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## REGIONAL SOCIO-ECONOMIC TRENDS IN TURKEY

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**Abstract.** This paper is focusing on the regional socio-economic structure of Turkey in an effort to explore its internal dynamics and its geo-economic equilibria that to a large degree determine its long term socio-economic stability. Extensive analysis of the findings of recent research experience, based on the employment of Efficient Frontier Analysis techniques, is also presented in this paper.

**Keywords:** Multi-criteria Analysis, Data Envelopment Analysis (DEA), Regional Planning

## 1. INTRODUCTION

During the last 80 years Turkey is constantly attracting the interest of socio-economic and political analysts due to its strategic location, its amazing economic and especially industrial progress and its relatively advanced, with respect to its Middle East Muslim counterparts, democracy. Recently, this interest is increasing rapidly, mainly due to the expected, this October, start of EE-Turkey negotiations that will hopefully end up (some time in the rather far future) with the award of the full EE membership prize to this country. It is apparent that the successful realization of the above process will drastically alter and shift the power equilibria both in Europe and the Middle East. As a consequence this process is raising critical geo-strategic questions that are demanding quick and safe answers.

This paper is focusing on the regional socio-economic structure of Turkey in an effort to explore its internal dynamics and its geo-economic equilibria that to a large degree determine its long term socio-economic stability.

In chapter 2, the general socio-economic profile of Turkey is concisely presented. In chapter 3, a concise analysis of the regional socio-economic profile of this country is presented mainly aiming at the exploration of regional discrimination trends. Finally, in chapter 4, an extensive analysis of the findings of recent research experience, based on the employment of Efficient Frontier Analysis techniques, is presented.

## **2. THE GENERAL SOCIO-ECONOMIC PROFILE OF TURKEY**

The term “E.E. enlarged” refers to the set of countries that is composed by the 25 member countries of E.E. and Turkey. The source of the data presented in this chapter is “CIA – The World Factbook” ([www.cia.gov/cia/publications/factbook/](http://www.cia.gov/cia/publications/factbook/))

Turkey occupies an area of 780.000 square kilometers whereas its population in 2004 was estimated to be 68.9 millions.

In terms of area Turkey is the second largest country of Europe after Russia and the largest in E.E. enlarged, whereas in terms of population Turkey ranks third in Europe, after Russia and Germany, and second in E.E. enlarged (see Table 1). Turkey has a population density (2004 estimate) equal to 88.3 inhabitants per square kilometer which is near the European median.

