6. REGIONAL UNEMPLOYMENT DISPARITIES IN TURKEY

Mehmet Güçlü[1]

Abstract

The aim of this study is to analyze the reasons of unemployment disparities among 26 NUTS-2 regions in Turkey for the period 2004-2013. To that end, spatial panel econometrics is employed. It is empirically proven that the determinants of the regional unemployment disparities are labor force participation rate, young population, industrial mix and educational attainment. Further, it is detected that there is a spatial dependence (spatial autocorrelation) among the regions. In other words, it is discovered that an increase in unemployment rate in a region also affects the unemployment rates of neighboring regions. Spillover effects of independent variables are also estimated. Hereby, the impacts of factors, which determine unemployment in a region, both on that region and neighboring regions are obtained individually.

Keywords: regional unemployment, spatial panel econometrics, spatial autocorrelation, spillover effects

JEL Classification: R12, R23, C23, C33

I. Introduction

As one of the most important macro-economic indicators of an economy, unemployment has been mainly analyzed in Turkey at the national level and neglected at the regional level. Although regional unemployment rates are acknowledged to be one of the socio-economic indicators of a region, reasons of high regional unemployment and substantial unemployment disparities among the regions in Turkey have not been investigated thoroughly.

There are two remarkable facts in Turkey in terms of regional unemployment. First, there are substantial differences in unemployment rates among the regions. Second, the unemployment rates of neighboring regions are generally close to each other and tend to cluster (see Figure 1). Since an analysis of overall unemployment gives no explanation for the reasons of the mentioned facts above, an analysis at regional level is needed. Despite the necessity of regional analysis, regional unemployment is a less studied topic in Turkey. From this point of view, the aim of this study is to analyze the

[1] *Ege University, Department of Economics and Administrative Sciences, Turkey. E-mail: Mehmet.guclu@ege.edu.tr.*

underlying reasons of unemployment disparities among the 26 NUTS-2 regions in Turkey for the period of 2004-2013 and to complement earlier studies at the regional level. There are only two empirical studies regarding the regional unemployment disparities in Turkey. In the first study by Filiztekin (2009), a cross-sectional regression model does not adequately reveal the dynamics of regional unemployment. The second study by Köse and Güneş (2013) uses traditional panel data analysis, a method that is not a suitable econometric method for regional analysis, also especially because neglects the spatial effects. To the author's best knowledge, this is the first study to analyze regional unemployment disparity in Turkey via spatial panel econometrics method. Three contributions are made to the current literature through the use of this method. The first contribution is that the dynamics of regional unemployment may be better revealed by spatial panel data models. The second one is the determination of spatial dependence existence (that is, the impact of the increase in the rate of unemployment within a region on the rate of unemployment in the neighboring regions). The third contribution is the estimation of spillover effects (that is, the impact of factors determining unemployment within a region on the rate of unemployment in the neighboring regions).

Elhorst (2003) brings forward three major reasons to analyze unemployment at the regional level. First of them is that regional unemployment disparities show the performance of labor markets of regions and refer to regional problems. This is why it is essential that a government that wants to eliminate regional inequalities should handle regional labor markets more seriously. The second reason is that factors used to describe unemployment disparities among countries are not applicable to describe regional unemployment disparities. Social security, retirement and differences in tax systems are indicated as reasons of unemployment disparities among countries. While these are acknowledged to describe disparities between the countries, such are not acknowledged to describe disparities between the regions, since there are no substantial differences as regards these issues in terms of regions within a country. Therefore, it is required to find other reasons to describe unemployment disparities between the regions. The third reason is that regional unemployment disparities may have the potential to cause inefficiency. It is likely to obtain substantial social benefits, a higher national output and a decrease in inflationary pressure thanks to the decrease in regional unemployment disparity (Taylor, 1996).

