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New Regional Definition and Spatial Analysis of Regional Inequalities in Turkey. Related to the Regional Policies of EU

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**New Regional Definition and Spatial Analysis of Regional Inequalities
in Turkey**

Related to the Regional Policies of EU

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1. Introduction

Regional inequalities and spatial dimension or effects of growth have become more significant and the studies emphasizing these issues enhance the literature recently. Especially for the EU project, there have been two main trends as deepening on one hand and widening on the other. Therefore inequalities both between member states and newly member states, furthermore within states should be examined in order to establish the regional policy of the EU. Reducing “spatial disparities” has been an essential part of the integration and cohesion process since 1972. The concept of cohesion is explained as the degree to which disparities in economic welfare between countries and regions within the Union are socially and politically tolerable (Keane,1999).

For practical reasons which have to do with the data availability and the implementation of regional policies, the EU has established the nomenclature of territorial units for statistics (NUTS). This geographical classification system provides a single uniform breakdown of territorial units for the production of EU regional statistics. According to European Regional Statistics Reference Guide (European Commission, 2002), definition of a region depends on two main aspects such as delimitation of space on the basis of one or more criteria and use for administrative purpose at a level below that of the nation state. The system is also helpful for the identification of disadvantaged or less developed regions in order to direct development objectives and funds of the EU.

The regions are born of history, culture and traditions as well as geographical characteristics. The new concept of region spans multiple political jurisdictions and collaboration among cities or states (Sweet,1999). After globalization process, regional policy in the most countries has become more emphasized on international competitiveness. As national barriers are lowered, “city regions” are the real arenas for global economic competition. For the purpose of reducing interregional inequalities, regional policy has to be adjusted not only to enhance international competitiveness but to raise the competitive level of backward regions as well.

Enlargement process of EU has brought a debate and several scenarios on disparities within enlarging EU. Cohesion requires a better performance by the lower-income

countries over a sustained period. For this reason, there has been an increasing interest and studies on examining interregional disparities between regions in member states and among member states. When using any classification of regions, the level of detail increases as the degree of spatial or geographical disaggregation increases (Keane, 1999). Thus, disparities between the regions are wider than those between member states of EU. Some authors argue that factor movements will tend to equalize and lead to economic convergence between existing and new members following the neoclassical theory. But on the other hand, alternative theories emphasize the polarization process whereby the attractiveness of dynamic rich regions (core) is reinforced at the expense of less dynamic ones, leading to wider income disparities. From this point of view, satisfactory EU growth policies have no guarantee that the gap between the successful and the unsuccessful regions will not widen. On the one hand, it is required the newly member states should catch up the EU level of per capita income as a whole. But on the other hand, considerable disparities occur among the regions within country.

If the integration process will not help the backward regions without any intervention, there will be a need for regional insurance mechanism to achieve a reduction of inequalities throughout the EU (Keane,1999). The purpose of the Structural Funds is to assist regions in achieving the living standards and productivity levels of the richer EU regions by bringing about faster economic growth than in the core regions. After 1999, the resources would be diverted from existing peripheral regions to the potential new members throughout the enlarging process.

From the economic point of view, Europe seems to be still divided between the western and more affluent part and the eastern part that is still faced with a lower development level (Petrakos, Maier and Gorzelak, 2000). On the other hand, there would be opportunity for relatively peripheral regions. The expansion of EU would shift the economic centre of gravity in Europe eastwards. Economic gains would be least to southern and western peripheral regions (McQuaid,2000). It seems that the approach to Eastern Europe will change with reorientation of the European Project as a whole away from a single Europe to a patchwork Europe by accepting and valuing local and regional differences (Agnew,2001).

From this framework, this paper will give an opportunity to evaluate adjustment process related to regional issues such as definition of new regional statistical units in Turkey by examining between and within regional inequalities considering space. Next section will make a summary of regional development issues and policies in Turkey and, evaluate definition of regional statistical units (NUTS) as one of the significant instruments for the accession process to the EU. In third section, the methodology of inequality and spatial dependence analysis will be reviewed and the findings of within and between region inequalities will be displayed based on different regional partitions. In the fourth section, it will be focused on spatial dependence of growth and relation between inequalities and spatial dependence in order to explain neighbor effects.

2. Regional Policies in Turkey with respect to the EU Accession

2.1. An Overview of Regional Development Policies and Issues in Turkey

During the early 1980s, the most intensive effects of liberalization and globalization have been seen in Turkey. The question raised here is whether these processes have affected interregional disparities positively or negatively. After the beginning of policies supporting export activities, there has been considerable structural change and the share of export in GNP has increased. In economic terms, the EU has already emerged as a center of gravity for Turkey, evident from the fact that the EU routinely absorbs around 50 % of Turkish exports, well ahead of any other group of countries (DTM-UFT, 2000). The sectoral share of exports yields clues as to the changing economic structure of Turkey since the beginning of 1980s. Trade, transportation and telecommunication sub-sectors have the highest growth rate in the economy in 1990s. In addition to the export figures, the growth of foreign capital- investment is another significant factor in expanding Turkey's links to the world economies as well as a source of structural change. The EU accounts for a major proportion of total foreign capital and its share increased to 60% after 1994 (DTM-UFT, 2000).

Turkey has recognized the need for change in the creation of the Seventh Five Year Development Plan (1996-2000). First, 'Integration with the world' is the major theme of the plan. European integration policies are reflected in goals such as 'the

development of human resources,' 'structural change projects in infrastructure services,' 'establishing regional balance' (SPO, 1997).

Regional planning and development policies in Turkey together formed a new field at the beginning of 1960s when the First National Development Plan was issued and focused mainly on sector studies without spatial development methods. Regional policies have taken place in "Development Plans," but the question is whether regional policies are actually implemented and the degree to which the benefits of regional policy spill over to the peripheral regions. During the planning period in Turkey, two conflicting goals are defined as *'maximizing national income'* on the one hand, and *'reducing interregional disparities'* on the other. But even in the 7th Development Plan, it is accepted that no more progress has been made other than the affirmation of the existence of interregional disparities in the Development Plans promulgated to the present period. Main factors on failure of regional policies have occurred with the absence of administrative capacity and institutionalization in order to implement spatial-regional plans and policies (Eraydin, 2001). With respect to regional development, two main problems should be highlighted, one of them being lagging/less developed provinces and the second the rapid growth of metropolitan regions/cities. The concentration of population and capital in the west is both a cause of and contributes significantly to the magnitude of these problems. After 1980, the spatial reflections of the new policies on export base development and decentralization policy of industrial activities from metropolitan cities caused industrial expansion in the adjacent provinces of metropolitan regions. Moreover, there have been new industrial foci that are specialized in certain sectors due to comparative advantages, while the role of *metropolitan cities* (especially Istanbul), have increased to constitute and control total capital and business-service sector with respect to increasing international relations and receipts of foreign trade.