| Area: 2004 (thousands of square km) | Population: 2004 estimate (millions) | Population density: 2004 estimate | Population growth rate: 2004 estimate |
|-------------------------------------|--------------------------------------|-----------------------------------|---------------------------------------|
| 1. RUSSIA: 17075.2                  | 1. RUSSIA: 143.8                     | 1. NETHERLANDS: 393               | 1. ISRAEL: 1.29                       |
| 2. TURKEY: 780.6                    | 2. GERMANY: 82.4                     | 2. BELGIUM: 338                   | 2. IRELAND: 1.16                      |
| 3. UKRAINE: 603.7                   | 3. TURKEY: 68.9                      | 3. ISRAEL: 298                    | 3. TURKEY: 1.13                       |
| 4. FRANCE: 547                      | 4. FRANCE: 60.4                      | 4. UNITED KINGDOM: 246            | 4. NETHERLANDS: .57                   |
| 5. SPAIN: 504.8                     | 5. UNITED KINGDOM: 60.3              | 5. GERMANY: 231                   | 5. SWITZERLAND: .54                   |
| 6. SWEDEN: 450                      | 6. ITALY: 58.1                       | 6. ITALY: 193                     | 6. ALBANIA: .5                        |
| 7. GERMANY: 357                     | 7. UKRAINE: 47.7                     | 7. SWITZERLAND: 182               | 7. BOSNIA: .45                        |
| 8. FINLAND: 338.1                   | 8. SPAIN: 40.3                       | 8. MOLDOVA: 130                   | 8. PORTUGAL: .41                      |
| 9. NORWAY: 324.2                    | 9. POLAND: 38.6                      | 9. CZECHIA: 129                   | 9. NORWAY: .41                        |
| 10. POLAND: 312.7                   | 10. ROMANIA: 22.4                    | 10. DENMARK: 125                  | 10. FRANCE: .39                       |
| 11. ITALY: 301.2                    | 11. NETHERLANDS: 16.3                | 11. POLAND: 123                   | 11. FYROM: .39                        |
| 12. UNITED KINGDOM: 244.8           | 12. SERBIA: 10.8                     | 12. ALBANIA: 122                  | 12. DENMARK: .35                      |
| 13. ROMANIA: 237.5                  | 13. GREECE: 10.6                     | 13. PORTUGAL: 114                 | 13. UNITED KINGDOM: .29               |
| 14. BELARUS: 207.6                  | 14. PORTUGAL: 10.5                   | 14. SLOVAKIA: 111                 | 14. GREECE: .2                        |
| 15. GREECE: 131.9                   | 15. BELARUS: 10.3                    | 15. FRANCE: 110                   | 15. SWEDEN: .18                       |
| 16. BULGARIA: 110.9                 | 16. BELGIUM: 10.3                    | 16. HUNGARY: 108                  | 16. FINLAND: .18                      |
| 17. SERBIA: 102.4                   | 17. CZECHIA: 10.2                    | 17. SERBIA: 105                   | 17. MOLDOVA: .18                      |
| 18. HUNGARY: 93                     | 18. HUNGARY: 10                      | 18. SLOVENIA: 99                  | 18. BELGIUM: .16                      |
| 19. PORTUGAL: 92.4                  | 19. SWEDEN: 9                        | 19. AUSTRIA: 98                   | 19. SPAIN: .16                        |
| 20. AUSTRIA: 83.9                   | 20. AUSTRIA: 8.2                     | 20. ROMANIA: 94                   | 20. SLOVAKIA: .14                     |
| 21. CZECHIA: 78.9                   | 21. SWITZERLAND: 7.5                 | 21. TURKEY: 88                    | 21. AUSTRIA: .14                      |
| 22. IRELAND: 70.3                   | 22. BULGARIA: 7.5                    | 22. FYROM: 83                     | 22. ITALY: .09                        |
| 23. LITHUANIA: 65.2                 | 23. ISRAEL: 6.2                      | 23. SPAIN: 80                     | 23. SERBIA: .03                       |
| 24. LATVIA: 64.6                    | 24. SLOVAKIA: 5.4                    | 24. CROATIA: 80                   | 24. POLAND: .02                       |
| 25. CROATIA: 56.5                   | 25. DENMARK: 5.4                     | 25. GREECE: 80                    | 25. GERMANY: .02                      |
| 26. BOSNIA: 51.1                    | 26. FINLAND: 5.2                     | 26. UKRAINE: 79                   | 26. SLOVENIA: 0                       |
| 27. SLOVAKIA: 48.8                  | 27. NORWAY: 4.6                      | 27. BOSNIA: 78                    | 27. CZECHIA: 0                        |
| 28. ESTONIA: 45.2                   | 28. CROATIA: 4.5                     | 28. BULGARIA: 68                  | 28. CROATIA: 0                        |
| 29. DENMARK: 43.1                   | 29. MOLDOVA: 4.4                     | 29. IRELAND: 57                   | 29. ROMANIA: -.1                      |
| 30. NETHERLANDS: 41.5               | 30. IRELAND: 4                       | 30. LITHUANIA: 55                 | 30. BELARUS: -.1                      |
| 31. SWITZERLAND: 41.3               | 31. BOSNIA: 4                        | 31. BELARUS: 50                   | 31. HUNGARY: -.2                      |
| 32. MOLDOVA: 33.8                   | 32. LITHUANIA: 3.6                   | 32. LATVIA: 36                    | 32. LITHUANIA: -.3                    |
| 33. BELGIUM: 30.5                   | 33. ALBANIA: 3.5                     | 33. ESTONIA: 30                   | 33. RUSSIA: -.4                       |
| 34. ALBANIA: 28.7                   | 34. LATVIA: 2.3                      | 34. SWEDEN: 20                    | 34. UKRAINE: -.7                      |
| 35. FYROM: 25.3                     | 35. FYROM: 2.1                       | 35. FINLAND: 15                   | 35. LATVIA: -.7                       |
| 36. ISRAEL: 20.8                    | 36. SLOVENIA: 2                      | 36. NORWAY: 14                    | 36. ESTONIA: -.7                      |
| 37. SLOVENIA: 20.3                  | 37. ESTONIA: 1.34                    | 37. RUSSIA: 8                     | 37. BULGARIA: -.9                     |

TABLE 1. Population statistics

On the other hand, Turkey's population annual growth rate (2004 estimate) is 1,13% which is the second largest in Europe after Ireland. Note at this point that, ten years ago Turkey's annual growth rate was twice as much, but the rapid adoption of the Euro-american life style model in combination with the fast increasing purchasing power of a large proportion of its population led to the rapid reduction of population growth rate.

The GDP of Turkey (2004 estimate) is 458.2 billions of Purchasing Power Parity US \$ (PPP \$) which is the 8<sup>th</sup> highest in Europe (the 7<sup>th</sup> highest in E.E. enlarged) after Germany, U.K., France, Italy, Russia, Spain and the Netherlands (see Table 2). Turkey's GDP growth rate estimate for 2004 was 5,8% according to which Turkey ranks 8<sup>th</sup> in Europe and 1<sup>st</sup> in E.E. enlarged. In view of the fact that the Netherlands

GDP growth rate for 2004 was estimated to be negative, Turkey is expected to surpass in 2005 the Netherlands' GDP which will place this country among the 6 biggest economic powers of E.E. enlarged. On the other hand, Turkey's GDP per capita estimate in 2004 was 6.650 PPP \$, which was one of the lowest in Europe and the lowest in E.E. enlarged with the second lowest being that of Latvia (10.391 PPP \$). Note at this point that, Greece's GDP per capita in 2004 was 20.151 PPP \$. Turkey's GDP composition (agricultural sector accounting in 2001 for 11,7% of GDP, industrial sector for 29,8% and the services sector for 58,5% of GDP) deviated significantly from E.E. averages. In particular, the agricultural sector of Turkey (as % of GDP) is the 6<sup>th</sup> highest in Europe and the highest in E.E. enlarged with Greece having the second highest agriculture share (6,7%). The services sector share of Turkey is the second lowest, after Ireland, in E.E. enlarged. Finally, Turkey's industrial sector share is near the E.E. average levels.

