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THE IMPACTS OF SOCIO-ECONOMIC FACTORS ON MIGRATION ACROSS TURKISH REGIONS: A SPATIAL DATA ANALYSIS

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Abstract: *When examining the causes of migration in Turkey, it can be seen that low quality health and education services, imbalanced urbanization, security problem, high level unemployment rate have pivotal role on migration. In the 1950s Turkey, with intensified migration to big cities (mostly to West part of the country), urbanization process has accelerated. This process brought a number of problems with itself.*

Although many studies have been performed by researchers about migration in Turkey, there is no paper which includes spatial analysis. In this manner, this study purpose to examine the impacts of the factors as unemployment rate, Socio-economic Development Index on migration and their spatial analysis dimensions.

To test spatial dimensions of the variables, we perform an exploratory spatial data analysis (ESDA) on migration and other variables among provinces of Turkey. While our choropleth maps indicate that the some part of the country is significantly more developed than the others, the tools of spatial statistics reveal the presence of spatial dependence across provinces. The presence of heterogeneity is reflected in the distribution of LISA statistics. Overall, our results shed new light on the distribution of migration and its relation with the others among provinces across Turkey.

Keywords: *Migration, Socio-Economic Factors, Spatial Analysis, Exploratory Spatial Data Analysis (ESDA), Turkey*

JEL Codes: *Q15, R12*

AIM AND BACKGROUND

The concept of migration has a history dating back centuries. Migration is a term that has economic, political and social consequences and it occurs as a result of external and internal problems of countries. Migration is a result of several problems and also it is a cause of another several problems.

Today, the experiencing political issue in the Middle East and war conditions has moved migration to world agenda again. The most striking example of this is refugee crisis caused by immigrant fleeing from the war atmosphere in Syria to Turkey and other European Countries.

Issues relating closely to the whole world such as transformation process, economic stability, employment, social and regional imbalances etc. cause a number of problems. One of them is immigration. Immigration is an issue that hard to control and may cause a variety of different problems (Çelik, 2012: 1).

Migration is not a static phenomenon in contrast it is a dynamic process which has socio-economic causes and consequences. Therefore migration is needed to be evaluated and defined within contexts time-space and causes-consequences (Karabulut and Polat, 2007: 2). There are many definitions of migration in the literature and some of them are mentioned below.

Lee (1966: 49) defines the concept of migration as a permanent or temporary change of location. According to Nivalainen (2004: 157) migration is a population movement from one geographic area to another. By making reference to causes of migration, Apan (2006: 26) defines migration as a replacement of individuals or groups because of economic and socio-cultural reasons. Common feature of these definitions implies that migration is a population movement that causes geographic, economic, social, cultural and political consequences.

Yücel (2011: 31) gradually increasing migration process after the Second World War in Turkey affected directly the country›s economic, social and security problems. Migration in Turkey was realized rapid and irregularly from rural areas towards urban areas. Cities were not ready for intensive migration and this has brought economic and social problems.

It is observed that initially, migration from rural to urban areas, transformed to urban to urban over time. When examining the direction of migration in spatial sense it can be seen migration appears to be towards the developed regions from

less developed regions. Therefore, migration is increasing in parallel with the development level of the region. Because there are differences in terms of employment and income and so on. Between underdeveloped and developed regions, these differences leads the individuals to migration. The majority of theories try to explain migration is based on these differences (Yakar and Saraçlı, 2010: 47).

Briefly, the basis of the migration of individuals or communities is to benefit from a number of opportunities such as finding appropriate place to ensure their livelihood and finding jobs there (Buzdağlı and Kızıltan, 2011: 65- 66).

The direction of migration experienced in Turkey, often due to socio-economic reasons, is from Black Sea, Eastern and Southeastern Anatolia provinces to provinces in western region which are industrialized, have wide job field and high per capita income levels (Bülbül and Köse, 2010: 76). According to Özdemir (2012:2) the negative impacts of migration which occurs due to socio-economic, cultural and political reasons can be summarized as follows: bring to a standstill of economic and social plans of the country unplanned structuring, squatting, socio-cultural orientation problem of immigrants, transportation problems, air pollution, wasting of public resources etc.