In the 3rd Development Plan (1973-77), the definition of "*Priority Provinces for Development*" (PPD) was made to give precedence to those provinces by directing industrial investments towards them in order to reduce interregional disparities in the long term. The first declaration of PPDs was in 1968 with 22 provinces located in the East and South East Anatolia being identified. During the planning period, the number of PPDs has been frequently changed by political decisions instead of scientific criteria. Until 1981, all PPDs were considered in same development category, after that it was

emphasized that relatively less developed provinces among PPDs should be given more precedence for allocating incentives and two categories were defined as 1st priority and 2nd priority for development. Finally in 1996, all PPDs were considered as 1st priority provinces again and 49 provinces were considered as PPDs in 1998. PPDs as backward regions are mainly located in the Black Sea, East and Southeastern Anatolia.

The analysis of Gezici and Hewings (2001) indicates that PPDs have common characteristics compare to the developed provinces, though they have some differentiations with respect to several indicators among themselves. Some provinces that are included in the Southeast Anatolia Project (GAP) have positive population change and are receiving relatively more public investment in total, though they do not have adequate per capita investment and have not yet experienced faster GDP growth so far. The Southeast Anatolia Project is the most important project of the policy to give priority of the lagging regions which have development potential by regional planning after the mid 1980s. The initial purpose of the project was focusing on agriculture sector and infrastructure projects, later it has become an integrated project for regional socio-economic development.

In the 8th Five Year Development Plan (2000), the failure of policy on PPDs is explained by following factors such as; declaration of too many provinces, frequently changes by political decisions, considering all PPDs as same priority even they are at the different development level, failure to provide the integration among the investments (Gezici&Hewings, 2001).

All of the PPDs are considered as 1st priority provinces even though they are differentiated in terms of development level and potential. Considering all PPDs as having the same priority level is not efficient for regional allocation of public investment but clearly reflects tendencies towards an equity policy. Nevertheless, formation among PPDs during the period analyzed has not indicated an achievement in terms of equity (Gezici&Hewings, 2001). By focusing on the Southeastern Anatolia Regional Development Project with large infrastructure investments, significant differentiations among PPDs has resulted. Furthermore, public investment could not create sufficient attraction for private investment towards most of PPDs.

2.2. New Agenda of Regional Development in Turkey and Definition of NUTS Regions

Since the beginning of regional issues and policies in Turkey, geographical region is the most common regional definition and there are several studies looking at regional issues in Turkey based on geographical regions. On the other hand, Turkish regions have been classified not only based on Geographical Regions (7 regions); but also Programming Regions (8 regions) and Functional Regions (16 regions) as well. Programming regions were defined in terms of certain criteria with respect to homogeneity and simple agrarian economy for development planning purpose in 1960s. Geographical regions are reflections of geographical conditions and the disparities between the east and west still exist in Turkey.

“Functional regions” were defined resulting from an investigation of *“The Hierarchy of Urban Settlements in Turkey”* by the State Planning Organization in 1982. Sixteen regions have been derived from a comprehensive analysis in terms of central place theory and the interactions of the centers. Each functional region has a central province that is supposed to stimulate its region with spillover effects. But, this division has not become a common aggregation for either the empirical studies or regional policy initiatives.

Gezici&Hewings (2003) examined classification of coastal-interior provinces beside geographical regions and functional regions in order to test regional inequalities in Turkey. This paper will bring the findings of inequality analysis based on a new regional definition. For the adjustment and accession process of Turkey to the EU, it has been emphasized the absence of regional statistical units in the report of EU. In this report (AB, 2002); it is pointed out the requirement of “preparing national development plans covering integrated regional development plans especially for the PPDs at NUTS 2 level in the period of 2003-2005”. In the report of Turkish National Program on the way of the EU, it is declared to speed up the attempts on regional development policies in order to harmonize the EU policies. For this purpose, establishing the statistical database harmonized with the regional statistical system of EU, making socio-economic analysis of regions and decision making for regional policies, classification of new regional statistical units of Turkey has been completed in 2002. Therefore all the statistical data and analysis will be based on new regional statistical units and it will

give opportunity to make comparison with the EU and member states (SPO-DPT, 2003).

First step of the classification of regional statistical units (NUTS) is definition of Level 3 which is constituted by provinces. The provinces which are neighbors to each other and have similar features with respect to economic, social and geographical conditions are classified as Level 1 and Level 2 by considering their population and regional development plans (SPO-DPT, 2003). Finally, the NUTS regions are established as following:

Level 3- 81 Provinces

Level 2- 26 Units (grouping of neighbor provinces among Level 3)

Level 1- 12 Units (grouping of Level 2 Units)

After establishing NUTS regions, State Planning Organization has prepared “Regional Development Strategy, Objectives and Operational Programs” especially for 10 Level-2 regions, as a part of Preliminary National Development Plan and as a road map in order to direct regional development activities in Turkey. This report indicates that national level of GDP per capita is 2146 dolar, while the average level of GDP per capita of 10 Level 2 regions is 1188 dolar in 2001 (SPO-DPT, 2003). As its known that one of the third of EU fund sources for Turkey will allocate to the goal of regional development in order to reduce interregional inequalities until 2006. For this reason, regional development plans and operational programs have become very significant and SPO-DPT developed a framework of integrated regional development programs, the objectives and strategies for 10 Level 2 regions which are mostly called as PPDs as well and located in the east. Developing of human resources, supporting the small and medium size firms, local entrepreneurship, regional development agencies, competitiveness, local participation and governance, public-private partnerships are the main emphasizes of these strategies following the EU policy (SPO-DPT, 2003). SPO has made several studies (1981-1985-1991-1996-2003) on definition of socio-economic development level of provinces based on five categories in Turkey. It is examined for NUTS regions in 2003 and the findings of this study put forward that 9 of 10 Level 2 regions are located at the end of the rank of 26 Level 2 regions (SPO-DPT, 2003).

3. Empirical Study

3.1. Methodology and Data

One of the main purposes of this paper is to examine the inequality based on different regional definitions not only over time, but across regions and within regions as well in Turkey. The result of this analysis will give us an opportunity to evaluate the regional development pattern of Turkey as a candidate for future policy while there are several studies on regional issues in the EU. Thus, the pattern will be examined with respect to definition of NUTS regions in Turkey related to the statistical regions of EU¹. Furthermore the spatial dependence of the level of income and its relationship to regional inequality in terms of GDP per capita is also examined.

In order to realize the dynamics and the role of regions or smaller spatial units on inequalities, attention should be directed to intra-regional inequalities as well. The Theil index accounts both for inter-regional and intra-regional inequalities and is presented as:

$$T = T(y : x) = \sum_{i=1}^n y_i \log \left(\frac{y_i}{x_i} \right) \quad (1)$$

where x_i = population of province i relative to the national population and y_i = GDP of province i relative to the national GDP. By using the Theil index, interregional and intra-regional disparities can be estimated as:

$$T = \sum_{i=1}^n y_i \log \left(\frac{y_i}{x_i} \right) + \sum_{g=1}^n Y_g T_g(y : x) \quad (2)$$

where the left side is the Theil index measuring the disparity between regions (inter-regional), and Y_g is the region g 's share of total GDP, and $T_g(y : x)$ is the Theil index measuring the disparities among provinces (intra-regional or within) in region g .