The classical economic theory asserts that unemployment disparity among the regions is likely in the short run, however it is not possible in the long run as those who are unemployed would migrate from the regions where unemployment is high to the regions where unemployment is low. Thus, it is justified that unemployment disparity between the regions is closed over time. However, it is observed that such claim did not come true when regional unemployment data in many countries are considered. This resulted in development of theories to explain unemployment disparity. While the models to describe this issue have been called the disequilibrium theory up to early 20th century, alternative models emerged under the name of equilibrium theory after 1970s (Waltert and Schläpfer, 2010). The disequilibrium view argues that regional unemployment rates are equalized in time but adjustment process is likely to be slow. Low adjustment speed leads to persistent unemployment disparities between the regions. As for adjustment

speed, it is based on the factors determining labor supply and demand of the region (*i.e.* migration, capital flow, wage elasticity, etc.).

As to the equilibrium view, it asserts that there is a stable equilibrium in regional labor markets and each region has different unemployment rates (in other words, each region has its own natural rate of unemployment). Unemployment within a region is the function of amenities in that region. The main determinants of preferences of employees and companies depend on the attractiveness of amenities (better climate conditions, cheaper rents, higher quality of life, better educational opportunities, etc.) held by the region. Such amenities in the region do not allow equalization of unemployment between the regions preventing migration of the unemployed (or influencing the preferences of companies). Hall (1972), Marston (1985), Reza (1978), Carlsen (2000) and Aragon *et al*., (2003) are the researchers providing both theoretical and empirical evidences for such view. Hunt (1993) analyzed empirical literature and obtained results supporting both of the views.

The rest of the study is organized as follows. In the second section, information on Turkey's regional unemployment is provided. In the following section, literature on this subject is summarized. In the fourth section, econometric method is described. In the fifth section, the data are defined, and the empirical results also are presented. Finally, some policy implications are discussed.

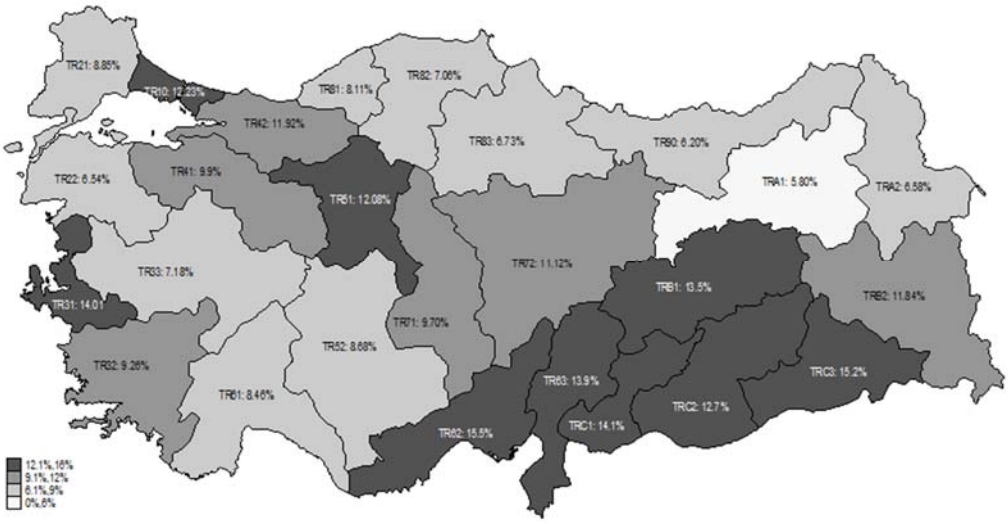
II. Regional Unemployment in Turkey

Coherent data on regional unemployment rates in Turkey are available only for the 2004-2013 period. Based on average unemployment figures of this period, regional unemployment disparity in Turkey is visualized in Figure 1. While the lowest average rate of unemployment in this period is in TRA1 (Erzurum, Erzincan, Bayburt) region with 5.8 %; the highest unemployment is in TR62 (Adana, Mersin) region with 15.5%. The rate of unemployment disparities between the two regions is approximately more than 2.5 times. When the figures in 2013 are considered only, the lowest (TR2: 4.7%) and highest (TRC3: 21.1%) rates of unemployment disparities between regions reach up to 4.5 times approximately. Such rates clearly indicate to what substantial extent regional unemployment disparity in Turkey has reached.