The aim of this study is to analyze the effect of socio-economic factors on interregional migration in Turkey. Three fundamental variables that have an impact on migration are taken into account in the study. These are; the average net migration rate of the provinces, socio-economic development level (SEGE) and the unemployment rate.

LITERATURE

There are many theories and approaches have been developed in the literature on migration. First in the literature Todaro (1969) and Harris-Todaro (1970) have addressed case of migration from rural to urban areas and consequently experienced unemployment in cities in the less developed countries. Because rural migrants were increasingly migrating to the cities, but the city could not provide a permanent job opportunities in the economy to many of these workers. In model, two factors play significant role on rural-urban migration process. These are income differences between rural and urban areas and possibility of getting a job in the cities. Analysis indicated that the likelihood of finding work in the city, has been found to play a more important role in the migration by income differences.

In his study, Cebula (2005) examined economic and non-economic determinants of total domestic migration in USA for years 1999-2002. According to results, migration by states is an increasing function of expected or current income per capita in contrast it is a decreasing function of the average living costs. While non-economic factors such as parking areas in the states, recreation or entertainment places, temperature level, being in west and receiving much sunlight positively affects migration, crime rates and hazardous wastes reduces migration to the provinces.

Adewale (2005) has examined the socio-economic factors associated with the migration from urban to rural in Nigeria. He presented individuals' fundamental reasons of migration from rural to urban such as not having a reliable job, high cost of living in urban center, congestion, and he also revealed that age and marital status of immigrants' affects duration of stay in rural areas.

Rebhun and Goldstein (2009), investigated the determinants of Jewish internal migration by using logistic regression analysis in USA for years 1985-1990 and 1990-2000. They demonstrated that internal migration stems from economic social and environmental factors.

Bunea (2012) has investigated the determinants of internal migration in Romania by using data for years 2004-2008. In his research, using static and dynamic prediction models with panel data analysis he examined internal migration in Romania statistically and econometrically. With static analysis he has drawn attention to the significant effect of population size, GDP per capita, comfort index, traffic and crime rate; with dynamic analysis effects of previous migration rate, population size and comfort index.

Some of the studies on causes and consequences of migration in Turkey is mentioned below:

Munro (1974) studied the movement of internal migration in Turkey for period of 1960-1965. He stated migration follows a path that starts mostly agricultural region to towns and then to the center of attraction.

Doh (1984) investigated causes of migration for period of 1970-1975. In his study he identified that the rural population in Turkey leaving their non-profitable jobs in agriculture emigrated to intensively modernized places.

In a study of Üçdoğruk (2002) related to internal migration to Izmir, age and education were mentioned as important factors influencing migration. Karabulut and Polat (2007) listed the causes of migration in the province in the sub-region of Agrı as lack of health and education services and social activities, bad weather conditions and finding better jobs. Gökhan (2008) identifies the causes of internal migration in Turkey as job search, assignment, education, marriage, earthquake, and safety problems.

Başel (2007) concluded in his study, the economic and social and regional disparities, rapid population growth, low share of agricultural sectors in income distribution and political factors have significant place among causes of migration in Turkey.

Ekmekçiler (2011) studied economic and social impact of rural migration on the province of Diyarbakir. The causes of migration from rural to urban areas are listed in the paper as economic reasons, terrorism, vendetta, marriage, attractiveness of city life and other reasons.

Yakar (2013) in his study, investigated the relationship between inter-provincial net migration and socio-economic development level. It is tested what extent development level is effective (and which part of the country) on net immigration or emigration of provinces. To explain the relationship in question with spatial dimensions and modelling Geographically Weighted Regression Analysis is used. As a result of research it is found that SEGE values is more effective on getting net migration rather than net emigration of provinces.

In the literature, the number of study which makes spatial analysis of migration is not much. Especially the study of spatial analysis in Turkey is quite limited. There is not another migration study which using ESDA[1] analysis and this makes the study original.

