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Determining Suitable Investment Areas for the Forest Products Industry: an Example from the Black Sea Region in Turkey

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Abstract: Investment decisions and regional development are significant for economic development and the welfare of society. The most suitable decision should be made by using multivariable statistical techniques in both public and private sector investments, because various factors may affect such investments. In this study the aim was to direct the preferences of private sector investments in the forest products industry in the Black Sea region, which lags behind the other regions from the point of view of economic development and has an unstable development situation. With this aim, cities with advantages and investment priorities were determined. Principal component analysis (PCA) was used. The data obtained at the end of this analysis were used in ordering the cities, with the help of the statistics, determined as priority investment regions due to their having lower and more extreme points than the other cities in the analyses.

Key Words: Investment priority, Forest products industry, Black Sea region

Orman Ürünleri Sanayi Alanında Uygun Yatırım Alanlarının Belirlenmesi: Karadeniz Bölgesi Örneği

Özet: Yatırım kararı, bölgesel gelişim, ekonomik kalkınma ve toplum refahı için önemlidir. Gerek kamu ve gerekse özel sektör yatırımlarının yönlendirilmesinde, yatırımı etkileyecek bir çok faktör olduğundan dolayı, çok boyutlu istatistiki yöntemlerin kullanılması ile en uygun kararın verilmesi gerekmektedir. Bu çalışmada ekonomik gelişme seviyesi bakımından diğer bölgelerin gerisinde kalan ve dengesiz bir kalkınma ortamına sahip olan Karadeniz Bölgesinde önemli ağırlığa sahip olan orman ürünleri sanayi alanında özel sektörün yatırım tercihlerinin yönlendirilmesi amaçlanmıştır. Bu maksatla bölge genelinde yatırım avantajı ve önceliğine sahip olan iller belirlenmiştir. Çalışma sırasında Temel Bileşenler Çözümlemesi yöntemi kullanılmıştır. Bu analiz sonucunda elde edilen veriler belirlenen yöntem yardımıyla illerin sıralanması amacıyla kullanılmıştır.

Anahtar Sözcükler: Yatırım önceliği, Orman Ürünleri Sanayi, Karadeniz Bölgesi

Introduction

Investment is a complex process that cannot be encapsulated by a single-variable approach and that is influenced direct or indirectly by both internal and external variables. It is necessary to evaluate and deal with all factors affecting investment to guide entrepreneurs. Therefore, investment must be evaluated with multivariable methods.

Many factors influence investment. These are demographic structure, agricultural structure, industrial structure, level of income, capital accumulation, infrastructure possibilities and incentives. Factors for determining the investment environment and characteristics are the most important. There are benefits from the scale level (city /region/country), corporational structure, human resources and natural infrastructure (Atalay et al., 1997).

The decision process governing the allocation of resources between competing industrial investment projects has been the subject of several recent studies. In general, these studies have shown a very weak association between the priority ranking assigned to a given industrial investment project and that project's calculated economic cost, benefit, or benefit/cost ratio. Recent research shows that the availability or lack of investment opportunities is an important consideration in

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assessing the wealth of investment decisions (Chen, 2001).

Investment and its contribution to regional development has long been the subject of theoretical studies, and major theories of regional development assume a geographical mobility of capital. Neoclassical regional growth theories maintain that efficient markets and factor mobility tend to equalize regional differentials (Wei, 2000). Having different resources in regions results in the collection of investment possibilities in specific areas and in the creation of development level differences among the regions.

Over the last decade there have been a large number of studies attempting to model the evolution of aggregate or sector investment by private firms in less-developed areas. This empirical literature, a large part of which was surveyed by Serven and Salimano (1994), is a response to the urgent need for concrete evidence on the determinants of economic growth in the world's poorest areas (Fielding, 1999).