Highest unemployment figures are encountered in several regions (TRC1: 14.1%; TRC2: 12.7%, TRC3:15.2%; TRB1: 13.5%; TR63: 13.9% and TR62:15.5%) located in the south east of Turkey and three big metropolises (TR51-Ankara: 12.0%, TR10-İstanbul: 12.23% and TR31-İzmir: 14.01%). In these regions (i.e., in the regions with the darkest color), the average unemployment rate is around 13.5%. The regions where unemployment is low are located in the north of Turkey (TR81: 8.1%, TR82: 7%; TR83: 6.7%, TR90: 6.2%; TRA1: 5.8% and TRA2: 6.5%) and in the west of Turkey (TR21: 8.8%; TR22: 6.5%; TR33: 7.2%; TR61: 8.5%; TR52: 8.7%). In these regions (i.e., in the regions with the lightest color), the average unemployment rate is around 7.9%. Generally, it is observed that unemployment rates of neighboring regions are close to each other. It is further observed that disparity between unemployment rates exhibited a persistent structure over the period. The high unemployment disparities among the regions and its persistency over time make necessary to perform this analysis at regional level.

Figure 1

Unemployment in NUTS2 Regions in Turkey, 2004-2013



III. Literature Review

There is an increasing interest in unemployment disparities in the literature. Therefore, there are many studies conducted in this field. While some of them analyze unemployment disparities among the countries, some others focus on unemployment disparities within a country. While Bean (1994) and Zeilstra and Elhorst (2014) conduct studies to investigate the countries of European Union, Scerpetta (1996) conducts a study to investigate the OECD countries. The studies analysing regional unemployment disparities for England are performed by Burridge and Gordon, (1981) and Taylor and Bradley, (1997); for USA by Murphy (1985), Blanchard and Katz (1992) and Partridge and Rickman, (1995); for Canada by Johnson and Kneebone (1991); for Germany by Lottmann (2012) and Taylor and Bradley (1997); for Italy by Cracolici, Cuffaro and Nijkamp (2007) and Taylor and Bradley (1997); for Spain by López -Bazo, Barrio and Artis (2002, 2005); for Greece by Lolos and Papapetrou (2012) and for France by Aragon *et al*. (2003).

Although there are many studies conducted with respect to national unemployment in Turkey, there are only two empirical studies in relation to regional unemployment disparities. In the first study by Filiztekin (2009), two cross-sectional regression models are estimated thanks to spatial econometric method for the years 1980 and 2000. It is concluded that unemployment between the provinces exhibit a persistent structure and provincial disparities increase gradually. It is further inferred that the underlying reason for unemployment disparity is human capital and demand deficiency.

In another study by Köse and Güneş (2013), growth rate of regional unemployment (instead of regional unemployment rate) is studied as distinct from the above mentioned study. They use non-spatial panel data method in the study. They conclude that employment in industry and education level below high school have an impact on the growth rate of unemployment; other variables (exports, higher education, young population, urban population, etc.) are insignificant. However, the estimation problems caused by the use of a non-spatial econometric model are ignored.

Spatial panel data method is employed in our study in order to determine the factors to affect regional unemployment disparities in Turkey. Thus, the estimation problems in the study of Köse and Güneş (2013) is overcome and an opportunity is obtained to work with a data set even larger than the cross section study by Filiztekin (2009). With the same idea, it is seen that spatial econometric methods have been preferred in the recent studies in the international literature (See, Molho, 1995; Aragon *et al*., 2003; López - Bazo, Barrio and Artis, 2002; Zeilstra and Elhorst, 2014; Lottmann, 2012, Lolos and Papapetrou, 2012 and Cracolici, Cuffaro and Nijkamp, 2007).