DATA AND METHODOLOGY

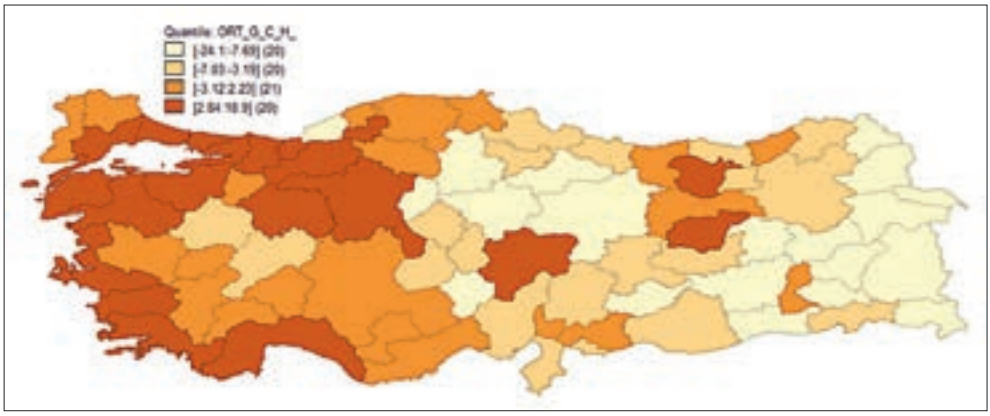
Three different data sets are used in the study which aims to analyze socio-economic reasons of average migration among provinces in Turkey. These are; as dependent

[1] Here are some of the studies in this regard: Rey and Montouri (1999), Ying (2000) Manfred et al. (2001), Le Gallo and Ertur (2003), Perobelli and Haddad (2003), Van Oort and Atzema (2004), Dall'erba (2005), Voss et al.. (2006), Ezcuerra et al. (2007, 2008), Battisti and Di Vaio (2008) Celebioglu and Dall'erba (2010), Altay and Celebioglu (2012), Altay and Celebioglu (2015).

variable the average net migration rate of the provinces, as independent variables, socio-economic development level (SEGE) and the unemployment rate. Average net migration rate of provinces and unemployment rate is provided from Turkish Statistical Institute[2] and province based SEGE is obtained from reports published by the State Planning Organization[3]. To test spatial dependency, Exploratory Spatial Data Analysis is used. This analysis is performed with GeoDa programme.

Mapping for All Variables

We firstly give mapping distributions (quantile maps) by using GeoDa program for all variables. The darker areas indicate a greater level of relative of all variables in these distributions, while the lighter areas show that lower values of our variables (look at the maps below).



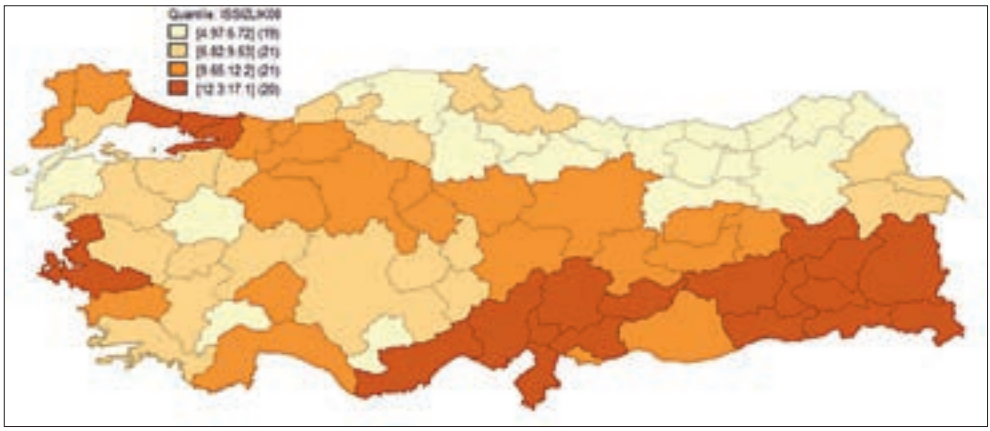
Map 1. Province Level Net Migration Rate in Turkey (2008-2014)

Map 1 show that Western provinces mostly have high level positive net migration rates. These provinces which have big population and important industrial investments take people from Central, East and South East Anatolian cities. Other important dimension that Western provinces also have better education and health system services.

