die.gov.tr.

SIS (2004) **Main Economic and Social Indicators**, Ankara. http://www.die.gov.tr.