Turkey's industrial production growth rate estimate for 2004 was 8,5%, one of the highest in E.E. enlarged, actually the 3d highest after Lithuania and Poland. This makes industry the locomotive of Turkey's economy.

The economic progress of Turkey is in sharply contrast with its social progress as the following figures could suggest.

Besides its relatively very low GDP per capita, Turkey has a very high, for E.E. standards, population portion below poverty line, 18,0% (2001 estimate). On top of that, GDP distribution with social criteria is also problematic: the income of the 10% poorest population portion of Turkey accounts for 2,3% of the total income (1994) one of the lowest in E.E. enlarged whereas the income of the 10% richest

population portion accounts for 32,3% of total population income (1994) which is the highest in E.E. enlarged.

Turkey's per capita foreign debt in 2004 was estimated to be 2.138 \$ which is near the European and E.E. enlarged median levels. Note that Greece's corresponding figure in 2004 was almost triple (6.179 \$).

Turkey's value of exports (49,1 billion \$) and of imports (62,4 billion \$) in 2003 place this country in a median position in Europe. The exports per capita of Turkey was 713 \$ in 2003, the second lowest in E.E. enlarged with Greece being at the bottom of the list with 557 \$. Turkey, with 906 \$ imports per capita, ranks last in E.E. enlarged. In 2003 Germany received 15,8 % of Turkey's exports value, USA 8,0% , U.K. 7,8% and Italy 6,8%. On the other hand, in the same year Turkey imported 13,6 % of total value from Germany, 7,9 % from Italy, 7,8% from Russia and 6,0 % from France.

| Gross Domestic Product (GDP) | GDP growth rate: 2004 estimate (%) | GDP per capita in purchasing power |
|------------------------------|------------------------------------|------------------------------------|
| 1. GERMANY: 2271             | 1. UKRAINE: 9.4                    | 1. NORWAY: 37326                   |
| 2. UNITED KINGDOM: 1666      | 2. LITHUANIA: 9                    | 2. SWITZERLAND: 31907              |
| 3. FRANCE: 1661              | 3. LATVIA: 7.4                     | 3. DENMARK: 30963                  |
| 4. ITALY: 1550               | 4. RUSSIA: 7.3                     | 4. AUSTRIA: 29915                  |
| 5. RUSSIA: 1282              | 5. ALBANIA: 7                      | 5. IRELAND: 29050                  |
| 6. SPAIN: 885.5              | 6. BELARUS: 6.8                    | 6. BELGIUM: 29039                  |
| 7. NETHERLANDS: 461.4        | 7. MOLDOVA: 6.3                    | 7. NETHERLANDS: 28307              |
| 8. TURKEY: 458.2             | 8. TURKEY: 5.8                     | 8. UNITED KINGDOM: 27629           |
| 9. POLAND: 427.1             | 9. ROMANIA: 4.9                    | 9. GERMANY: 27561                  |
| 10. BELGIUM: 299.1           | 10. GREECE: 4.7                    | 10. FRANCE: 27500                  |
| 11. UKRAINE: 260.4           | 11. ESTONIA: 4.7                   | 11. FINLAND: 27346                 |
| 12. AUSTRIA: 245.3           | 12. BULGARIA: 4.3                  | 12. ITALY: 26678                   |
| 13. SWITZERLAND: 239.3       | 13. CROATIA: 4.3                   | 13. SWEDEN: 26478                  |
| 14. SWEDEN: 238.3            | 14. SLOVAKIA: 3.9                  | 14. SPAIN: 21973                   |
| 15. GREECE: 213.6            | 15. POLAND: 3.7                    | 15. GREECE: 20151                  |
| 16. PORTUGAL: 181.8          | 16. BOSNIA: 3.5                    | 16. ISRAEL: 19500                  |
| 17. NORWAY: 171.7            | 17. HUNGARY: 2.9                   | 17. SLOVENIA: 18400                |
| 18. DENMARK: 167.2           | 18. CZECHIA: 2.9                   | 18. PORTUGAL: 17314                |
| 19. CZECHIA: 161.1           | 19. FYROM: 2.8                     | 19. CZECHIA: 15794                 |
| 20. ROMANIA: 155             | 20. SPAIN: 2.4                     | 20. HUNGARY: 13990                 |
| 21. FINLAND: 142.2           | 21. SLOVENIA: 2.3                  | 21. SLOVAKIA: 13389                |
| 22. HUNGARY: 139.8           | 22. UNITED KINGDOM: 2.2            | 22. ESTONIA: 12985                 |
| 23. ISRAEL: 120.9            | 23. FINLAND: 1.9                   | 23. LITHUANIA: 11361               |
| 24. IRELAND: 116.2           | 24. SWEDEN: 1.7                    | 24. POLAND: 11065                  |
| 25. SLOVAKIA: 72.3           | 25. SERBIA: 1.5                    | 25. CROATIA: 10467                 |
| 26. BELARUS: 62.6            | 26. IRELAND: 1.4                   | 26. LATVIA: 10391                  |
| 27. BULGARIA: 57.1           | 27. ISRAEL: 1.3                    | 27. RUSSIA: 8915                   |
| 28. CROATIA: 47.1            | 28. BELGIUM: 1.1                   | 28. BULGARIA: 7613                 |
| 29. LITHUANIA: 40.9          | 29. AUSTRIA: .7                    | 29. ROMANIA: 6920                  |
| 30. SLOVENIA: 36.8           | 30. NORWAY: .6                     | 30. TURKEY: 6650                   |
| 31. BOSNIA: 24.3             | 31. FRANCE: .5                     | 31. FYROM: 6571                    |
| 32. SERBIA: 23.9             | 32. ITALY: .4                      | 32. BELARUS: 6078                  |
| 33. LATVIA: 23.9             | 33. DENMARK: 0                     | 33. BOSNIA: 6075                   |
| 34. ESTONIA: 17.4            | 34. GERMANY: -.1                   | 34. UKRAINE: 5459                  |
| 35. ALBANIA: 16.1            | 35. SWITZERLAND: -.5               | 35. ALBANIA: 4600                  |
| 36. FYROM: 13.8              | 36. NETHERLANDS: -.8               | 36. SERBIA: 2213                   |
| 37. MOLDOVA: 7.8             | 37. PORTUGAL: -1.3                 | 37. MOLDOVA: 1773                  |