However, there is no formal administrative regional unit in Turkey as we mentioned above; in this paper, five alternative partitions are explored in order to analyze inequality from different levels and perspectives: geographical regions, functional regions, coastal-interior regions and regional statistical units (NUTS-1, NUTS-2). Gezici and Hewings (2003) display the findings of the analysis for three partitions from

¹ However, the absence of data according to GDP per capita as purchasing power parity makes hard to compare to the EU regions directly.

1980 to 1997. In this paper, NUTS regions are the main focuses as current definition for regional issues of Turkey. Furthermore, the period of analysis will be larger than before including 2001. Therefore, the role of spatial scale and its impact on inequality can be examined. In order to test spatial dependence, the well-known Moran-*I* and Moran Scatter-plot (Anselin, 1988) were used. Moran's *I* provides an indicator for spatial autocorrelation, here interpreted to imply value similarity with locational similarity. A positive autocorrelation occurs when similar values for the random variable are clustered together in space and vice versa (Cliff and Ord,1981; Upton and Fingleton,1985). The spatial dependence (global spatial autocorrelation) measure of Moran's *I* is represented by equation 3:

$$I_i = \frac{n}{s} \frac{\sum_i \sum_j w_{ij} z_i z_j}{\sum_i z_i^2} \quad (3)$$

n is the number of regions, z_i and z_j are log of per capita income of each region, w_{ij} are the elements of weight matrix $W(n \times n)$ and it is equal to 1 if i and j are neighbors and 0 if they are not; s is the sum of all elements of W (spatial weights). A binary contiguity matrix was used adopting the familiar rules. There are two constructions of used for the binary spatial weight matrix, namely rook and queen. Rook computes only common boundaries, while queen compute both common boundaries and nodes². In the case of our data, there is no different result by using either rook or queen, because all neighbors have common boundaries rather than nodes.

A value of Moran's *I* statistics around 1 represent strong and positive spatial autocorrelation, while values around -1 show negative spatial autocorrelation. The Moran scatter-plot provides a way of visualizing spatial association (Anselin, 1996). Four quadrants in the scatter-plot represent different spatial association. The upper right and lower left quadrants correspond to positive spatial association by the presence of similar values in neighboring locations. The other two quadrants correspond to negative spatial association. The Moran scatter-plot can also be mapped as Moran scatter-plot map.

The provincial GDP time series has been constructed from two different sources. For 1979-86, the data were obtained from the Istanbul Chamber of Industry (ISO,1988) and

² For more information about binary weight matrix, see Anselin (1988)

for 1987-2001, data are derived from the State Statistics Institute (www.die.gov.tr). All nominal data were converted to 1987 constant prices. Population data have been obtained from State Statistics Institute based on 1980-1985-1990 and 1997 official census and interpolated for the years that do not coincide with the census. To avoid the effect caused by the creation of new provinces after 1990, though there are 81 provinces currently, the data set was created based on the former 67 provincial level throughout the 1980-2001 period.

3. 2. Inequalities based on Different Regional Definitions

Although there is no formal administrative unit at the regional level in Turkey, reducing interregional inequalities has been a major goal during the planning period. Thus, inter-regional inequalities have been one of the main foci of regional studies. The 1987 study of State Institute of Statistics was the first survey covering Turkey as a whole (SIS,1990). The Gini Coefficient was equal to 0.43, while it was 0.49 in 1994 (SIS,1997). Atalik (1990) measured regional income disparities in Turkey for the years 1975 and 1985. For the functional regions, the coefficient of regional income variation moved from 0.32 in 1975 to 0.43 in 1985. Özmucur and Silber (2002), Senesen (2002) and Dogruel&Dogruel (2003) are the some of the recent studies focusing on interregional inequalities based on the geographical regions. The study of Gezici and Hewings (2003) has brought a new sight to the issues of inequalities in Turkey considering different regional partitions. Issues of regional inequality can be addressed with aggregation issues as well. Rey (2001) found out that “the choice of the partition can fundamentally change the inequality decomposition”.

In this paper, by following Gezici&Hewings (2003), the results of three partitions display as geographical regions (7 regions), functional regions (16 regions) and coastal-interior provinces (2 sets) from 1980 to 2001. Furthermore, the results of inequalities among NUTS regions will display as NUTS-1 (12 units) and NUTS-2 (26 units) by using Theil index. NUTS-3 level is considered as all provinces.

Geographical regions: Inequality among the seven geographical regions has been increasing steadily. Although there is a decline of total inequality in the mid 1980s, it has been increasing in 1992 again until 2001 (Figure 1). In the initial year (1980), inequalities could be categorized as 55% at the between/inter-regional level, while 45% were derived from within/intra-regional level. However this proportion increased for

between regions inequality during the analyzed period, but it became 55% again in 2001 (Figure 1).

Mediterranean, Southeast Anatolia, Black Sea and East Anatolia are more stable and have relatively lower within region disparities. The Marmara region has the highest share of inequality (28%) within region during all analyzed period, while the Black Sea and Southeast Anatolia have relatively lower share of total within inequalities in geographical regions (see in Gezici&Hewings, 2003). This result shows that less-developed or poor regions have relatively lower inequalities than richer ones. However, “within region” inequality indicates increasing trend in 2001 (Figure 2).

Functional regions: The Theil index indicates slightly decreasing inequality within regions, while there is increasing inequality between regions, a result similar to the one found for geographical regions. But there is a controversy pattern in 2001. Analysis reveals that for functional regions inequalities between regions account 60% of total inequalities in 1980, 73% in 1997 and 64% in 2001 (Figure 1).

When the focus is on the inequalities within functional regions, it is obvious that the highest inequality is within the Istanbul functional region (Gezici&Hewings, 2003). Izmir and Ankara functional regions are other regions that have relatively higher within region inequalities. These results are related to the effect of metropolitan/big cities in the corresponding region, but it is also related to the number of provinces in the region.

Coastal-Interior provinces: With this partition, the objective was to examine whether there is a relation between geographical position in terms of coastal or interior provinces and inequalities in terms of growth. Although the west and south coasts of Turkey include the most developed provinces, the provinces along the Black Sea coast have basically backward features such as high out-migration, low growth rate, etc. At first, coastal provinces are the wealthiest in the country in terms of initial advantages like location and transportation opportunities. In Turkey, the inclusion of provinces in the Black Sea region as PPDs³ to the coastal partition, within region inequalities account 72% of total inequalities in 1980, but then it becomes 66% in 2001. Moreover, between-region inequalities have been increasing until 1997, while within region/intra-region inequality accounts for a large part of total inequalities. In 2001, both between and within region inequalities indicates declining pattern (Figure 1 and 2).

³ Backward regions- defined as Priority Provinces in Development by State Planning Organization. For more information Gezici and Hewings (2001)

The hypothesis is that during the period of fast national growth, richer regions receive more benefits than poorer regions and thus it is to be expected that the result would be increasing inequalities. On the other hand, when the national economy slows down, the richer areas could be the first ones to be affected, while the poorer regions experience the negative effects later on. The results of inequality analysis reinforce this hypothesis. The economic crisis in Turkey in the year of 2001 helps relatively poor regions among the coastal provinces for catching up process, while the provinces as heart of the economy were slowing down with the national economy.