Economic and industrial policies have strong implicit spatial tendencies toward core regions because government investment and incentives tend to benefit economic activities and industries in these areas (Kim, 2001). Rural areas attract a relatively low share of new investment, partly due to poor infrastructure and a restricted range of raw materials (Soares et al., 2003). People require a heightened perception of business opportunity and more dynamism in the development of civil society (Ivanova, 1995) although rural regions are not excessively radicalized because of the contentment deriving from land restitution (Drgona, 2002).

Investments will have varying numbers of determining factors in this context and there are various types of methods under study that aim to direct the investment decision toward the most appropriate region and sectors. In this respect, taking into consideration the investment aspects, it is necessary to include many dimensions of the approaches in the investment. If the subject deals with such an approach, making use of the indicator variables in many approaches, selection, availability and classification are important.

In an attempt to classify and categorize a number of observations, the most sensitive step is the initial decision concerning the appropriate dimensions against which individual cases should be measured and judged. In the present case, the particular choice of variables reflects the different dimensions along which cities can increase their development levels.

Based on this reading, it is unnecessary to attach arbitrary value to the variables. On the other hand, many interrelated variables are less important, and principal component analysis obtains the basic component of independent variables (SPO, 2000a).

The economy of Turkey was falling behind the developed market economies in the generation of human well-being. It is widely believed that a number of distortions in resource allocation resulted from a combination of political choices and planning dysfunctions administration system.

The government has customarily assumed a dominant role in economic and spatial development in Turkey through the 5-year economic development plans. Central planning made much use of regions for the spatial allocation of capital by government ministries and as a basis for recognizing and correcting the imbalance between advanced and backward areas. Over the last 50 years, the increasing concentration of people and economic activities in some regions and a relative deprivation of economic and social opportunities in other regions have intensified.

Most regions and localities outside the development regions lack spontaneous development potential and capabilities because they have been structurally dependent upon the developed regions in Turkey. It seems unlikely that this shortcoming will be overcome merely by the redistribution of national resources. Rather, it is essential to promote the capabilities of endogenous development in each region and locality.

The problems of regional inequalities and extreme concentrations of population and economic activities, particularly in the developed regions, are of great concern. Various policy measures have been introduced to control the growth of the development regions and to promote the growth of other regions. However, this spatial policy has not been very successful in achieving balanced regional development. The failure of national spatial policy may be closely related to the incompatibility and impracticality of planning goals (Kim, 2000).

This study attempts to define the appropriate investment areas for the private sector in the forest products industry in the cities of the Black Sea region that

have unplanned investment environments and lag behind the other regions of Turkey in terms of economic development (Akyüz, 2000). In this region, 18.211 businesses were determined based on the last national census data (SIS, 1992) (Table 1).

Materials and Methods

Materials

Turkey consists of 7 regions, which differ in terms of level of development. The Black Sea region has a lower development level than many other regions in Turkey (Akyüz, 2000). This study deals with all the 18 provinces (Amasya, Artvin, Bartın, Bayburt, Bolu, Çorum, Giresun, Gümüşhane, Karabük, Kastamonu, Ordu, Rize, Samsun, Sinop, Tokat, Trabzon, Zonguldak and Düzce) in the region.

The Turkish statistical authority State Institute of Statistics (SIS) (SIS, 1992, 1994, 1996, 1999a, 1999b, 2000) and the state planning organization (State Planning Organization) (SPO) (SPO, 1995, 1999, 2000a, 2000b) provided data concerning the demographic, economic, health, education, employment, industrial, communication, investment, infrastructure and cultural characteristics of each province.

There are many variables related to statistical analyses in determining the preferences of investment. The variables used should show the socioeconomic features of the region to be invested in. The quality and quantity of the population, level of migration indicators and education levels used in this study are important criteria attracting the attention of investors. The present situation of industry in all cities and gross natural product showing economic development are significant indicators connected with the economic situation and performance. Possibilities of substructure and level of encouragement are very significant especially with regard to the private investor. Moreover, the present situation of the forest products industry being present in all cities will be a pioneer in these investments.

Thirty-three different variables relevant to the analysis represent the general context of the economic structure (6 variables) and industry characteristics (27 variables) (Table 2).