IV. Econometric Method

The fact that the employees in a region start a job in vacant positions in another region or that a company looks for employees in another region leads to spatial interactions between regional labor markets. The presence of spatial (auto)correlation between the regions (*i.e.* the dependence) refers to the correlation (dependence) of unemployment rate in a region with that of neighboring regions. Traditional econometric methods see each region implicitly as an independent identity and largely neglect potential regional interactions (of these regions across space). Omitting spatial dependence in empirical studies leads to biased results and misleading conclusions (Anselin and Griffith, 1988). In order to remove these drawbacks, a spatial econometric model is employed in this study. The model is defined as a panel data model which allows to account for unobserved individual heterogeneity in the data.

Some procedures for testing the potential presence of spatial dependence have been developed and models accounting for this dependence have been designed. In the linear regression model, spatial dependence can be specified in two general forms: spatial error model (SEM) and spatial lag model (SAR). SAR considers spatial dependence across observations on the dependent variable. Omitting the spatially lagged dependent variable from the set of explanatory variables causes the OLS estimator to be biased and inconsistent. Elhorst (2010) defines the spatial lag model as follows:

$$U_{it} = \rho \sum_{j=i}^{N} W_{ij} U_{jt} + \alpha + X_{it}\beta + \mu_i + \lambda_t + \varepsilon_{it}$$

where *i* is an index for the cross-section dimension (i.e regions in Turkey), with *i* = 1,…,*N* and, *t* is and index for the time dimension , with t = 1,…*T*. *ρ* denotes spatial autoregressive coefficient. U_{it} is an observation on the dependent variable (unemployment rate) at *i* and *t*.W_{ij} is an element of a spatial weight matrix *W* describing the spatial arrangement of the units in the sample.

It is assumed that *W* is a pre-specified non-negative matrix of order *N*. *α* is the constant term parameter. X_{it} is a *1 × K* row vector of observations on the independent variables, and β is a matching *K × 1* vector of fixed but unknown parameters. ε_{it} is an independently and identically distributed error term for *i* and *t* with zero mean and variance σ^2 , while μ_i denotes a region-specific effect; and λ_i a time-period specific effect.

SEM considers spatial dependence across error terms. Omitting the presence of spatial autocorrelation among population errors causes OLS to be a biased variance estimator and an inefficient regression coefficient estimator. Elhorst (2010) formulates the spatial error model as follows:

$$U_{it} = \alpha + X_{it}\beta + \mu_i + \lambda_t + \emptyset_{it} \ , \ \emptyset_{it} = \delta \sum_{j=1}^{N} W_{ij}\emptyset_{it} + \varepsilon_{it}$$

where the parameters are the same as before but $\emptyset_{it}$ reflects the spatially autocorrelated error term and δ is called the spatial autocorrelation coefficient.

V. Data and Empirical Results

The empirical analyses are carried out for the period 2004-2013. All the data for 26 NUTS-2 regions are obtained from the Turkish Statistical Institute (TURKSTAT). There is no unemployment data at the regional level before 2004. Since the calculation method of unemployment series after 2013 was changed, the current data for the year 2014 are not included in the analysis. While many studies in literature use regional unemployment rate directly as the dependent variable, very few studies, including also Filiztekin (2009), use the variable obtained through removal of national unemployment from regional unemployment as the dependent variable, (see Elhorst, 2003). Following the majority in literature, regional rate of unemployment (*U*) is also used directly as the dependent variable in this study.

There are many variables in literature considered to be the determinant of regional unemployment. However, it is a major constraint for variable selection that there are no consistent data covering the analysis period, such as wage, migration, population density, etc., at the regional level in Turkey. This is why explanatory variables are specified in this study considering the availability of data.

First of these variables is labor force participation rate (*LFPR*). The direction of impact of this variable on unemployment is controversial. When considered in simple terms, it is expected that these two variables are positively related. Because an increase in labor force participation rate raises unemployment by leading to an increase in labor supply. Fleisher and Rhodes (1976) claim that these two variables are negatively related. According to the authors, if labor force participation rate is low in a region, this is an indication of low investments in human capital and low commitment to working life. Therefore, unemployment risk of an employee endowed with such low characteristics in such region is higher. This is why a low participation rate leads to high unemployment. There are findings in literature supporting both of them. The results of these studies are outlined by Elhorst (2013).