The main part of the analysis is to examine the NUTS regions in order to adjust regions to the EU norms and create some comparable statistical data. The findings of the analysis will help to establish the policy for regional development of these regions and put forward the differences from other regional partitions.

As it is mentioned above, NUTS-1 regions are defined as 12 regions covering several provinces and NUTS-2 regions as well. 26 regions are defined as NUTS-2 regions which the main base for the regional development plans and programs for the near future (Figure 3 and Table 1).

NUTS-1 region: Between region inequalities are increasing until the mid 1980s (Figure 4). After 1987 there is a diminishing trend and the index value is smaller than 1980 as initial year. The index value indicates that between region inequalities are decreasing in 2001 as well. This decreasing trend of between inequalities can be explained by the national economy during that time. Firstly, in 1999 there was a big earthquake which stroke the Marmara region and the most productive provinces as the heart of spatial economic development of the country. Later on, an economic crisis was occurred in 2001. All these events are the main reasons of the slowing down of the national economy and most developed regions. It seems that this causes decreasing trend of inequalities.

Within region inequalities are declining after 1986 while it reached the highest point in 1983. In 2001, after 4 years break, inequalities indicate the initial index value (0.036) (Figure 5). With respect to within region inequalities among 12 regions, it is strengthened the findings of the analysis on geographical and functional regions that rich regions contribute to the overall inequalities rather than poor ones (Figure 6). Among NUTS-1 regions, the region of Bursa has the highest proportion (39% in 2001)

and the increasing trend related to the earthquake and economic crisis in 1999 and 2001. Almost all provinces in this region have been affected by earthquake and there has been population loss as well. Izmir and Antalya are the other provinces contribute to the within region inequalities including mostly coastal and developed provinces.

NUTS-2 region: Between region inequalities indicate almost five times larger than within inequalities (Figure 7). There has been a declining trend paralel to the NUTS-1 regions after 1986 until 1993. Between 1997 and 2001 there is an obvious decrease from 0.10 to 0.07 index value. Within region inequalities is mostly stable compare to “between region inequalities” and “inequalities of NUTS-1 regions” as well. There has been slightly declining trend after 1987. Although there has been increasing movement in 2001, the index value is still smaller (0.018) than initial year (0.021). With respect to the regions contribution to the within region inequalities, Bursa region (Bolu, Düzce, Kocaeli, Sakarya, Yalova) indicates the highest proportion (53%) in 2001, just like for NUTS-1 regions (Figure 8).

The analysis of “NUTS regions” indicates that definition of these regions is more meaningful than the other regions for the future policy. Related to the number of provinces and units, inequality index values are changing as we expected. Especially NUTS-2 regions have mostly similar features, economic and political background within their provinces. This will facilitate establishment of institutions, development policy and plans for less-developed ones.

4. Spatial Autocorrelation and Regional Inequalities

In this section, the spatial relationship of provinces by using spatial autocorrelation of GDP per capita during 1980-2001 in Turkey are examined.⁴ Later on, the results of spatial autocorrelation are interpreted considering the NUTS regions in order to realize the dynamics with respect to new regions and to lead the regional policies.

4.1. Spatial Autocorrelation

It is important to look at the spatial patterns of GDP per capita in order to examine spillover effects. If comparison is made of the spatial clustering of both initial and actual GDP per capita, then the dynamism of the poor regions and rich regions can be

⁴ Results of this section were obtained through SpaceStat™ extension for ArcView™ (Anselin, 1999)

related to their neighbors' dynamism. At this point, if a neighbor relation has a positive effect, spillover effects and complementarities can be assumed. ESDA highlights the importance of spatial interactions and geographical locations in regional growth issues. In order to test the spatial dependence of GDP per capita in Turkey, the initial (1980) and final year (2001) variances were examined.

Moran's I of the log of GDP per capita is increasing from 0.5372 in 1980 to 0.6355 in 1995 and then it is decreasing to 0.4880 in 2001; (a randomization assumption is rejected for variables (highly significant) and it means that the distribution of GDP per capita by province is strongly influenced by neighbors. This highly spatial clustering pattern can be seen in the Moran scatter plot map as well (Figure 9). However it seems that spatial autocorrelation is getting weaker, when it is excluded the most important outlier (Afyon-HH) from the scatter plot, Moran I has become 0.6160 (Figure 10). In 1980, 76.12% of the provinces show association of similar values with their neighbors, while this ratio increased 80.59% in 2001. The distribution revealed 38.88% in quadrant I as HH, and 37.31% in quadrant III as LL in 1980, while 38.80% were in quadrant I as HH and 41.79% in quadrant III as LL in 1997. It seems that spatial dependence is increasing among poor provinces rather than the rich ones. Rich provinces are becoming stronger related to their spillover effects with their closest neighbours, rather than expanding their spillover effects to other provinces.

In both years (1980 and 2001), provinces that are clustering as High-High are located in the west and mainly west and south coast. Excluding some provinces in the east which are more dynamic than the others, there is almost no difference in the east provinces categorized as Low-Low over the 20 years. Distribution of GDP per capita highlights the "spatial peripherality" as an effective factor associated with being economically peripheral as well (Figure 11).

As a result of our findings, it is claimed that there is a strong spatial autocorrelation on GDP per capita for initial and final years and the level of growth among provinces is dependent on their neighbors.

4.2 Regional Inequality and Spatial Dependence

In this part of the paper, it is examined the relationship between "regional inequality and spatial autocorrelation" in Turkey. Inequality is measured by using the Theil index, while spatial autocorrelation is measured by using Moran's I . Rey and Montouri (1999)

used the coefficient of variation the log of GDP per capita and Moran's I in order to present this relationship. According to their findings, in any given year, state income distribution exhibits a high degree of spatial dependence. They offered two explanations: first, an increase in spatial dependence could indicate that each cluster is becoming more similar in terms of convergence. Secondly, "an increase in spatial dependence could also be due to newly formed clusters emerging during a period of increased income dispersion."

In Turkey, the Theil index is decreasing especially in mid 1980's, while Moran's I is slightly increasing over entire period. Moran's I coefficients are highly significant⁵ for all years providing support for the hypothesis of spatial dependence, while rejecting a hypothesis of a random distribution of income. While overall inequalities are decreasing (0.116 in 1980 and 0.096 in 2001), spatial dependence is still strong. This finding may be explained by increasing interconnections among provinces over time and the effects of slowing down in national economy in the last period. Furthermore, a comparison between Moran's I and both interregional and intra-regional inequalities, reinforces the role of neighbor effects on growth and inequality (Figure 12 and 13). Between region inequalities indicate a declining trend, while within regional inequalities are increasing for NUTS-1 and NUTS-2 regions in the last part of the period, similar to the results of geographical and functional regions as well. However, comparison to five different partitions indicates that NUTS-2 regions have the lowest value of Theil index (0.018), while coastal-interior partition indicate the highest value (0.063). In terms of within region inequalities, NUTS-1 regions have some similarities with the functional regions and they have similar index value (0.034 and 0.036). It can be interpreted that spatial dependence has a positive effect on within regional inequalities for NUTS-2 regions rather than the other partitions. Hence, definition of NUTS-2 regions will be beneficial for developing policies and the outcomes of the policies may be realized sooner.