Method

Three-phased analysis was performed involving the 33 variables. In the first stage, was applied to the PCA 33 variables. PCA is a method used where many variables

Table 1. Manufacturing industry in the Black Sea region.

Sector	Number of establishments	%	Employment	%	Value added (billion TL)	% %
Manufacture of food, beverages and tobacco.	2.856	15.6	50.605	38.8	5.683	41
Textiles, clotting and leather industries.	4.282	23.5	5.540	7.3	218	1.5
Manufacture of wood and wood products, including furniture.	4.760	26.1	18.426	14.1	1.029	7.4
Manufacture of paper and paper products printing and publishing.	447	2.4	3.621	2.7	233	1.6
Manufacture of chemicals and chemical petroleum, coal, rubber and plastic products.	296	1.6	3.502	2.6	529	3.8
Manufacture of non-metallic mineral products, except for petroleum and coal products.	599	3.2	10.422	7.9	1.309	9.4
Basic metal industries.	122	0.6	19.425	14.8	4.039	29.11
Manufacture of fabricated metal products, machinery and equipment, transport equipment, professional and scientific and measuring and monitoring equipment.	4.773	26.2	14.313	10.9	856	6.1
Other manufacturing industries.	76	0.4	150	0.01	0	0
Manufacturing industry	18.211	100	130.404	100	13.860	100

Table 2. Description of variables and respective codes.

General context of the economic structure

Population (SIS 1999), (SIS 1992)
X1: Population density of provinces,
X2: Annual rate of growth of city and village populations,
X3: Economically active female population in manufacturing industry,
X4: Economically active male population in manufacturing industry,
X5: Economically active total population in manufacturing industry,
X6: Net migration and rate of net migration by provinces.

Manufacturing industry (SIS 1994), (SIS 2000)
X7: Rate of new firms by industry group,
X8: Number of new firms by industry group,
X9: Large and small establishments by industry group,
X10: Value added in manufacturing industry by size of establishment,
X11: Annual rate of growth of investments by industry group,
X12: Number of establishments in manufacturing industry.

Gross national product (SPO 1999)
X13: Gross national product at 1987 constant prices,
X14: Percentage rate of change of gross national product (1987=100).
Investment, incentive and bank indicators (SPO 1999)
X15: Public investment expenditure: at 1998 constant prices,
X16: Number of certificates in private sector investment incentives,
X17: Total bank reserves; at 1998 constant prices,
X18: Total bank credits; at 1998 constant prices.

Education (SPO 1995)
X19: Rate of students in primary schools,
X20: Rate of students in high schools,
X21: Rate of students in vocational training centers,
X22: Rate of students in junior high schools.

Infrastructure (SIS 2000), (SPO 2000)
X23: Number of establishments in small scale industrial estates,
X24: State of highways and provincial roads by surface type,
X25: Motor vehicles by use.

Communication (Turk Telecom 2001)
X26: Rate of total subscribers by industrial groups,
X27: Rate of total beepers and telephones by industrial groups.

Industry Characteristics
X28: Number of establishments in manufacture of wood and wood products including furniture (1-9),
X29: Annual average number of employees in manufacture of wood and wood products including furniture (1-9),
X30: Number of establishments in manufacture of wood and wood products including furniture (10+),
X31: Annual average number of employees in manufacture of wood and wood products including furniture (10+),

Agriculture and Forestry statistics (Konukçu 1999), (SIS 1999)
X32: Forest resources
X33: Number of journeymen and masters receiving journeymanship and mastership certificates. Establishments in Manufacture of wood and wood products including furniture.

apply and is used in social studies (Jolliffle, 1986; Ozimek, 1993; Openshaw, 1995; Sun, 2000). As for the determination of appropriate investment fields, it is necessary to consider those indicators that are in interaction with each other and constitute the differences among towns. The number of indicators may thus be in the hundreds in terms of reliability and data acquisition methods. For this reason, methods such as taxonomy and adaptation were used initially. However, to obtain more coherent results PCA has been widely employed and accepted.