2004 estimate: in billions PPP \$

2004 estimate: in PPP \$

TABLE 2. GDP Statistics

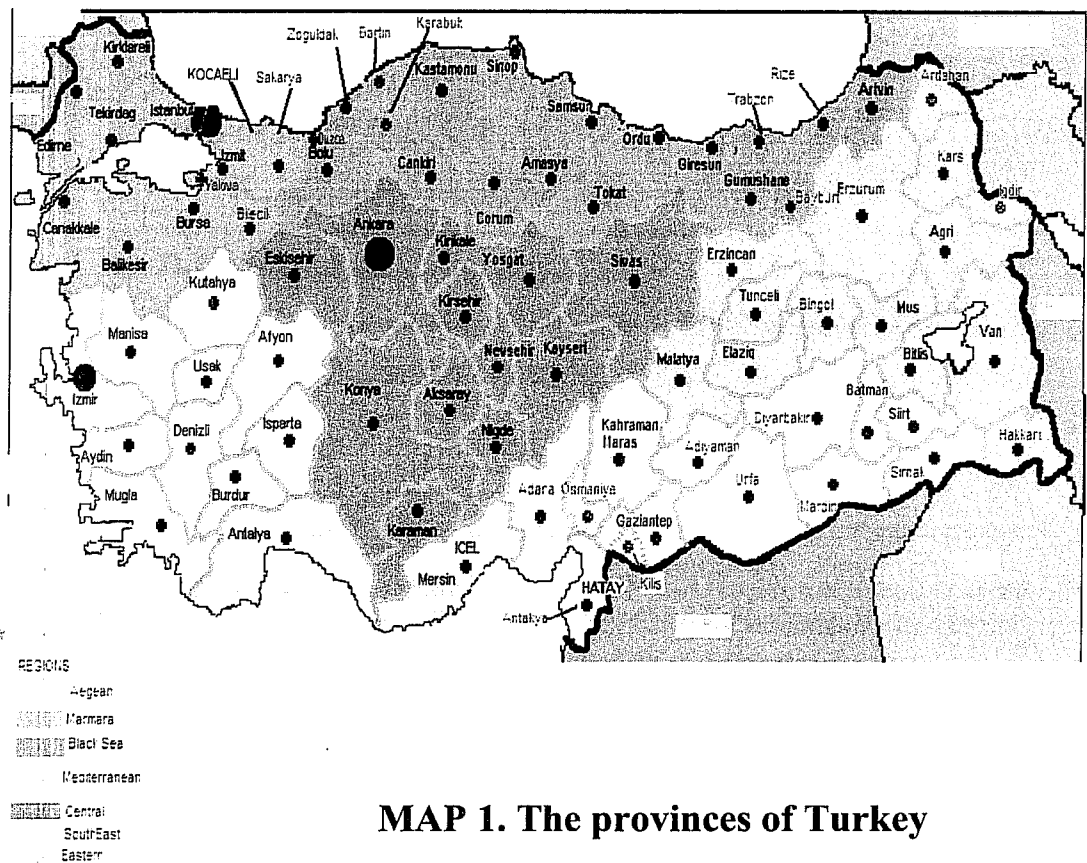
### 3. THE PROVINCES OF TURKEY

Turkey is divided into 81 administrative units called provinces whereas in Turkish are called “iller” (see Map 1 and also Table 3 for a list of Turkey’s provinces with their area, population and capital name). The source of the data presented in this chapter is Turkish Government Statistics ([www.die.gov.tr/ENGLISH/ISTATIS/](http://www.die.gov.tr/ENGLISH/ISTATIS/)). The average area of Turkey’s provinces is approximately 9600 square kilometers whereas their average population is approximately 850 thousands (2001 data).