5. Conclusion

In this paper, new regional statistical units are examined with respect to within and between region inequalities, and spatial or neighbor affects on the growth dynamics in Turkey from 1980 to 2001. This kind of analysis is expected to contribute the literature

⁵ z-values are highly significant (less than 1%) for all years.

on regional issues, but also they will help to establish the regional policy for development and reducing interregional inequalities.

The concept of cohesion is explained as the degree to which disparities in economic welfare between countries and regions within the European Union are tolerable. For the EU, there have been two main purposes as deepening and widening. While deepening is expected that inequalities between member states and regions of EU should be declined, widening will bring new problems and inequalities not only between member states, but within newly members as well. While the EU funds will be orientated to the newly member states rather than relatively poor regions in others, there is no common view that this will help to the least developed regions. Therefore, the expansion of the EU may shift the economic geography away from a single Europe.

For the adjustment and accession process of Turkey to the EU, it has been emphasized the absence of regional statistical units for data availability and the implementation of regional policies, in the report of EU. For the purpose of “preparing national development plans covering integrated regional development plans especially for the PPDs at NUTS 2 level in the period of 2003-2005”, new regional statistical units of Turkey are established in 2002. Later on, State Planning Organization developed a framework of integrated regional development programs, the objectives and strategies for 10 Level 2 regions which are mostly called as PPDs as well and located in the east.

This paper will bring a new sight considering with NUTS regions, following the analysis of Gezici&Hewings (2003). The last period of the analysis displays considerable results. Since, there was a big earthquake in 1999 and the economic crisis in 2001, slowing down of the national economy and most developed regions causes decreasing trend of inequalities. Related to the number of provinces and units, inequality index values are changing as we expected. Especially, NUTS-2 regions have mostly similar features, economic and political background within their provinces considering the lowest within region inequality. This will facilitate establishment of administrative units and institutions for development policy and plans of less-developed regions.

The result of spatial data analysis is claimed that there is a strong spatial autocorrelation on GDP per capita for initial and final years, while overall inequalities are decreasing.

Rich provinces are becoming stronger related to their spillover effects with their closest neighbors, rather than expanding their spillover effects to other provinces. These rich provinces that are clustering as High-High are located in the west and mainly west and south coast. Moreover, distribution of GDP per capita highlights the “spatial peripherality” as an effective factor associated with being economically peripheral as well.

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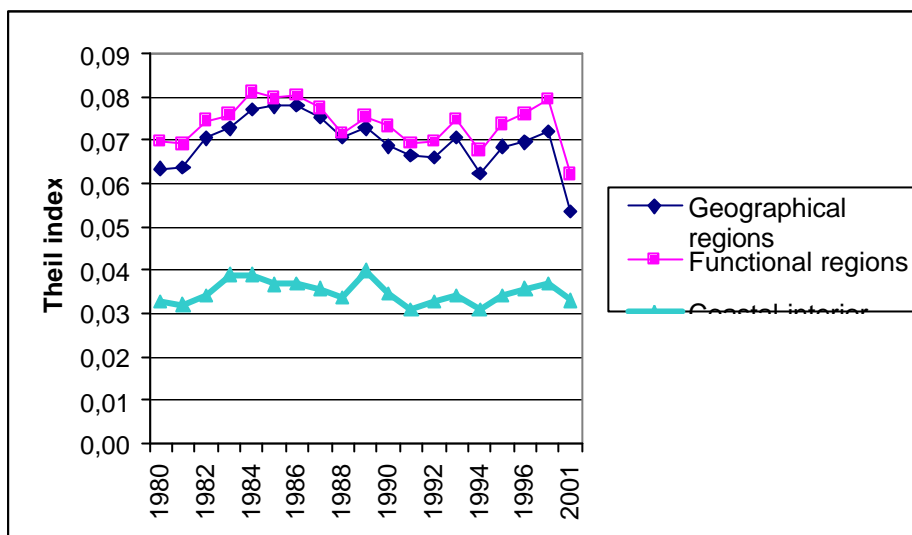


Figure 1– Between region inequalities, 1980-2001 (3 different partitions)

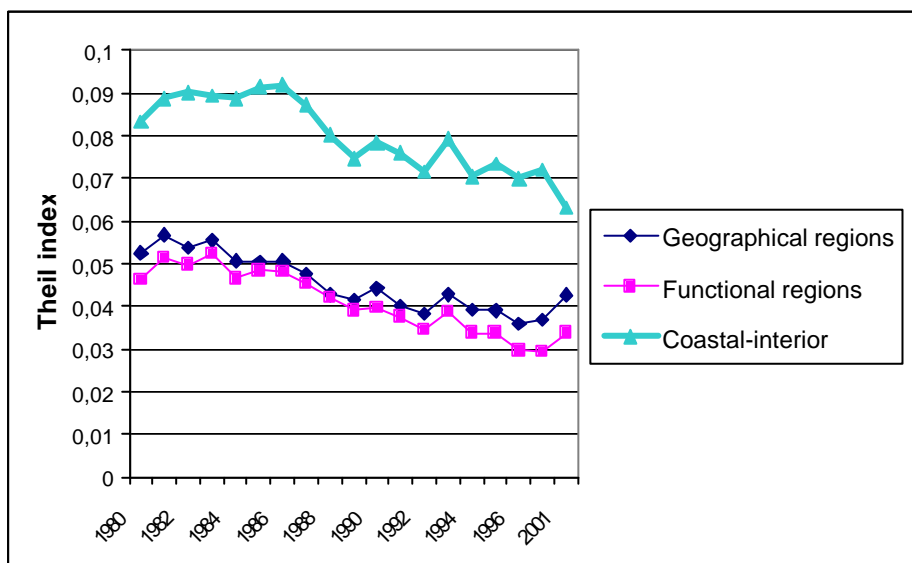


Figure 2– Within region inequalities, 1980-2001 (3 different partitions)



Figure 3- Sub-regions of NUTS-2 level (SPO; 2003)

