2023, 7 (1), 42-57

Uluslararası Ekonomi, İşletme ve Politika Dergisi

International Journal of Economics, Business and Politics

https://dergipark.org.tr/tr/pub/ueip

Determining the Effect of Foreign Trade On Employment in Turkey with Spatial Panel Data Analysis

Türkiye'de Dış Ticaretin İstihdam Üzerinde Etkisinin Mekânsal Panel Veri Analizi İle Belirlenmesi

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ARTICLE INFO

Article Type
Research Article

Keywords
Spatial Analysis
Maximum Likelihood
Foreign Trade
Employment

Received: Nov, 23, 2022
Accepted: Mar, 16, 2023

ABSTRACT

In this study, which examines the relationship between foreign trade and employment, which is directly proportional to economic growth, the aim is to investigate the effect of import and export on employment by including neighborhood relations. In the study, while the number of insured 4a, 4b and 4c in Turkey's 81 provinces is considered as employment variable, annual import, export and population values are also considered as independent variables and the period of 2009-2020 is examined. Using the spatial econometrics application, which also includes the effect of neighborhood relations, remarkable results were obtained in the study, which was examined under three headings: spatial Durbin, spatial autoregressive and spatial error model. Models were estimated using the Maximum Likelihood (ML) method. In the study, Moran's I index was calculated to examine the convergence in employment rates between provinces. According to the model results, it was determined that there is a significant inverse relationship between exports and employment. Population variable, on the other hand, was found to have a significant relationship in the same direction with employment. A significant effect of the import variable could not be determined. When the variables of neighboring provinces were examined, it was concluded that the variables of import and employment were significant.

MAKALE BİLGİSİ

Makale Türü
Araştırma Makalesi

Anahtar Kelimeler
Mekânsal Analiz
Maksimum Olabilirlik
Dış Ticaret
İstihdam

Geliş Tarihi: 23 Kasım 2022
Kabul Tarihi: 16 Mart 2023

ÖZ

Ekonomik büyüme ile doğru orantılı olan dış ticaret ve istihdam ilişkisinin incelendiği bu çalışmada, amaç istihdam üzerinde ithalat ve ihracat etkisini komşuluk ilişkilerinin dâhil edilerek araştırılmasıdır. Çalışmada, Türkiye 81 iline ait 4a, 4b ve 4c sigortalı sayısı istihdam değişkeni olarak ele alınırken yıllık ithalat, ihracat ve nüfus değerleri bağımsız değişken olarak kullanılmış ve 2009-2020 dönemi incelenmiştir. Komşuluk ilişkilerinin de etkisini dâhil eden mekânsal ekonometri uygulaması kullanılarak mekânsal Durbin, mekânsal gecikmeli ve mekânsal hata modeli olmak üzere üç başlık altında analizler yapılmıştır. Modeller Maksimum Olabilirlik (ML) yöntemi kullanılarak tahmin edilmiştir. Çalışmada iller arasındaki istihdam oranlarındaki yakınsamayı incelemek için Moran's I endeksi hesaplanmıştır. Mekânsal model sonuçlarına göre ihracatın istihdam ile ters yönde anlamlı bir ilişkisinin olduğu belirlenirken nüfus değişkeninin istihdam ile aynı yönde anlamlı bir ilişkiye sahip olduğu görülmüştür. İthalat değişkeninin istihdam üzerinde anlamlı bir etkisi tespit edilememiştir. Komşu illerin değişkenleri incelendiğinde ithalat ve istihdam değişkenlerinin anlamlı olduğu sonucuna ulaşılmıştır.

1. Introduction

The continuous increase in human wants and needs has made foreign trade necessary in modern times. Foreign trade is also expressed as the sum of imports and exports in the trade of goods and services between regions and countries. With foreign trade, countries export their existing resources and meet the needs of other countries. Factors such as excess supply within the country,

Atıf/Cite as: Elmalı, K. (2023). Determining the Effect of Foreign Trade On Employment in Turkey with Spatial Panel Data Analysis. *Uluslararası Ekonomi, İşletme ve Politika Dergisi,* 7(1), 42-57.

low-profit margins, inadequacies in domestic production, price and product differences between countries make foreign trade attractive. At this point, countries development levels, their social and economic structures, and their needs are among the reasons for foreign trade. For example, the Japanese economy is a production-oriented economy with a low consumption. In this case, they were exporting the access supply of Japan in the country. The situation is similar in other countries. In other words, while one of the countries that are a party to trade meets its needs, on the other hand, it receives an income from the goods, services, or capital it markets to this country (Ersungur, 2021:1335).

In this case, it means that countries stand out in the producing of different products and can find other markets to sell them. Thus, governments can create new employment areas to export. They can revitalize their economy with the goods and services they import to meet their needs, and they can increase the speed of development by meeting with technological innovations that they do not have. In line with this purpose, countries will increase the welfare level of societies with their foreign trade and ensure that they have better standards.

Increasing the current production amounts through foreign trade or producing and exporting goods that did not make before requiring more labor. The vitality of foreign trade in economies affects many economic elements differently. One of these factors is unemployment. At the same time, a decrease in unemployment positively affects employment. The increase in unemployment affects employment negatively. Thus, unemployment and employment are closely linked.

Every country wants to reach a whole employment level, but this is not an easy goal in countries that diversify and expand employment opportunities, economic and social improvements are observed with decreased unemployment. Foreign trade is an important area that increases employment. Foreign trade increases the income and profit of the countries by offering a broad market to the nations. The increase in income brings growth and unemployment is expected to decrease by creating new job opportunities with exports.