In many studies, it is concluded that age structure of the population, especially young population, has an impact on the rates of regional unemployment (Hofler and Murphy,

1989; Jhonson and Kneebone, 1991; Elhorst, 1995; López -Bazo, Barrio and Artis, 2002; Cracolici, Cuffaro and Nijkam, 2007). Consequently, the share of young population (YOUNG) (ages 15-24) to the total working age population is used in the regression as an explanatory variable.

Human capital is another important factor having impact on unemployment. Highly skilled workers are more likely to find a job in proportion to low skilled workers. Thus, there is a negative relationship between the level of human capital and unemployment rate. There are four different regional education variables to be used in TURKSTAT as an indicator of human capital of regions. These are shares of those who are illiterates, those who have education below high school (*EDU1*), those who have education at the level of high school or vocational high school (*EDU2*), and those who have higher level of education (*EDU3*) within the working age population of the region. Three variables are included in the regression (the illiterates are excluded from the regression).

The industry in which the region specializes in is seen as a determinant of unemployment in that region. Because it is anticipated that while declining industries generally create low employment (higher unemployment), growing industries create high employment (lower unemployment). Employment rates of different industries are used in literature in order to measure the industry mix within a region. While agriculture has constantly lost its weight in production in Turkey up to early 2000s, industry has constantly increased its weight in production. However, it is observed that such trade-off experienced between agriculture and industry in the previous years started to be experienced between industry and services and that the percentage of services gradually increased when analysis period of this study is considered. This is why the percentage of industry (*EMI*) and the percentage of services (*EMS*) in total employment are utilized as indicators of industry mix of the region.

To estimate spatial regression models, a weight matrix (W) must be defined. In the literature, different types of weight matrices are used. The most frequently used is the binary contiguity matrix, which takes a value of 1 if regions are neighbors and 0 otherwise. In our study, a row-normalized binary contiguity matrix is employed. The econometric estimations are carried out in several stages. First of all, it is determined whether the model is a one-way panel data model or two-way panel data model through the LR test. Then, the form of spatial dependence process (SAR or SEM model) is determined via the LM test. Afterwards, it is determined with the Hausman test whether fixed effects model or random effects model is more appropriate. As to the final stage, direct and indirect effects are estimated.

Table 1 reports the estimation results of the non-spatial panel data model. The table also shows the results indicating whether one way model or two-way model is more appropriate as well as the results indicating whether spatial error model or spatial lag model is more appropriate. The results of *LR* test reject the hypothesis that there are no region-specific fixed effects and time-fixed effects. In other words, the results indicate that two-way panel model in the fourth column is more appropriate. Since LM_{lag} statistics in the fourth column is statistically significant, the spatial lag model is preferred over the spatial error model (Anselin [2005] assets that If both LM_{lag} and/or LM_{error} are statistically insignificant, we cannot proceed to the next step, checking out the robust statistics, to determine the form of spatial dependence). Up to this point, the test results point to the spatial lag specification of the two-way fixed effects model.