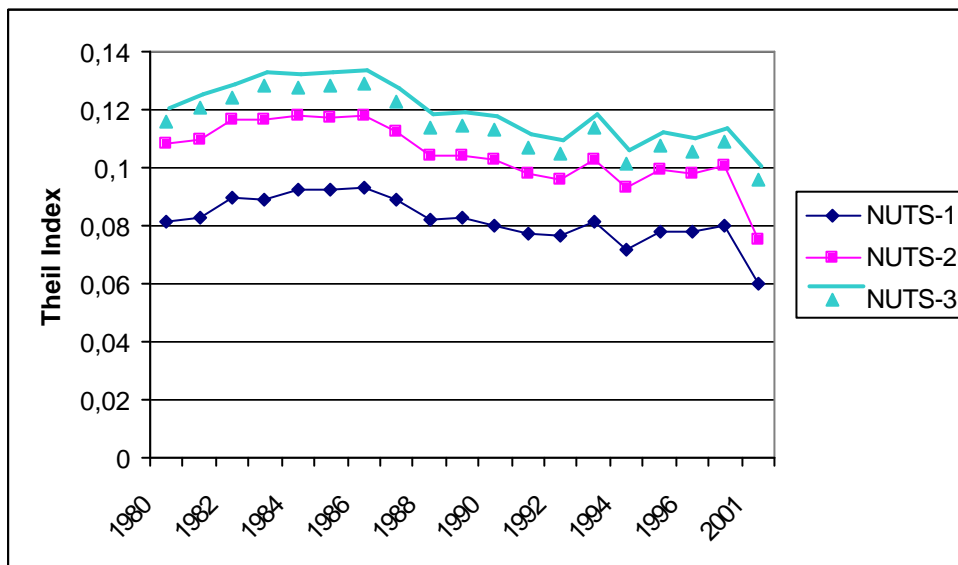


Figure 4 – Between region inequalities, 1980-2001 (NUTS regions)

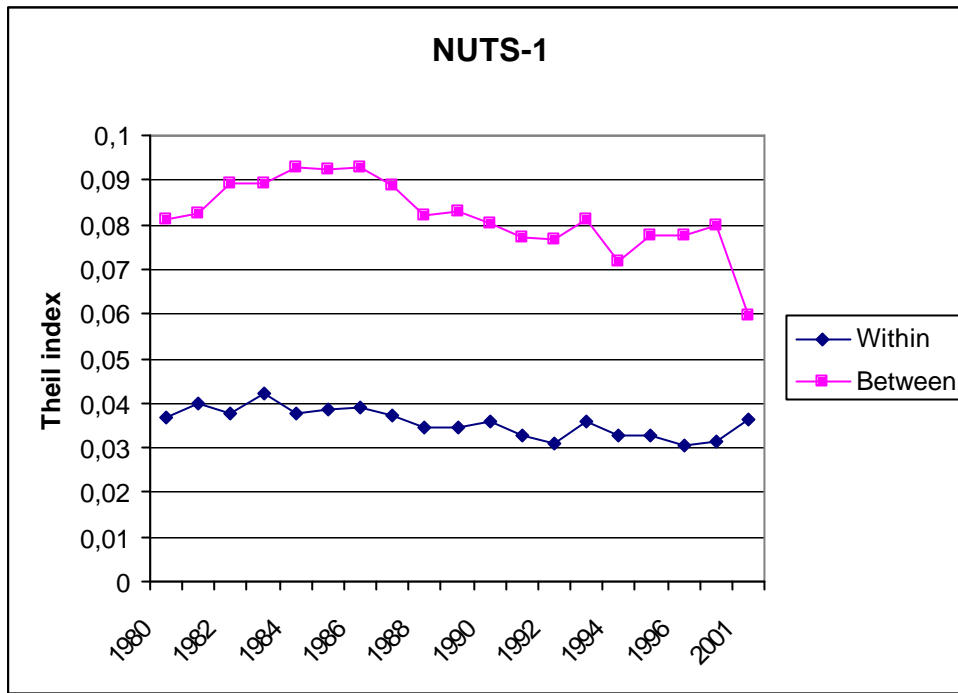


Figure 5– Regional inequalities based on NUTS-1 regions (12 regions), 1980-2001

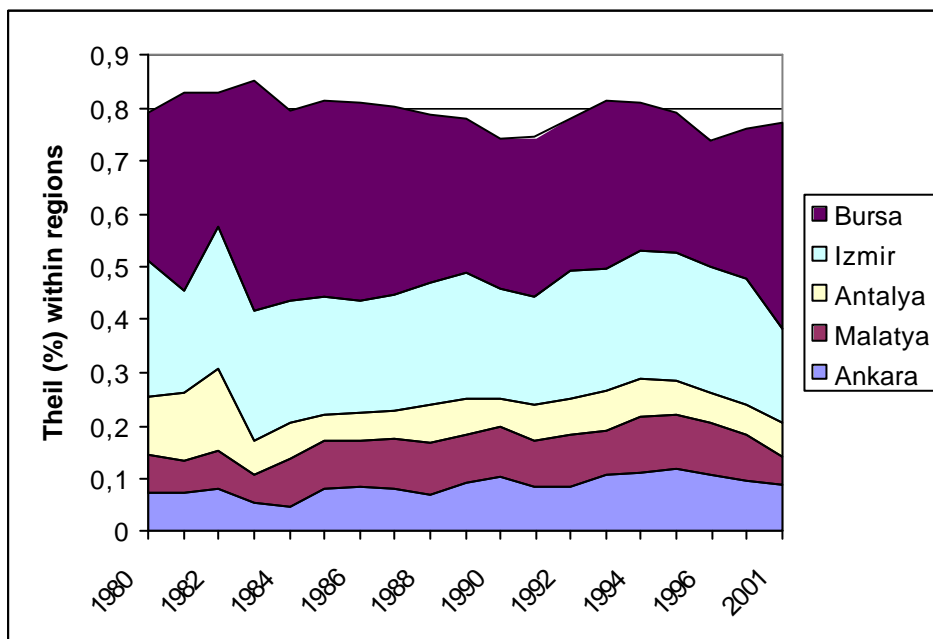


Figure 6– Highest contributor regions to within region inequalities based on NUTS-1 regions