In multivariable statistical analysis "p" variables belonging to "n" individual are examined. It is difficult to perform different evaluations due to their interactive characteristics and the excessive number of variables. PCA, a method used in such cases, is a multivariable statistical method based on the hypothesis that the statistical relations among variables are due to the influence of one or a few basic factors (Dinçer et al., 1996). This method comprises fewer numbers of variables and factors that appear as a result of variables being in interaction.

PCA assumes accepts a data set, X, of n-dimensional vectors, X = (Xx), x = 1,2,.....,N, and derives a linear transformation, P, to give x=* x + Pb; it is customary to expect the vectors, x, to have internal coherence in the sense that the components have corresponding meaning, and therefore scale (Boyle, 1998).

As result of PCA analysis 7 basic components were obtained whose Eigenvalues were greater than 1. Six basic components whose total variance description percentages were greater than 10% were included in the second phase of the study for the purpose of allowing towns to gain priority, and indicator values were made.

In this stage

λ_k is the Eigenvalue that is assumed to be the principal component of k. Thus, the coefficient

$$P_k = \frac{\lambda_k}{\sum_{j=1}^{k} \lambda_k}$$

can be calculated with the help of the formula

where

K = The number of basic components determined,

İ = The number of individuals or regions (i: 1, 2, 3… 17),

J = The number of variables included in the analysis (j: 1, 2, 3,.... 59),

Z_{ij} = J variables, i = the value of the standard regarding individual or region (Each j variable is calculated by being considered).

Under these assumptions the indicator value is calculated from the formula

$$G_{ik} = \sum_{j=1} Zji \, . \, Pk$$

In the third phase, Varimax rotation was performed in order to interpret the factor burdens. The factors were named with the help of 4 principal components whose variance was greater than 10%.

SPSS-11 was used.

Results and Discussion

Evaluating the suitability of PCA means assessing whether the variables are significantly and sufficiently correlated with each other so that applying the factor model can reduce their number. This can be done with a visual inspection of the correlation matrix for all variables (Soares et al., 2003). The correlation matrix reveals that all variables have at least one correlation coefficient with an absolute value greater than 0.3, which Kinnear and Gray (1994) suggest as the minimum for including a variable in the analysis. For that reason all variables have been included in analysis.

Five criteria are frequently used to decide the number of factors to be extracted. These are the Eigenvalue criterion the screen test criterion, the percentage of variance criterion, the test of fit on the number of factors, provided by the maximum likelihood method and the interpretability of the factor structure solution (Kline, 1994, Hair et al. 1998).

The Eigenvalue criterion considers that all factors having Eigenvalues greater than 1 should be retained. The rationale for the Eigenvalue criterion is that any factor should account for the variance of a single variable at least (Soares et al, 2003). Looking at Table 2, this means that 7 factors should be retained.

Added to the Eigenvalue criterion, however, the percentages of variance criterion suggests that one should extract all factors that account for 80% (approximately) of the variance of the original variables. Although no absolute cut off point has been adopted for all data, this figure is normally regarded as satisfactory in the social sciences (Soares et al. 2003). Looking at Table 2 again, this means that only 6 factors should be retained.

In order to determine the priority, the share of variance of the components considered within the total variance is calculated. Indicator values were generated by multiplying the standardized data matrix by the calculated weighted coefficient. When the indicator values are sorted in ascending order, according to the forest products industry sector, the priority of provinces appears in Table 3.

In this priority calculation, the effects of all variables are considered for each principal component. For investment opportunities in the forest products industry, Gümüşhane, Bayburt, Sinop, Artvin and Bartın rank as first priority provinces.

Varimax rotation was then used to provide a more interpretable factor structure. Varimax rotation, which imposes an orthogonal structure on data, should always be used when the resulting factor scores are to be analyzed by other statistical procedures, as is the case in the present study (Hair et al. 1998). The rotated factor matrix is shown in Table 4.