Table 1

Determinants of Regional Unemployment Disparities: Non-Spatial Panel Data Models

	1		2		3		4	
Variable	**pooled ols**		**panel with region -specific fixed effects**		**panel with time-period fixed effects**		**panel with cross-section and time-period fixed effects**	
LFPR	0.137	*(0.004)* ***	0.251	*(0.000)* ***	0.112	*(0.009)* ***	0.210	*(0.000)* ***
YOUNG	-0.004	*(0.961)*	0.186	*(0.118)*	0.023	*(0.759)*	0.377	*(0.004)* ***
EDU1	-0.179	*(0.015)* **	-0.115	*(0.301)*	-0.159	*(0.022)* **	-0.280	*(0.005)* **
EDU2	-0.183	*(0.032)* **	-0.721	*(0.000)* ***	-0.022	*(0.814)*	-0.535	*(0.000)* ***
EDU3	-0.713	*(0.000)* ***	-0.624	*(0.000)* ***	-0.810	*(0.000)* ***	-0.641	*(0.000)* ***
EMI	0.168	*(0.000)* ***	0.172	*(0.004)* ***	0.157	*(0.000)* ***	0.218	*(0.000)* ***
EMS	0.342	*(0.000)* ***	0.487	*(0.000)* ***	0.330	*(0.000)* ***	0.409	*(0.000)* ***
constant	4.199	*(0.558)*						
R^2	0.559		0.321		0.609		0.342	
LogLikelihood	-610.9		-540.7		-581.5		-495.6	
LM_{lag}	33.8	*(0.000)* ***	61.4	*(0.000)* ***	5.225	*(0.022)* **	3.438	*(0.064)* *
Robust LM_{lag}	0.4	*(0.533)*	30.5	*(0.000)***	0.293	*(0.589)*	6.736	*(0.009)* ***
LM_{error}	39.8	*(0.000)* ***	36.3	*(0.000)* ***	5.536	*(0.019)* **	*0.674*	*(0.412)*
Robust LM_{error}	6.4	*(0.012)* **	5.4	*(0.020)* **	0.604	*(0.437)*	*3.972*	*(0.046)* **
LR Test Statistic			90.1	*(0.000)* ***	171.832	*(0.000)* ***		

*Note: p values in parentheses; ***, ** and * significant at 1% , 5% and % 10, respectively.*

The estimation results of the spatial panel models are given in Table 2. The significant Hausman test statistic indicates fixed effects model. The coefficient of significant spatially lagged unemployment variable (ρ = 0.22) which is very close to the value (0.26) obtained by Filiztekin (2009) for Turkey implies the existence of a spatial dependence. In other words, it denotes that the unemployment rate of a region is affected by the rates of unemployment within neighboring regions. This can, at the same time, be perceived as an indication to support Figure 1 that regions with high (or low) rates of unemployment are clustered together. All the variables are found statistically significant at 1 % level of significance. While the signs of the coefficients on *LFPR, YOUNG, EMI* and *EMS* variables are found positive, the signs of the coefficients on all the educational variables *(EDU1, ED2* and *EDU3)* are found negative.

Table 2

Determinants of Regional Unemployment: Spatial Panel Data Models

Variable	SAR_{FE}		SAR_{RE}	
LFPR	0.216	*(0.000)* ***	*0.210*	*(0.000)* ***
YOUNG	0.377	*(0.005)* ***	*-0.013*	*(0.815)*
EDU1	-0.294	*(0.004)* ***	*-0.216*	*(0.000)* ***
EDU2	-0.525	*(0.000)* ***	*-0.382*	*(0.000)* ***
EDU3	-0.663	*(0.000)* ***	*-0.585*	*(0.000)* ***
EMİ	0.203	*(0.001)* ***	*0.182*	*(0.000)* ***
EMS	0.409	*(0.000)* ***	*0.358*	*(0.000)* ***
ρ	*0.226*	*(0.002)* ***	0.432	*(0.000)* ***
Corrected R^2	0.354		0.543	
LogLikelihood	-493.7		-2333.5	
Hausman	83.0	*(0.000)* ***		

Note: p *values in parentheses; ***, ** and * significant at 1% , 5% and % 10, respectively.*

Contrary to non-spatial models, LeSage and Pace (2009) state that it would be wrong to directly interpret coefficients obtained from spatial models in order to determine whether or not spatial spillover effects exists. Instead, LeSage and Pace (2009) suggested a partial derivative approach. Thanks to this method, three different interpretable effects (direct effects, indirect effects and total effects) can be calculated. Direct effects refer to the impact of an explanatory variable in region *A* on the dependent variable of region *A*. This effect includes feedback effects (*i.e.*, impacts passing through neighboring regions and back to the region that initiated the change). Indirect effects (spillover effects) refer to the impact of an explanatory variable in region *A* on the dependent variable of neighboring regions. Total effect represents the sum of two effects.