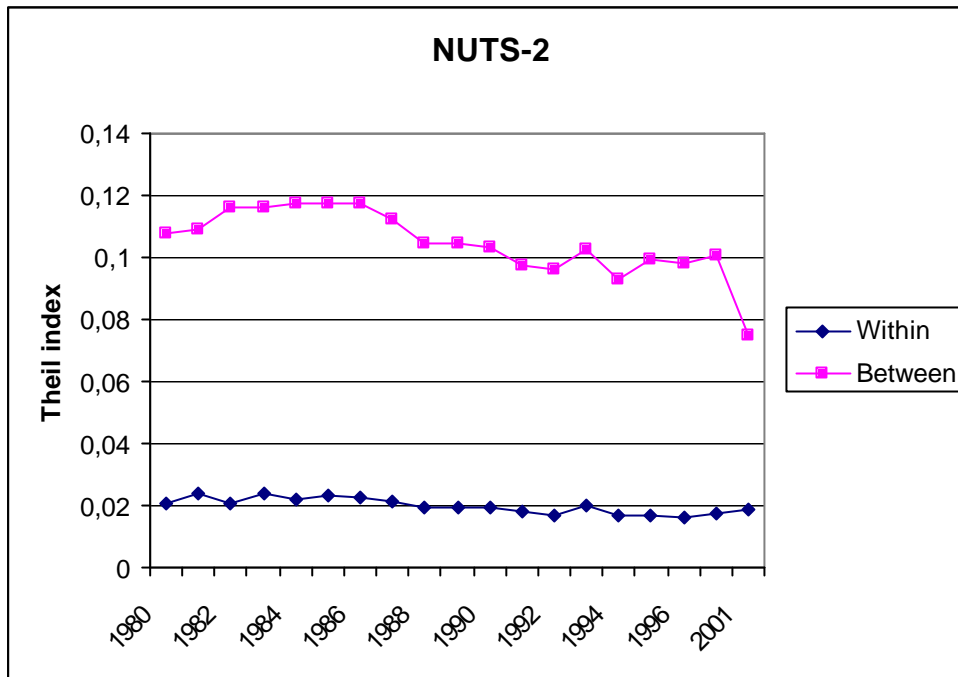


Figure 7– Regional inequalities based on NUTS-2 regions (26 regions), 1980-2001

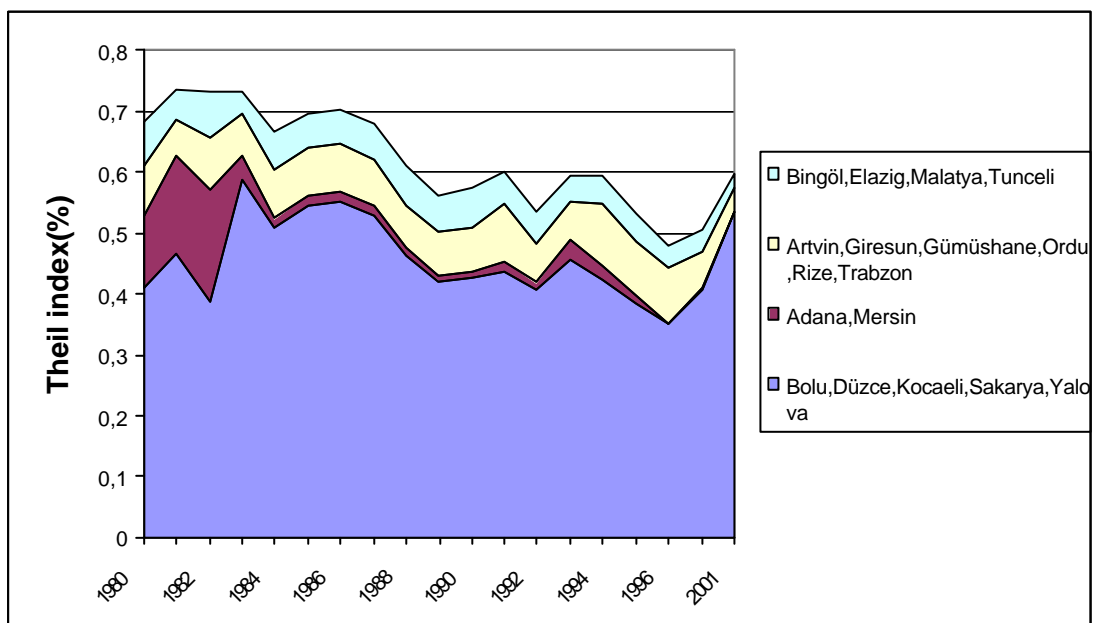


Figure 8– Highest contributor regions to within region inequalities based on NUTS-2 regions

Moran Scatter 1- GDP per capita-1980

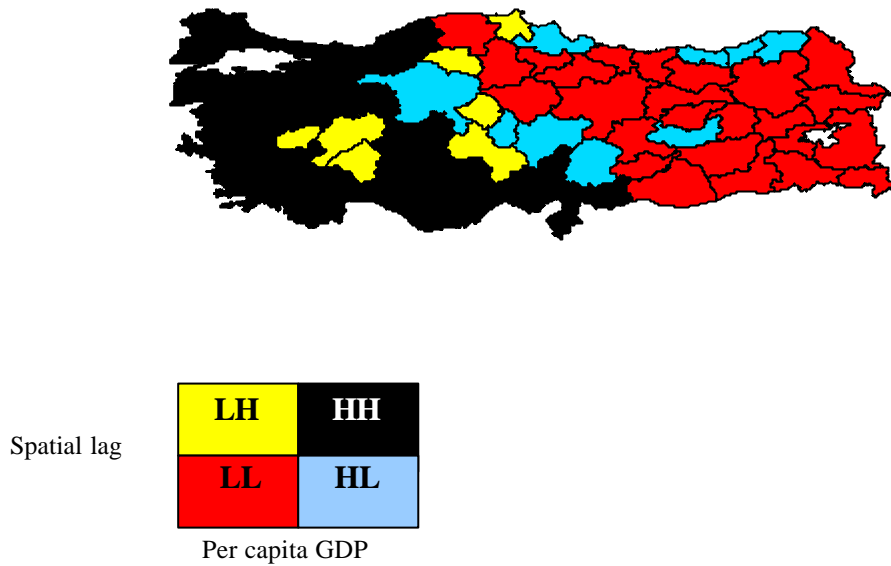


Figure 9- Moran Scatter-plot map for Log of GDP per capita-1980

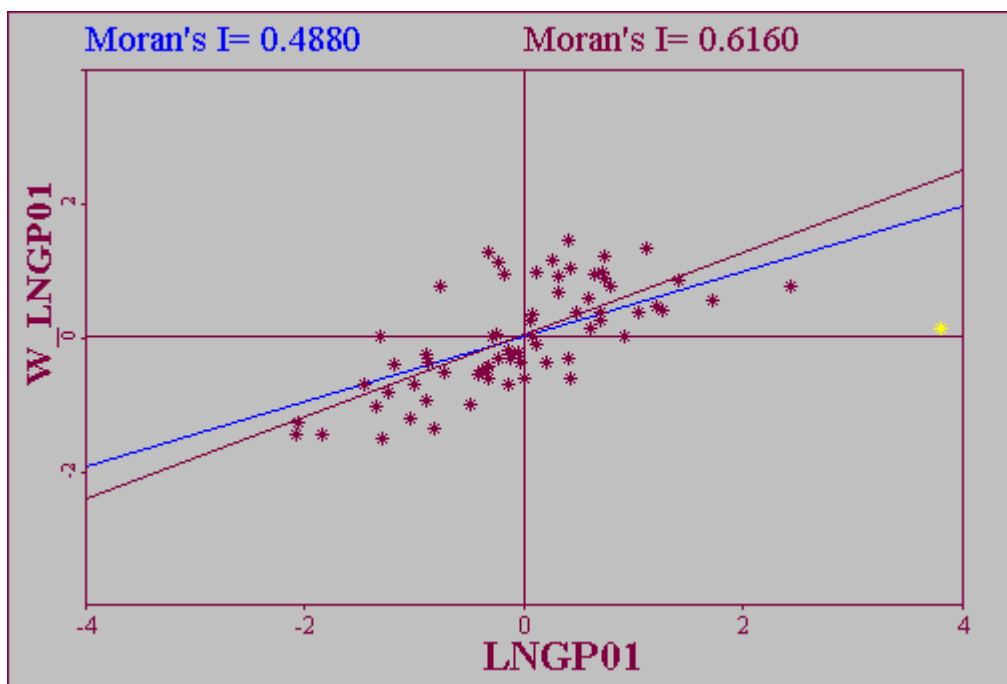


Figure 10- Moran Scatter-plot for Log of GDP per capita-2001

Less-developed Provinces as "LL"