Table 3. Results of principal components analysis.

Principal component	Eigenvalue (λ)	Percentage of variance	Cumulative percentage of variance
1	9.3228	28.25	28.25
2	5.4891	16.63	44.88
3	3.5665	10.80	55.69
4	3.4763	10.53	66.22
5	3.1908	9.66	75.89
6	2.4841	7.52	83.42
7	2.2603	6.84	90.27

Table 4. The priority list and Eigenvalues of the provinces for the forest products industry.

Provinces	PC1	PC2	PC3	PC4	PC5	PC6
1. Gümüşhane	-7.07545	-4.16573	-2.70708	-2.63802	-2.42173	-1.88517
2. Bayburt	-5.06114	-2.97979	-1.9364	-1.88700	-1.73229	-1.34848
3. Sinop	-4.48224	-2.63896	-1.71492	-1.67117	-1.63742	-1.19424
4. Artvin	-3.28382	-1.93338	-1.25640	-1.22434	-1.12396	-0.87493
5. Bartın	-3.06377	-1.80382	-1.17220	-1.14230	-1.04864	-0.8163
6. Rize	-1.30676	-0.76936	-0.49997	-0.48721	-0.44727	-0.34817
7. Giresun	-1.29322	-0.76139	-0.49479	-0.48216	-0.44263	-0.34456
8. Amasya	0.11510	0.06776	0.04403	0.04291	0.03939	0.03066
9. Kastamonu	0.41978	0.24715	0.16061	0.15651	0.14368	0.11184
10. Karabük	1.37785	0.81122	0.52716	0.51371	0.47159	0.36711
11. Ordu	1.83149	1.07830	0.70073	0.68285	0.62686	0.48797
12. Çorum	2.24450	1.32147	0.85875	0.83684	0.76823	0.59802
13. Tokat	2.53565	1.49288	0.97014	0.94539	0.86788	0.67559
14. Trabzon	5.00697	2.94790	1.91568	1.86680	1.71374	1.33404
15. Zonguldak	7.24471	4.26539	2.77184	2.70112	2.47966	1.93026
16. Bolu	7.65096	4.50457	2.92727	2.85259	2.61870	2.03850
17. Samsun	10.7519	6.33031	4.11372	4.00877	3.68009	2.86473

It is known that the number of principal components equals the number of variables involved. Furthermore, a large part of the total variation can be explained in terms of the first few principal components since the basic components are sorted in ascending order according to the amount of information carried. Two common approaches are generally used for selecting the number of principal components whose Eigenvalues are at least 1. In this study, the first 7 principal components have Eigenvalues greater than 1, whereas only 4 principal components carry more than 10% of information about the total variation. Therefore, the first 6 principal components that explain 80% of total variation are considered in the analysis and evaluated.

At the end of the analysis, the principal component was been defined as bank, support and small-scale business investments, the second component as infrastructure and employment investments, the third as education and communication investments and the fourth as education investments (Table 5).

Table 5. Varimax rotated factor matrix.

Variable	Factor 1	Factor 2	Factor 3	Factor 4
X15	0.93	-0.04	-0.08	0.02
X12	0.93	0.18	-0.03	0.07
X29	0.93	-0.12	0.04	-0.02
X28	0.90	0.11	-0.08	0.05
X8	0.87	0.22	0.07	0.23
X13	0.86	0.35	0.04	0.21
X25	0.85	0.46	0.0	0.11
X16	0.76	0.31	0.03	0.11
X17	0.74	0.50	0.01	0.05
X10	0.23	0.95	0.09	0.03
X11	0.23	0.92	-0.03	0.11
X24	0.06	0.74	-0.20	0.09
X4	0.62	0.70	0.25	0.04
X20	0.25	0.57	0.33	0.36
X14	0.36	-0.52	-0.44	-0.14
X9	0.20	0.11	-0.86	0.08
X21	0.08	0.33	0.73	0.51
X5	0.33	0.39	0.72	0.04
X27	-0.08	-0.37	0.70	0.22
X19	0.13	0.39	0.67	0.55
X33	-0.18	-0.17	-0.16	-0.91
X6	-0.37	-0.11	-0.28	-0.70
X1	0.07	0.05	0.10	-0.66
X22	0.28	0.44	0.07	0.45
X26	0.04	-0.15	0.01	0.04
X23	0.45	0.29	-0.26	0.07
X32	0.19	-0.14	-0.08	0.32
X7	-0.21	-0.1	0.28	0.56
X18	0.34	-0.13	0.09	-0.003
X3	0.49	0.12	-0.21	0.15
X30	0.46	0.30	0.13	0.16
X2	0.53	0.10	0.02	-0.04
X31	0.42	0.35	0.0	0.25