Table 3

Direct and Indirect Effects

Variable	***direct effects***		***indirect effects***		***total effects***	
LFPR	0.220	*(0.000)* ***	0.062	*(0.049)* **	0.282	*(0.001)* ***
YOUNG	0.378	*(0.008)* ***	0.106	*(0.083)* *	0.484	*(0.011)* **
EDU1	-0.301	*(0.007)* ***	-0.085	*(0.082)* *	-0.386	*(0.010)* **
EDU2	-0.531	*(0.002)* ***	-0.150	*(0.062)* *	-0.681	*(0.003)* ***
EDU3	-0.670	*(0.001)* ***	-0.191	*(0.061)* *	-0.861	*(0.002)* ***
EMİ	0.209	*(0.002)* ***	0.058	*(0.059)* *	0.267	*(0.003)* ***
EMS	0.415	*(0.000)* ***	0.117	*(0.028)* **	0.532	*(0.000)* ***

*Note: p values in parentheses; ***, ** and * significant at 1%, 5% and % 10, respectively.*

Following LeSage and Pace (2009), the direct and indirect effects are estimated and presented in Table 3. All the direct and indirect effects (spillover effects) are statistically significant. This means that all the explanatory variables not only directly affect regional unemployment but also indirectly affect it via regional spillover effects.

Since labor force participation rate as a control variable was ignored in the previous studies on Turkey, the effect of the variable on regional unemployment has become uncertain until now. In our study, the significant coefficient of the variable is found to be 0.28. The positive sign indicates that the growth of the regional labor force is not exactly compensated by the growth of the jobs and that unemployment increases accordingly. Although the negative impact is more dominant in literature (see Elhorst, 2003), there are also studies performed by Blackley (1989), López-Bazo *et al*., (2005) and Lolos and Papaterou (2012), and which found a positive impact. According to the estimation results, while a 10%-increase in labor force participation rate in a region is associated with a 2.2 % increase the unemployment rate of that region, it is also associated with a 0.6 % increase in the unemployment rate of neighboring regions. Since the direct effect of the variable *LFPR* is 0.220, and its coefficient estimate is 0.216, its feedback effects amounts to -0.004 or 2.1 % of the direct effect.

It is anticipated that in comparison to the regions with relatively old population, the regions with relatively young population have higher unemployment. The econometric results above also support this expectation. A 10 % increase in the young population (aged between 15 and 24) in a region increases unemployment in that region around 3.8%, and the spillover effect is around 1%. Surprisingly, Filiztekin (2009) finds the opposite, and says that his results have contradicted with many studies analyzing the OECD countries.

The empirical findings obtained in compliance with the literature also indicate that an increase in the level of human capital (*EDU1, EDU2* and *EDU3*) decreases unemployment. This result is consistent with the results of Filiztekin (2009) but does not comply with the claim of Köse and Güneş (2013) that secondary and higher education can not affect regional unemployment. The empirical evidences demonstrate that while a 10 % increase in the number of people with high school and vocational high school graduates is associated with a 5.3 % decrease in unemployment, the same percent increase in the number of people with higher education graduate is associated with a 6.7 % decrease in unemployment. Increasing educational level does not only decrease unemployment within that region but it also decreases unemployment within neighboring regions. It is concluded that a 10 % increase the number of those who have high school and higher level of education (edu1 and edu2) decrease unemployment in neighboring regions by % 2.4. According to the data obtained, the more the level of education in a region is increased, the more its effect to decrease unemployment increases both within that region and neighboring regions.

The estimated coefficients of industry mix variables are positive and statistically significant. This is an evidence in favor of the idea that regions with relatively high number of employees working in industry and services tend to have higher unemployment rates than that of the regions with relatively low number of employees working in such sectors. The paper of Köse and Güneş (2013) confirms this finding for the manufacturing industry, but claims that there is no such effect for the service sector in Turkey. The results in the studies by Summers (1986), Blackey (1989), Holzer (1993),

Taylor and Bradley (1997), Elhorst (1995) are also in parallel with the results in our study. The employment multiplier of a job in agriculture is higher than the employment multiplier in service and industry. Therefore, employment growth in service or industry may be inadequate to offset loss of employment in agriculture. Thus, increase in unemployment is more probable in regions that specialize in services and industry, compared to regions specialized in agriculture, because agriculture tends to absorb unemployment. At the same time, specialization in such sectors also contributes to unemployment growth in the neighboring regions.