In terms of area, the biggest provinces of Turkey are: Konya with 38.100 square kilometers (approximately the size of the Netherlands), Sivas with 28.400, Ankara with 25.700, and Erzurum with 25.000 square kilometers whereas the smallest provinces are: Zoguldak with 3.480,

Kocaeli with 3.625, Bayburt with 3.651 and Rize with 3.920 square kilometers. All 4 smallest provinces belong to the northern part of the country whereas the 4 biggest provinces belong to the central part of it.

In terms of population (2001 data), the biggest provinces of Turkey are: Istanbul with 10,2 millions Ankara with 4,06 Izmir with 3,44 and Konya with 2,25 millions whereas the smallest are: Tunceli with 91 thousands, Gumushane with 188, Artvin with 190 and Bilecik with 195 thousands. The 3 least populous provinces of Turkey belong to the eastern part of the country whereas the 4 most populous provinces of it belong to the western part of it.



The provinces with the highest density of population are (2001 data): Istanbul with 1962 inhabitants per square kilometer, Kocaeli with



338, Izmir with 287, Hatay with 230 and Trabzon with 212, whereas the provinces with the lowest density of population are: Tunceli with 11,7 inhabitants per square kilometer, Artvin with 25,5 Sivas with 26,3 and Erzincan with 26,6. The 4 least densely populated provinces belong to an arc (lying in the northeastern part of the country) that starts from Sivas and ends up to Artvin.

| Name       | CapitalA   | Area<br>(km2) | Population<br>(2000) |
|------------|------------|---------------|----------------------|
| Adana      | Adana      | 12,788        | 1,849,478            |
| Adıyaman   | Adıyaman   | 7,614         | 623,811              |
| Afyon      | Afyon      | 14,230        | 812,416              |
| Ağrı       | Ağrı       | 11,376        | 528,744              |
| Aksaray    | Aksaray    | 7,626         | 396,084              |
| Amasya     | Amasya     | 5,520         | 365,231              |
| Ankara     | Ankara     | 25,706        | 4,007,860            |
| Antalya    | Antalya    | 20,591        | 1,719,751            |
| Ardahan    | Ardahan    | 5,576         | 133,756              |
| Artvin     | Artvin     | 7,436         | 191,934              |
| Aydın      | Aydın      | 8,007         | 950,757              |
| Balıkesir  | Balıkesir  | 14,292        | 1,076,347            |
| Bartın     | Bartın     | 2,140         | 184,178              |
| Batman     | Batman     | 4,694         | 456,734              |
| Bayburt    | Bayburt    | 3,652         | 97,358               |
| Bilecik    | Bilecik    | 4,307         | 194,326              |
| Bingöl     | Bingöl     | 8,125         | 253,739              |
| Bitlis     | Bitlis     | 6,707         | 388,678              |
| Bolu       | Bolu       | 10,037        | 270,654              |
| Burdur     | Burdur     | 6,887         | 256,803              |
| Bursa      | Bursa      | 10,963        | 2,125,140            |
| Çanakkale  | Çanakkale  | 9,737         | 464,975              |
| Çankırı    | Çankırı    | 7,388         | 270,355              |
| Çorum      | Çorum      | 12,820        | 597,065              |
| Denizli    | Denizli    | 11,868        | 850,029              |
| Diyarbakır | Diyarbakır | 15,355        | 1,362,708            |
| Düzce      | Düzce      | 1,014         | 314,266              |
| Edirne     | Edirne     | 6,276         | 402,606              |
| Elazığ     | Elazığ     | 9,153         | 569,616              |
| Erzincan   | Erzincan   | 11,903        | 316,841              |
| Erzurum    | Erzurum    | 25,066        | 937,389              |
| Eskişehir  | Eskişehir  | 13,652        | 706,009              |
| Gaziantep  | Gaziantep  | 6,207         | 1,285,249            |
| Giresun    | Giresun    | 6,934         | 523,819              |
| Gümüşhane  | Gümüşhane  | 6,575         | 186,953              |