In an ideal solution matrix, each variable would only load on one factor with a score of 1, and would not load at all on the other factors. However, in practice, factor loadings greater than 0.30 are considered significant, and loading greater than 0.50 is considered very significant (Hair et al., 1998).

A good factor solution should also account for between 50% and 70% of the amount of variance of each individual variable. The 6-factor structure found explains 80% of the variance of each individual variable. This highlights the very good quality of the result of the principal component analysis.

The first principal component by itself explains 28.25% of the total variation of all variables under consideration. The first principal component, with 11 variables, showed a greater than 50% correlation. The correlation coefficient of 9 out of the 11 variables was greater than 70% and had a positive (+) value. The indicator values, calculated based on the first principal component, are sorted in ascending order and the following list of provinces was generated in terms of investment priority:

1. Bayburt
2. Gümüşhane
3. Bartın
4. Artvin
5. Sinop
6. Amasya
7. Giresun
8. Rize
9. Karabük
10. Kastamonu
11. Ordu
12. Tokat
13. Çorum
14. Bolu
15. Zonguldak
16. Trabzon
17. Samsun

The second principal component by itself explains 16.63% of the total variation of all variables under consideration. The second principal component, with 7 variables, presented a greater than 50% correlation. One of these variables had a negative (-) value. The correlation coefficient of the other 4 variables was greater than 70% and had a positive (+) value. The priority list of provinces according to the second component is as follows:

1. Gümüşhane
2. Bayburt
3. Giresun
4. Artvin
5. Sinop
6. Kastamonu
7. Rize
8. Trabzon
9. Bartın
10. Ordu
11. Amasya
12. Tokat
13. Çorum
14. Samsun
15. Karabük
16. Bolu
17. Zonguldak

The 6 principal components explain 83.42% of the total variation of the 7 principal components with Eigenvalues greater than 1. The priority list of investment according to the indicator values, calculated as a result of multiplying the standardized data matrix by the weighted coefficients of the 6 principal components, showed a similarity in those components.

Conclusion

Some differences are seen with regard to the development between the regions due to both potential sources and incentive supports provided by the state. According to Kim, who maintains that economic activities are concentrated in regions that are supported, these regions become more developed compared to the others and the become center of economic activity. As suggested, removing these differences is possible by assessing the available possibilities.

There were developmental differences between the cities in the Black Sea region as a result of investments and studies in the socioeconomic field. As Wei maintains, providing effective production and marketing conditions is regarded as a powerful factor in doing away with regional inequality.

Therefore, removing these differences will be possible with the help of state support and private sector investments. In assessing the resources that the cities posses private sector will tend to make investments in profitable areas. The presence of forests in the Black Sea region is an important factor together with the skills and industrial inclination of the people living there. Gümüşhane and Bayburt, cities in the region that have lagged behind, possess some advantages for wood products investors in terms of encouraging applications and labor costs. Thanks to investments in these cities, the development of the region will accelerate and the private industrialist will possess some advantages with regard to establishing connections with new markets.

References

Akyüz, K.C. 2000. Structural Analysis in Small and Medium Sized Establishments in Forest Product Industry in the Black Sea Region, Unpublished Phd Thesis, Black Sea Technical University, Graduate School of Natural and Applied Sciences General Information, pp. 190.