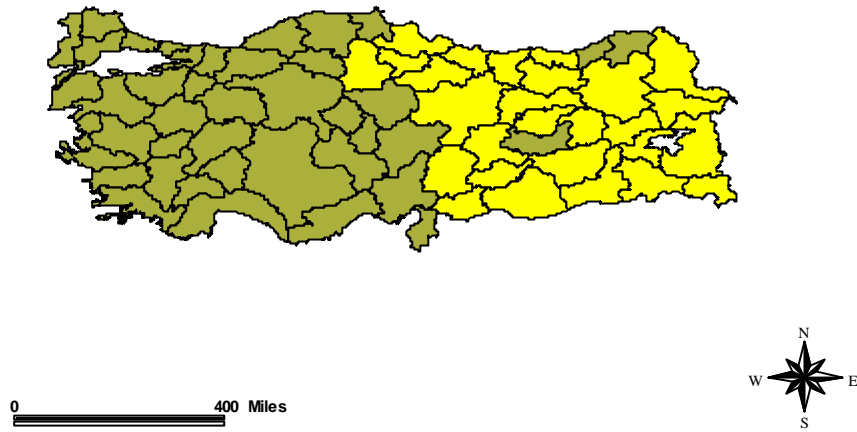


Figure 11– Less-developed (eastern) provinces as “Low-Low” GDP per capita in 2001

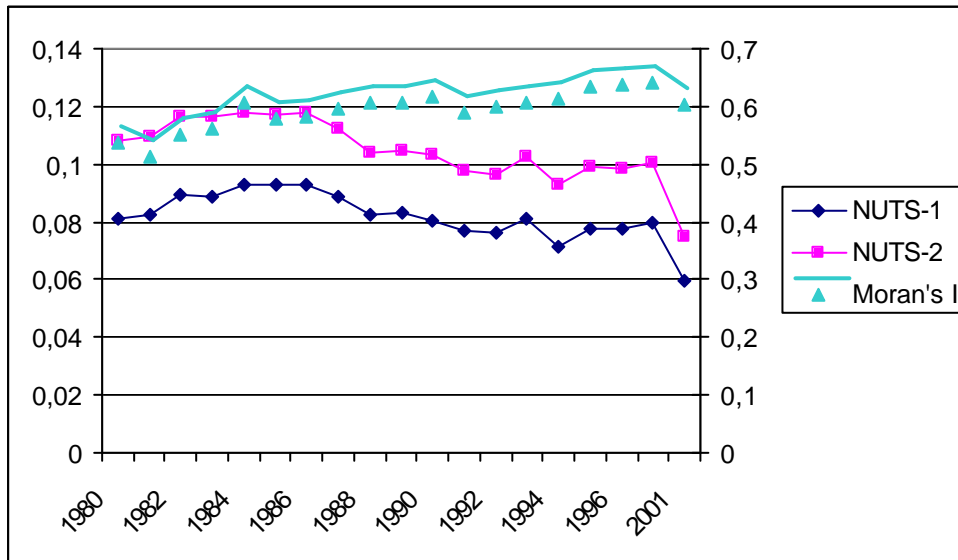


Figure 12- Between regions inequalities and spatial dependence

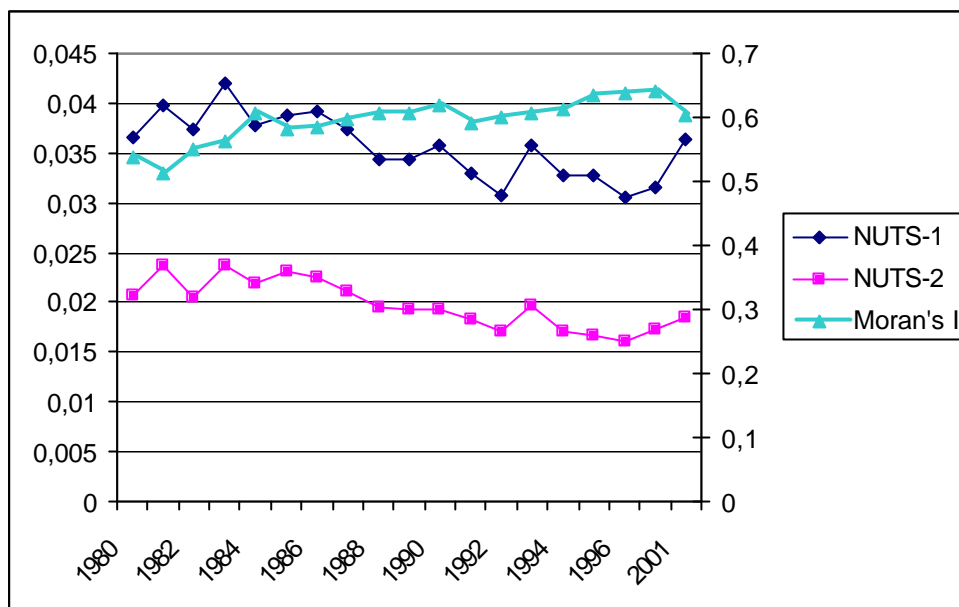


Figure 13- Within region inequalities and spatial dependence

Table 1- List of NUTS-2 level

	Sub-regions	Provinces
1	Istanbul	Istanbul
2	Tekirdag	Tekirdag,Edirne,Kirklareli
3	Balikesir	Balikesir,Çanakkale
4	Izmir	Izmir
5	Aydin	Aydin, Denizli, Mugla
6	Manisa	Manisa, Afyon,Kütahya,Usak
7	Bursa	Bursa,Eskisehir,Bilecik
8	Kocaeli	Kocaeli,Sakarya,Düzce,Bolu,Yalova
9	Ankara	Ankara
10	Konya	Konya,Karaman
11	Antalya	Antalya,Isparta,Burdur
12	Adana	Adana,Mersin
13	Hatay	Hatay,K.maras,Osmaniye
14	Kirikkale	Kirikkale,Aksaray,Nigde,Nevsehir,Kirsehir
15	Kayseri	Kayseri,Sivas,Yozgat
16	Zonguldak	Zonguldak,Karabük, Bartin
17	Kastamonu	Kastamonu, Çankiri,Sinop
18	Samsun	Samsun,Tokat,Çorum,Amasya
19	Trabzon	Trabzon,Ordu,Giresun,Rize,Artvin,Gümüşhane
20	Erzurum	Erzurum,Erzincan, Bayburt
21	Agri	Agri, Kars,Igdir
22	Malatya	Malatya,Elazig,Bingöl,Tunceli
23	Van	Van,Mus,Bitlis,Hakkari
24	Gaziantep	Gaziantep,Adiyaman,Kilis
25	Sanliurfa	Urfa,Diyarbakir
26	Mardin	Mardin,Batman,Sirnak,Siirt