|               |               |         |            |
|---------------|---------------|---------|------------|
| Hakkari       | Hakkari       | 7,121   | 236,581    |
| Hatay         | Hatay         | 5,403   | 1,253,726  |
| İçel          | Mersin        | 15,853  | 1,651,400  |
| İğdir         | İğdir         | 3,539   | 168,634    |
| Isparta       | Isparta       | 8,933   | 513,681    |
| İstanbul      | İstanbul      | 5,220   | 10,018,735 |
| İzmir         | İzmir         | 11,973  | 3,370,866  |
| Kahramanmaraş | Kahramanmaraş | 14,327  | 1,002,384  |
| Karabük       | Karabük       | 4,074   | 225,102    |
| Karaman       | Karaman       | 9,163   | 243,210    |
| Kars          | Kars          | 9,442   | 325,016    |
| Kastamonu     | Kastamonu     | 13,108  | 375,476    |
| Kayseri       | Kayseri       | 16,917  | 1,060,432  |
| Kilis         | Kilis         | 1,338   | 114,724    |
| Kırıkkale     | Kırıkkale     | 4,365   | 383,508    |
| Kırklareli    | Kırklareli    | 6,550   | 328,461    |
| Kırşehir      | Kırşehir      | 6,570   | 253,239    |
| Kocaeli       | Kocaeli       | 3,626   | 1,206,085  |
| Konya         | Konya         | 38,157  | 2,192,166  |
| Kütahya       | Kütahya       | 11,875  | 656,903    |
| Malatya       | Malatya       | 12,313  | 853,658    |
| Manisa        | Manisa        | 13,810  | 1,260,169  |
| Mardin        | Mardin        | 8,891   | 705,098    |
| Muğla         | Muğla         | 13,338  | 715,328    |
| Muş           | Muş           | 8,196   | 453,654    |
| Nevşehir      | Nevşehir      | 5,467   | 309,914    |
| Niğde         | Niğde         | 7,312   | 348,081    |
| Ordu          | Ordu          | 6,001   | 887,765    |
| Osmaniye      | Osmaniye      | 3,320   | 458,782    |
| Rize          | Rize          | 3,920   | 365,938    |
| Sakarya       | Sakarya       | 4,817   | 756,168    |
| Samsun        | Samsun        | 9,579   | 1,209,137  |
| Şanlıurfa     | Şanlıurfa     | 18,584  | 1,443,422  |
| Siirt         | Siirt         | 5,406   | 263,676    |
| Sinop         | Sinop         | 5,862   | 225,574    |
| Şırnak        | Şırnak        | 7,172   | 353,197    |
| Sivas         | Sivas         | 28,488  | 755,091    |
| Tekirdağ      | Tekirdağ      | 6,218   | 623,591    |
| Tokat         | Tokat         | 9,958   | 8828,027   |
| Trabzon       | Trabzon       | ,685    | 975,137    |
| Tunceli       | Tunceli       | 7,774   | 93,584     |
| Uşak          | Uşak          | 5,341   | 322,313    |
| Van           | Van           | 19,069  | 877,524    |
| Yalova        | Yalova        | 674     | 168,593    |
| Yozgat        | Yozgat        | 14,123  | 682,919    |
| Zonguldak     | Zonguldak     | 3,481   | 615,599    |
| Turkey        | Ankara        | 774,815 | 67,803,927 |

Table 3. Provinces of Turkey

The provinces with the largest population growth rate during the period 1990-2001 were: Antalya with 56,4% increase, Istanbul with 40,1%, Urfa with 46,7%, Van and Batman with 40,5%, Hakkari with 40,1% and Sirnak with 37,7% (corresponding national figure is 21,5%). Note that the last 5 of the above provinces belong to the southeastern part of the country. Among the 16 Turkey's provinces with the highest population growth rate 4 belong to the Marmara Region (see Map 1), 2 to the Aegean Region, 2 to the Mediterranean Region, 7 to the southeastern part of the country and only 1 (Konya) to the rest of it. The touristic development of the Aegean and the Mediterranean Regions on the one hand, and the industrial development of the Marmara Region on the other hand seem to be the main population attraction sources. The regions contributing most to corresponding internal population movements are: Eastern Region with an outmigration reaching 16% during the period 1985-90 and Black Sea and Central Regions with an outmigration around 10% each during the same period. The 4 provinces with the lowest population growth rate (actually the largest population decline rate) during the period 1990-2001 were: Kars with 51% reduction, Bolu with 50% reduction, Zoguldak with 43% reduction and Tunceli with 32% population reduction rate. It is interesting to note that among them, Bolu and Zoguldak seem to suffer most from outmigration to the nearby highly industrialized provinces of Kocaeli and Istanbul which are also characterized by relatively very high per capita GDP.

High population densities together with high population growth rates characterize, in many cases, areas exhibiting economic vitality that is not near saturation levels. Istanbul (with an annual population growth rate in 2001 equal to 2.2% and a population density in the same year equal to 1962) and Tekirdag (with 2.2% and 103 respectively) in