According to Map 1, high level unemployment rates are in East Mediterranean, East and South East Anatolian provinces. Exceptionally, İstanbul and İzmir have big unemployment rates. These cities are the most industrialized cities in Tur-

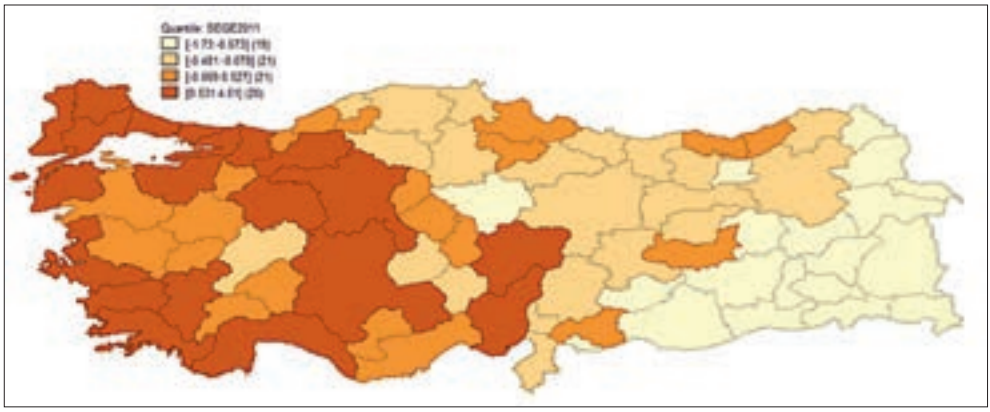
[2] Look at Turkish Statistical Institute website: http://www.turkstat.gov.tr

[3] Look at the link for the report: http://www.kalkinma.gov.tr/Lists/Yaynlar/Attachments/548/SEGE-2011.pdf



Map 2. Province Level Unemployment Rate in Turkey (2008-2013)

key. After global crisis (2008), unemployment rates in industrial areas (such as İstanbul, İzmir, Mersin, and Adana) increased in Turkey.



Map 3. Province Level Socio-Economic Development Index Values in Turkey (2011)

Map 3 displays that Socio-Economic Development Index Values in Western Anatolian provinces are higher than East and South Eastern Anatolian provinces. Socio-Economic Development Index includes Health service and education possibilities, employment opportunities and other important indicators. Many East and South East Anatolian provinces don't have good conditions for quality life, although the provinces take public expenditure (Tuncer vd. 2015: 11- 12).

These quantile maps (map 1-3) show that there is important disparity for all variables. For this reason, we use Exploratory Spatial Data Analysis (ESDA) for the data set.

Exploratory Spatial Data Analysis
Spatial Weight Matrix

A spatial weight matrix is the necessary tool to impose a neighborhood structure on a spatial dataset. As usual in the spatial statistics literature, neighbors are defined by a binary relationship (0 for non-neighbors, 1 for neighbors). We have used two basic approaches to define neighborhood: contiguity (shared borders) and distance. Contiguity-based weights matrices include rook and queen. Areas are neighbors under the rook criterion if they share a common border, not vertices. Distance-based weights matrices include distance bands and k nearest neighbors (Anselin, 1988).

Based on these two concepts, we decided to create a weight matrix to investigate the distribution of our variables of interest: queen neighbor matrix. Queen Weight Matrix indicate whether spatial units share a boundary or not. If the set of boundary points of unit *i* is denoted by band (*i*). We give the queen neighbor matrix only below:

$$w_{ij} = \begin{cases} 1, bnd(i) \cap bnd(j) \neq \emptyset \\ 0, bnd(i) \cap bnd(j) = \emptyset \end{cases} \quad (1)$$

Now that the weight matrix has been defined, we estimate a couple of spatial statistics that will shed some light on the spatial distribution of our variables. The most common of them is Moran's I which is a measure of global spatial autocorrelation.