Atalay, N., N. Demir, D. Birbil, Ş. Yıldırım and O.K. Ağaoğlu. 1997. Investment Options for Small and Medium Sized Establishments, National Productivity Centre Publication No: 618, Ankara.

Boyle, R.D. 1998. Scaling Additional Contributions to Principal Component Analysis, Pattern Recognition, 31, 12: 2047-2053.

Chen, S.S. 2001. Investment Opportunities Free Cash Flow and Stock Valuation Effect of Corporate Investments: The Case of Taiwan's Investments in China, Review of Quantitative Finance and Accounting, 16: 299-310.

Dinçer, B., M. Özaslan and E. Satılmı?. 1996. İllerin Sosyo-Ekonomik Gelişmişlik Sıralaması Araştırması, DPT, Ankara.

Drgona, V. and D. Turnock. 2002. Policies for rural Eastern Europe in transition: The case of Slovakia, GoeJournal, 50: 235-247.

Fielding, D. 1999. Manufacturing investment in South Africa: a time-series model, Journal of Development Economics, 58: 405-427.

Hair, J., R. Anderson, R. Tatham and W. Black. 1998. Multivariate Data Analysis, fifth ed. Prentice-Hall, Englewood Cliffs, NJ.

Ivanova, 1995. Social Change as Reflected in the Lives of Bulgarian Villages. In Kideckel D. (ed) East European Communities: Their Struggle for Balance in Turbulent Times, Boluder, pp. 217-236.

Jolliffle, I.T. 1986. Principal Component Analysis, Springer, New York.

Kim, Y.W. 2000. Territorial Development Policy, Spatial Development in Korea, Proceedings from the OECD-Korea Workshop on Development Policies, Seoul, March 8-9, 73-93.

Kim, Y.W. 2001. National Territorial Planning at the Turn of the 21st Century, GeoJournal, 53: 5-15.

Kinnear, P. and C.D. Gray. 1994. SPSS for Windows Made Simple, Lawrence Erlbaum Associates Publishers, Hove, U.K.

Kline, P., 1994. An Easy Guide to Factor Analysis, Routledge, London.

Konukçu, M., 1999. Ormancılığımız, DPT, Ankara.

Openshaw, S. 1995. Census Users' Handbook. Geoinformation International and John Wiley and Sons, Cambridge.

Ozimek, J. 1993. Targeting For Success: A Guide to New Techniques for Measurement and Analysis in Database and Direct Response Market, McGraw-Hill, Berkshire, U.K.

Serven, L. and A. Salimano. 1994. Striving for Growth after Adjustment, World Bank, Washington DC.

Soares, J.O., M.M.L. Marques and C.M.F. Monterio. 2003. Multivariate Methodology to Uncover Regional Disparities: A Contribution to Improve European Union and Govermental Decisions, European Journal of Operational Research, 145: 121-135.

Sun, J. 2002. A Note on Principal Component Analysis for Multi-Dimensional Data, Statistics and Probability Letters, 46: 69-73.

State Institute of Statistics 1992. Social and Economic Structure of Population.

State Institute of Statistics 1994. General Census of Industry and Business Establishments, Ankara.

State Institute of Statistics 1996. National Education Statistics, Ankara.

State Institute of Statistics 1999a. Agricultural Structure, Ankara.

State Institute of Statistics 1999b. Population Census, (1990-1997) Ankara.

State Institute of Statistics 2000. Statistics of Companies, Cooperatives and Firms, Ankara.

State Planning Organization, 1995. Various Indicators Related to Provinces in Turkey, Ankara.

State Planning Organization, 1999. Various Indicators Related to Provinces and Regions in Turkey, Ankara.

State Planning Organization, 1996-2000a, 7th Development Plan, Ankara.

State Planning Organization, 2000. 8th Regional Development Master Plan, Ankara.

Wei, Y.D. 2000. Investment and Regional Development in Post-Mao China, GeoJournal, 51: 169-179.