Marmara Region, Izmir (with 1.9% and 287 respectively) in the Aegean Region, Icel (with 2.7% and 107 respectively) in the Mediterranean Region, Ankara (with 1.3% and 158 respectively) in the Central Region, Trabzon (with 1.7% and 212 respectively) in the Black Sea Region, and finally Gaziantep (with 2,2% and 212 respectively) and Batman (with 6.1% and 103 respectively) in the Southeast Region are the provinces of Turkey exhibiting sustainable population attraction mechanisms. On the other hand, low population densities (well below the level of 88 inhabitants per square kilometer, which was the population density of Turkey in 2001) and at the same time low annual population growth rate (well below Turkey's population growth rate for 2001 which was 1.1%) characterized in 2001 the following provinces (the numbers in parentheses represent population growth rates and densities): Edirne (-0.5%, 64) in the Marmara Region, Denizli (-0.3%, 71) in the Aegean Region, Burdur (-0.4%, 37) in the Mediterranean Region, Sivas (-0.7%, 26) in the Central Region, Sinop (-1.8%, 38), Kastamonu (-0.8%, 28), Corum (-0.6%, 46) and Artvin (-0.6%, 26) in the Black Sea Region and Tunceli (-3.2%, 12), Bingol (-0.4%, 31) and Kars (-1.0%, 34) in the Eastern Region. It is interesting to note that the Black Sea and the Eastern Regions exhibit strong population desertification trends.

The provinces with the highest per capita GDP in 2001 were: Kocaeli with 7,4 millions Turkish Lira (TL) per capita, Bolu with 5,1 millions TL, Kirlareli with 4,4 millions TL and Mugla with 4,0 millions TL. The provinces with the lowest per capita GDP (all belonging to the extreme eastern part of the country) are: Agri with 0,69 millions TL, Mus with 0,7 millions TL, Sirnak with 0,77 millions TL and Bitlis with 0,78 millions TL. The variation (ratio) between the highest and the lowest provincial per capita GDP reached in 2001 the

value 10, a value underlying the extreme regional discrimination problems Turkey is facing. Note at this point that, among the 34 provinces with the highest per capita GDP in Turkey (2001 data), there is no one belonging to the Southeast and Eastern regions.

Turkey's GDP growth rate, expressed as the ratio of GDP in 2001 over its GDP in 1990 (in TL), is 453. The provinces with the highest GDP growth rate during the period 1990-2001 were (the numbers in parentheses give the ratio of GDP in 2001 over the GDP in 1990 expressed in TL): Yosgat (1162) in the Central Region, Urfa (682) in the Southeast Region, Hakkari (647) and Van (575) in the Eastern Region, Karaman-Maras (643) in the Mediterranean Region, Mugla (592) in the Aegean Region and Bayburt (592) in the Black Sea Region. The provinces with the lowest GDP growth rate during the same period were: Siirt (198), Adiyaman (236) and Batman (284) in the Southeast Region, Kars (244) in the Eastern Region, Canakkale (339) in the Marmara Region and Amasya (355) and Sinop (355) in the Black Sea Region.

High per capita GDP levels in combination with high GDP growth rates characterize, in many cases, areas exhibiting sustainable economic development. Note that the numbers in parentheses after the provinces names represent their GDP annual growth rate (expressed in TL) in the period 2000-2001 and their per capita GDP in 2001 expressed in TL. Note also that the corresponding national indices during the above years were 43% and 2030 TL respectively. Kirklareli (59%, 4350) and Kocaeli (61%, 7465) in the Marmara Region, Mugla (53%, 4008) in the Aegean Region, Antalya (50%, 2657) and Icel (47%, 2970) in the Mediterranean Region, Zoguldak (49%, 3596) in the Black Sea Region and Kirikale (54%, 3301) in the Central Region are the provinces of

Turkey exhibiting high economic development with strong sustainability characteristics. On the other hand, Agri (35%, 688) in the Eastern Region, Gumushane (39%, 1303) and Cankiri (37%, 1373) in the Black sea Region and Aksaray (32%, 1170) in the Central Region exhibit a repulsive economic image.

Conclusively, Kocaeli in the Marmara Region and Icel in the Mediterranean Region are the provinces of Turkey exhibiting the most positive profile with respect to the following 4 key indices: population density, population growth rate, per capita GDP and GDP growth rate. On the other hand, the Black Sea Region accommodates some of the most repulsive, with respect to the above indices, provinces of Turkey.