Moran's I ve P Values of the Variables

Spatial autocorrelation refers to the correlation of a variable with itself in space. It can be positive (when high values correlate with high neighboring values or when values correlate with low neighboring values low) or negative (spatial outliers for high-low or low-high values). Note that positive spatial autocorrelation can be associated with a small negative value (e.g., -0.01) since the mean in finite samples is not centered on 1. Spatial autocorrelation analysis includes tests and visualization of both global (test for clustering) and local (test for clusters) Moran's I statistic (Anselin et al. 2006).

Global spatial autocorrelation is a measure of overall clustering and it is measured here by Moran's I. It captures the extent of overall clustering that exists in a

dataset. It is assessed by means of a test of a null hypothesis of random location. Rejection of this null hypothesis suggests a spatial pattern or spatial structure, which provides more insights about a data distribution that what a quantile map or box plot does. For each variable, it measures the degree of linear association between its value at one location and the spatially weighted average of neighboring values (Anselin *et al*. 2007; Anselin 1995) and is formulated as follows:

$$I_t = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n} w_{ij}(q)x_{it}x_{jt}}{\sum_{i=1}^{n}\sum_{j=1}^{n} x_{it}x_{jt}} \qquad (2)$$

Where w_{ij} the (row-standardized) degree of connection between the spatial units i and j and x_{ij} is the variable of interest in region i at year t (measured as a deviation from the mean value for that year). Values of I larger (smaller) than the expected value $E(I) = -1/(n-1)$ indicate positive (negative) spatial autocorrelation. In our study, this value is (-0.0125). There are different ways to draw inference here. The approach we use is a permutation approach with 999 permutations. It means that 999 re-sampled datasets were automatically created for which the I statistics are computed. The value obtained for the actual dataset has then been compared to the empirical distribution obtained from these re-sampled datasets.

The results of Moran's I are given in table 1 below. All the results indicate a positive spatial autocorrelation, i.e. the value of a variable in one location depends positively on the value of the same variable in neighboring locations. For instance, when the net migration rate in one province increases by 1%, the one of its neighbors increases by slightly more than approximately 0.52% (for queen matrix). All variables are significant (at 5%) with the K-nearest 7, K-nearest 8, K-nearest 9, queen, and rook matrixes. Because of Moran's I value of net migration rate is the highest value for queen matrix, we decided to use queen.

Table 1. Moran's I and P values for all variables

Variables	K_7	K_8	K_9	ROOK	QUEEN
Unemployment	0,510884 (0,001)	0,465258 (0,001)	0,428557 (0,001)	0,654686 (0,001)	0,66466 (0,001)
Net Migration Rate	0,514393 (0,001)	0,495565 (0,001)	0,479738 (0,001)	0,521898 (0,001)	0,524286 (0,001)
Socio-economic Development Index	0,550751 (0,001)	0,546286 (0,001)	0,533856 (0,001)	0,575983 (0,001)	0,575669 (0,001)

Note: P values into brackets

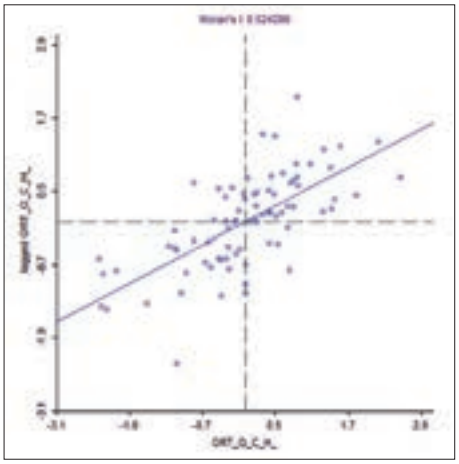


Figure 1. Moran's Scatterplot for Net Migration Rate (2008-2014)