VI. Conclusion

Despite a substantial amount of research trying to identify the fundamental causes of unemployment at national level in Turkey, very little work has so far been carried out at the regional level. Within the context of this paper we attempt to show that some useful insights into the causes of regional unemployment disparities in Turkey. The empirical results reported in this paper reveal that a substantial proportion of unemployment disparities across the 26-NUTS-2 regions can be explained by following key regional variables: educational attainment (human capital), young population, industrial mix and labor force participation rate.

According to the empirical results, educational attainment is the most important factor of unemployment disparities. Educational attainments at all levels are distributed fairly uneven across the regions. Especially the Eastern and Southeastern regions of Turkey, with the highest unemployment rates in general, have the lowest average rates in all levels. In order to decrease the disparities, policy makers should encourage increasing the level of human capital in the regions with higher unemployment rate.

The regression result asserts that young population has a negative impact on the rates of regional unemployment. When the effect of young population and educational attainment on regional unemployment is considered together, especially young people's education becomes more important. As it is known, vocational and technical education in Turkey cannot provide skilled human resources demanded by the businesses. Offering trainings to young people in accordance with the needs of businesses and encouraging entrepreneurship can be important factors in easing regional unemployment.

The industry mix is another determinant of the regional unemployment disparities empirically obtained. Contrary to the growing share of employment in services and manufacturing in the economy, the empirical results indicates that these sectors are inadequate to offset loss of employment in agriculture. In other words, the transformation of production from agriculture to manufacturing/services seems to have a negative effect on regional unemployment. It is clear that this structural transformation in the economy requires an improvement in the qualifications of the labor force. When demographic transition process in Turkey is considered, it is observed that young population in rural areas in agriculture are swiftly transferred to industry and services in urban areas. This process is one of the fundamental factors to increase the rates of regional unemployment, and it supports the results of the empirical analysis. This is one of the basic reasons why three metropolitan cities such as Istanbul, Ankara and İzmir, in particular, are considered to be among the regions with the highest rate of

unemployment. These are the regions in which agricultural employment is the lowest, whereas the services employment is the highest. In the light of this finding, it is essential that policy makers implement policies promoting employment creation and revise promotion policies particularly in this respect. It is required that promotion mechanisms should be put into action in a manner to subsidize not only the backward regions; but rather in a way to decrease unemployment in the regions with high rates of unemployment although they are not backward regions as in three big metropolitan cities.

The empirical analysis presents two more important findings. First, spatial dependence is determined among the regions. This means that an increase in the rate of unemployment within a region also leads to a growth in unemployment rate in neighboring regions. Second, spillover effects are detected. To put it more explicitly, it is concluded that factors affecting unemployment within a region not only affect unemployment in that region, but they also affect unemployment in neighboring regions. Such dependence and spillover effects lead to the regional polarization of unemployment rate in Turkish labor market. In other words, it results in clustering of regions where high (or low) unemployment is experienced. When the presence of spillover effects is considered, it should not be ignored that implementing a policy to decrease unemployment in a region will have an impact on decreasing unemployment in neighboring regions.

The fact that regional unemployment disparities have increasingly continued in Turkey in time indicates the failure of regional policies that have been implemented for years. The traditional regional development policies cannot be successful due to the following deficiencies (European Commission, 2012): i) they do not include a substantial analysis as regards the assets in the region, ii) they imitate the region with the best performance without regarding the current situation of the region, iii) they are not generally in compliance with economic and industrial texture of the region, iv) they do not have international and inter-regional perspectives and iv) they have a syndrome to support the winners (*i.e*. they have a thought to support a successful activity which is already successful in another region, without considering what the primary activity should be for the region to be supported).

The reasons above clearly show that new regional policies taking into consideration regional disparities and failures of traditional policies are required for Turkey. The new regional policies that encourage job creation and skill acquisition can lessen the problem. Policies aimed at reducing unemployment in Turkey are designed on the national level. Instead, policies at the regional level should be introduced. In this way, both unemployment and interregional differences can be reduced.

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