#### **4. THE ECONOMIC EFFICIENCY OF TURKEY'S PROVINCES**

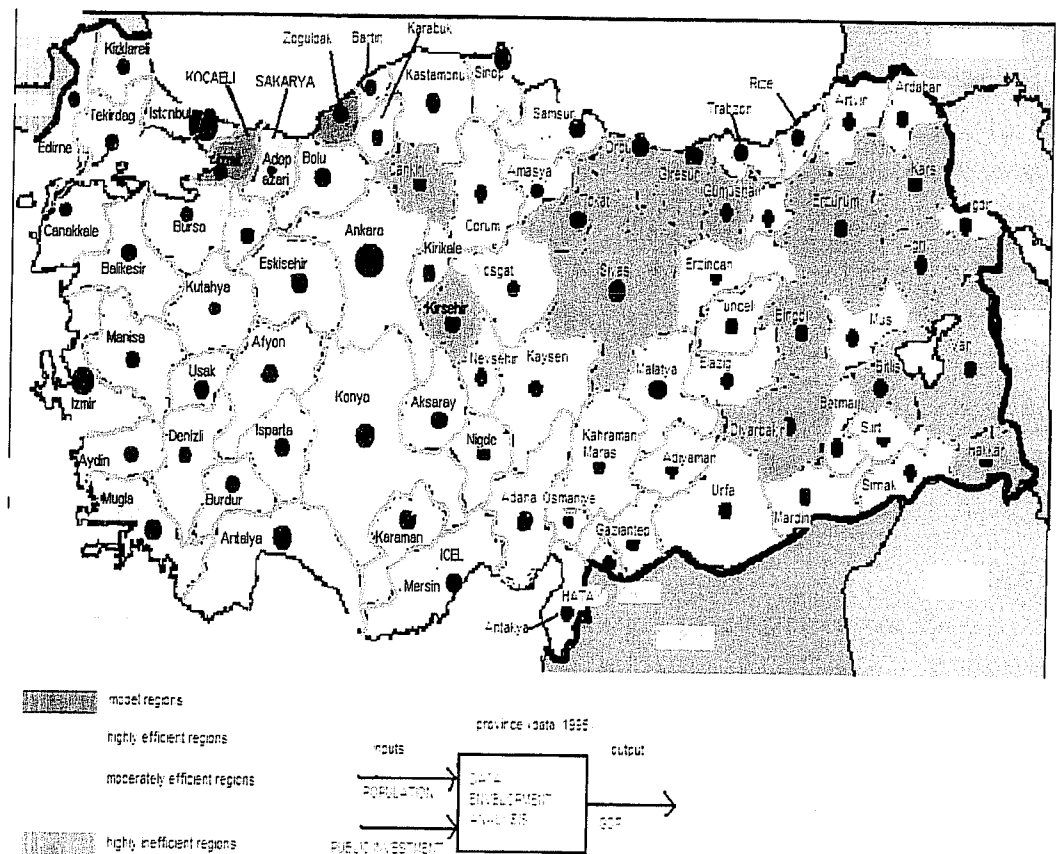
There exists a rich bibliography regarding the applications of Efficient Frontier Analysis methodologies, such as Data Envelopment Analysis (DEA), in Regional Development and Planning Studies.

Athanassopoulos and Karkazis (1997) applied DEA to assess the efficiency of the prefectures of Greece to improve their socio-economic image, introducing at the same time a new theoretical concept, that of "duality efficiency" as a tool for the exploration of the existence of sustainability features in the assessed units.

Karkazis and Thanassoulis (1998) applied DEA to assess the ability of the prefectures of Greece to use efficiently public resources in order to attract private investments. It is interesting to note that, according to their findings, the efficient prefectures of Greece were

Boiotia and Chalkidike, which are neighboring with the two largest urban areas of Greece, Athens and Thessaloniki respectively.

Anemodouras et al (2001) applied a similar model on the provinces of Turkey. The input criteria for each unit (province) were its population and the public investment directed to it in 1995 and the output criterion was its GDP in the same year. Note that, according to this model a province is assessed as efficient if its human administrative force in combination with the existing socio-economic development mechanisms exploit efficiently public investment flows so as to produce high GDP per capita increaments. The application of the DEA methodology produced a categorization of Turkey's provinces in the following 4 groups (see Map 2).



**MAP 2. Regional efficiency of Turkey**

A..Model provinces (the provinces achieving the maximum assessment mark)

*Kocaeli and Zoguldak*

B. Highly efficient provinces

*Istanbul, Kirklareli, Sakarya, Canakkale, Izmir, Manisa, Mugla and Aydin.*

C. Moderately efficient provinces

*Balikesir, Kutahya, Usak, Denizli, Burdur, Karaman, Icel, Adana, Osmaniye, Kahraman-Maras, Bolu, Ankara, Nevsehir and Artvin.*

D. Highly inefficient provinces

*Most of the provinces of the Eastern Region and five provinces of the Black Sea Region.*



but in different directions, that sustain or even deteriorate regional discrimination trends. In highly efficient provinces such as Kocaeli, which has also attained sustainable development, the quality of its socio-economic profile improves the quality of investment flows exploitation mechanism which, through a feed-back process, further improves its socio-economic profile. On the other hand, the repulsive socio-economic profile of the Eastern Region and part of the Black Sea Region, in combination with possible administrative inefficiencies influence negatively the quality of investment flows exploitation mechanism which, through a feed-back process, further downgrades their socio-economic profile. To further highlight the causes of the above regional discrimination process one may consider also a long term strategic index, the number of people with masters or doctoral education per million of inhabitants. In 1995, in the Marmara Region (the region accommodating Kocaeli) approximately 1500 people in every million of inhabitants were holding a masters or doctoral degree whereas in the Eastern Region the corresponding number was approximately 440.

Finally, Turkey exhibits two development poles which are mainly propelled by the industry. A development pole around Kocaeli and Istanbul in the northwestern part of the country and another pole around Icel in the southeastern part of it. To further highlight the power of these two poles one may consider a strategic index regarding industry, the productivity of their manufacturing value added process expressed as value added per hour of employment. In 1993 (the latest year for which relevant data were available to the author), Kocaeli and Icel exhibited the highest, after the province of Batman, manufacturing productivity in Turkey with 0.79 millions TL per hour.

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