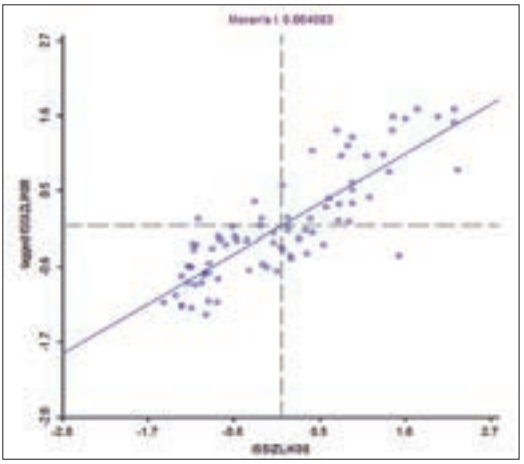


Figure 2. Moran's Scatterplot for Unemployment Rate (2008-2013)

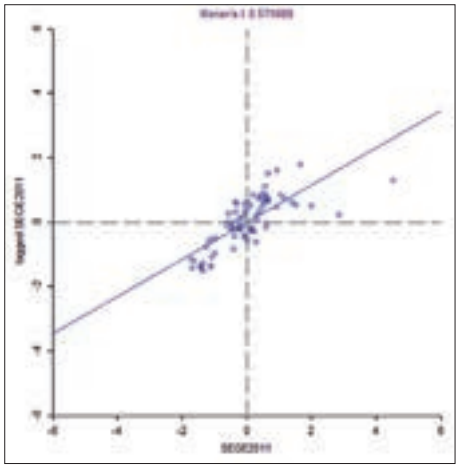


Figure 3. Moran's Scatterplot for Socio-Economics Development Index 2011

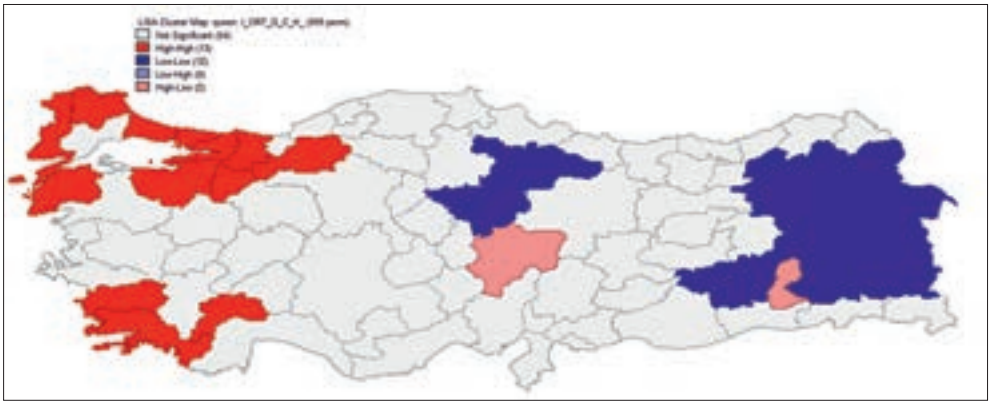
Local Indicators of Spatial Association Analysis of the Variables

LISA statistics (Local Indicators of Spatial Association) can be defined the presence of spatial autocorrelation for each of the location of our sample. It captures the presence or absence of significant spatial clusters or outliers for each location. Combined with the classification into three types defined in the Moran scatter plot above, LISA indicates significant local clusters (high–high or low–low) or local spatial outliers (high–low or low–high). The average of the Local Moran statistics is proportional to the Global Moran's I value (Anselin 1995; Anselin et al. 2007).

Anselin (1995) formulated the local Moran's statistics for each region i and year t as the follows:

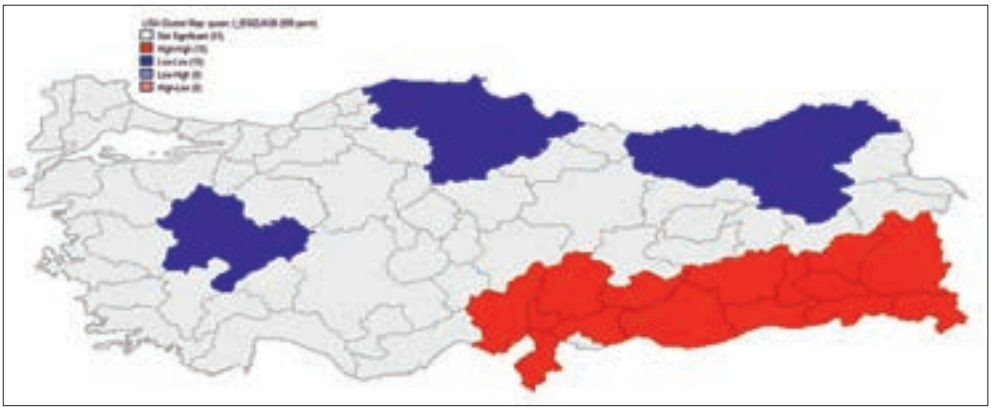
$$I_i = \left(\frac{x_i}{m_0}\right)\sum_j w_{ij}x_j \quad with \;\; m_0 = \sum_i x_i^2 / n \tag{3}$$

where w_{ij} is the elements of the row-standardized weights matrix W and x_i (x_j) is the observation in region i (j) . The significant results (at 5%) of the LISA statistics are given in table 2. Their significance level is based on a randomization approach with 999 permutations of the neighboring provinces for each observation.



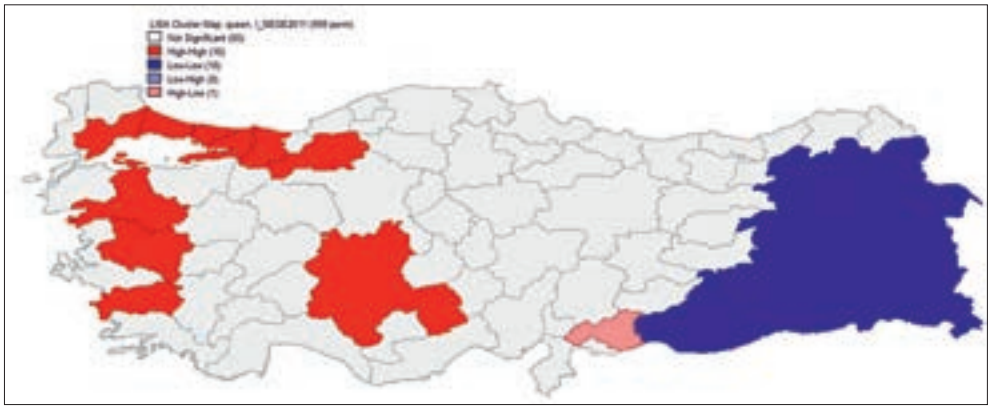
LISA Map 4. Province Level Net Migration Rate in Turkey

According to Figure 4, provinces have blue color (mostly in East and South East Anatolian provinces - Tokat, Amasya, Ağrı, Bitlis, Diyarbakır, Erzurum, Iğdır, Kars, Muş, Siirt, Şırnak, Van, Yozgat) show that this region is a negative concentration center for net migration rate. It means that these regions send immigrants to West Anatolian cities. On the contrary red areas (mostly in West Anatolian provinces-Bilecik, Bolu, Burdur, Bursa, Canakkale, Edirne, Istanbul, Kırklareli, Kocaeli, Muğla, Sakarya, Tekirdağ, Yalova) are positive concentration centers. It means that these regions take immigrants from East and South East Anatolian provinces. White color provinces show statistically insignificant country values in the Figure 4.



LISA Map 5. Province Level Unemployment Rate in Turkey

When we look at the Figure 5, we understand that provinces which have high-high values (red areas) are located in mostly East Mediterranean region and South East Anatolia. These provinces are Adana, Adıyaman, Batman, Bitlis, Diyarbakır, Gaziantep, Hakkari, Hatay, Kahramanmaras, Mardin, Osmaniye, Sanlıurfa, Siirt, Sırnak, and Van. Common denominators of these provinces (except Adana and Kahramanmaras) are weak industrial production and lower income. Lower unemployment rates are in Afyon, Amasya, Ardahan, Artvin, Bayburt, Corum, Erzurum Giresun, Gümüshane, Kastamonu, Kütahya, Ordu, Rize, Samsun, Sinop, Trabzon, and Usak.



LISA Map 6. Province Level Socio-Economic Development Index Values in Turkey

Figure 6 displays negative concentration about Socio-Economic Development Index in East and South East Anatolian provinces (Agrı, Batman, Bingöl, Bitlis, Diyarbakır, Erzurum, Hakkari, Igdır, Kars, Mardin, Mus, Siirt, Sanlı Urfa, Sırnak, and Van). It means that these provinces have lower ındex values than the other provinces. Besides Aydın, Balıkesir, Bolu, Istanbul, Kocaeli, Konya, Sakarya, Tekirdag, and Yalova provinces have high –high values of Socio-Economics Development Index.

Table 2. Provinces with significant LISA statistics at 5% (spatial weight matrix queen)

	HH	LL	HL	LH
Net Migration Rate	Bilecik, Bolu, Burdur, Bursa, Canakkale, Edirne, Istanbul, Kırklareli, Kocaeli, Mugla, Sakarya, Tekirdag, Yalova	Agrı, Amasya, Bitlis, Diyarbakır, Erzurum, Igdır, Kars, Mus, Siirt, Sırnak, Tokat, Van, Yozgat	Batman, Kayseri	-
Unemployment Rate	Adana, Adıyaman, Batman, Bitlis, Diyarbakır, Gaziantep, Hakkari, Hatay, Kahramanmaras, Mardin, Osmaniye, Sanlıurfa, Siirt, Sırnak, Van	Afyon, Amasya, Ardahan, Artvin, Bayburt, Corum, Erzurum Giresun, Gümüshane, Kastamonu, Kütahya, Ordu, Rize, Samsun, Sinop, Trabzon, Usak	-	-
Socio-Economic Development Index	Aydın, Balıkesir, Bolu, İstanbul, Kocaeli, Konya, Sakarya, Tekirdag, Yalova	Agrı, Batman, Bingöl, Bitlis, Diyarbakır, Erzurum, Hakkari, Igdır, Kars, Mardin, Mus, Siirt, Sanlı Urfa, Sırnak, Van	Gaziantep	-

CONCLUSIONS

The direction of migration experienced in Turkey, often due to socio-economic reasons, is from Black Sea, Eastern and Southeastern Anatolia provinces to provinces in western region which are industrialized, have wide job field and high per capita income levels. Experienced labor movement, increasing by increased regional disparities and it happens from less developed regions to more developed centers.

When we look at the results of the LISA analysis it is seen that there are similarities between the average provincial rate of net migration rates and the distribution of provinces' SEGE value. It means provinces that have high SEGE values gets migration. Because in provinces with high SEGE values individuals have the opportunity to receive a better quality of education services. In addition better economic conditions, more qualified health services and easy access to public services have come to the fore as important reasons for the migration to these regions.

According to LISA analysis results in the regions lagging behind in terms of SEGE values, there are high unemployment rates. Migration increases from the regions with high unemployment rate towards developed areas. Migration flows arising from regional disparities, shrinks volume of regional demand which is the main determinant of the investment in less developed regions. Moreover, it causes outflow of young and talented labor force and capital that are the basic elements of development to outside of the region. This situation leads to a further

decline of lagging regions and leads to continuous emigration of these regions.

In Turkey as a country that living ongoing industrialization process, due to industry is more concentrated in the western part of the country, there are more job opportunities than other regions. Individuals tend to migrate towards the industrialized regions and provinces in order to have a higher level of welfare. As noted Harris and Todaro, migration in Turkey follows a path from rural to urban and from agricultural sector to industrial sector.

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Appendix: Location and Names of all Provinces in Turkey