It is among the targets of developed and developing countries that employment does not become an essential macroeconomic problem. In this direction, an answer has been sought to the question of how the relationship between foreign trade and employment has taken its place among the subjects that have been researched for a long time. When the studies for Turkey are examined, it is seen that foreign trade, and employment are generally discussed at the national level (Erlat, 2000; Çütçü and Cenger, 2017; Gülmez, 2019).

This literature does not consider the unemployment effect of different regions. Only some studies have considered regional differences. It analyzed employment at the regional level in general (Gözgör and Pişkin, 2011; Tandoğan, 2019). However, none of them analyzed unemployment using the spatial panel data approach. Therefore, the importance of this article is to examine employment in Turkey by spatial panel data analysis, including regional differences.

The literature suggests that such inequalities and regional unemployment dynamics are better explained using a spatial panel of data (Burridge and Gordon, 1981; Johnson and Kneebone, 1991; Murphy, 1985; Partridge and Rickman, 1995; Taylor and Bradly, 1997). In addition, this technique allows for the examination of the effect of unemployment in a region on neighboring regions and testing whether there are clustering and spillover effects (Güçlü, 2017). In the creation phase of the study, took employment and foreign trade data for the years 2009-2020 at the provincial level were taken.

Spatial effects based on the neighborhood between provinces and regions were included in the created model, and made the analysis. For this reason, a study has been made for Turkey by considering the 2009-2020 periods over 81 provinces. After the second part, in which the

econometric model and model estimation method used in the study are explained, the main findings obtained from the application are presented in the third part. The study is completed with an evaluation.

2. Employment and Trade in Turkey

With technological developments and globalization in the world economy, employment and unemployment problems are gaining more importance daily. Considering that the production technique always develops in the direction of saving labor, it is seen that the employment of the labor supply that will arise from the population increase also causes the employee to remain an important issue (Gökçen, 2019: 1). These problems exist in developing countries as well as in all countries. In particular, an effective employment policy has become an indispensable prerequisite. The employment problem in our country is among the problems that need to be solved for years. Despite the agricultural sector, which has been made more attractive by the rapidly developing industry and state support, employment has not reached a sufficient level in the face of the rapidly increasing young population. Employment, which is a significant problem, especially for Turkey, which has a crowded and young people, is one of the problems that should be taken into account and that form the basis of economic problems.

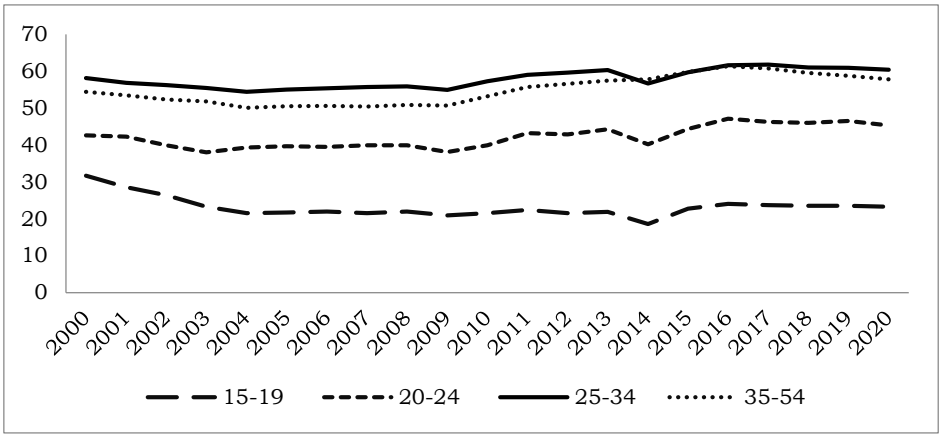
In this direction, the importance of active employment policies in the fight against unemployment has increased even more. Active employment policies, which play an important role in economic development by bringing the idle workforce to the labor market, have become an indispensable tool of social policy in terms of providing a solution to unemployment in today's economy, where demographic transformation is experienced (Erol, 2013:16).

Different employment policies have been implemented in Turkey after 2000. First of all, the support provided by Small and Medium-Sized Enterprises (SMEs) to employment was encouraged by the state by reducing taxes. On the other hand, emphasized active employment policies for women and youth. With the regulated laws, limitations on unfair dismissal and severance pay have been introduced. A "*Short-time working allowance fund*" for labor markets was created, and placed part-time jobs on a legal basis (Yeldan, 2010: 9).

The employment rate in Turkey for 2000-2020 is analyzed by age groups and presented in Graph 1. The reason for analysis in age groups is to see the change in employment. Accordingly, while the employment rate of the youth in the 15-19 age groups was 31.7% in 2000, this rate was 42.6% in the 20-24 age groups. While the employment rate for the 25-34 age groups is 58.1%, it is 54.40% for the 35-54 age groups. In 2009, the employment rate of young people between the ages of 15-19 showed a decreasing trend and declined to 21%. This rate is 38.1% in the same year's 20-24 age groups. The 25-34 age groups' employment rate displayed a decreasing graph with 54.9%. The 35-54 age groups' employment rate was 50.65 % (TURKSTAT, 2022b).

As can be seen from the graph, the problem of youth unemployment in Turkey appears at a higher rate. In particular, the difference between the employment rate of the youth aged 15-19 and the employment rate of the population over 35 is quite striking.

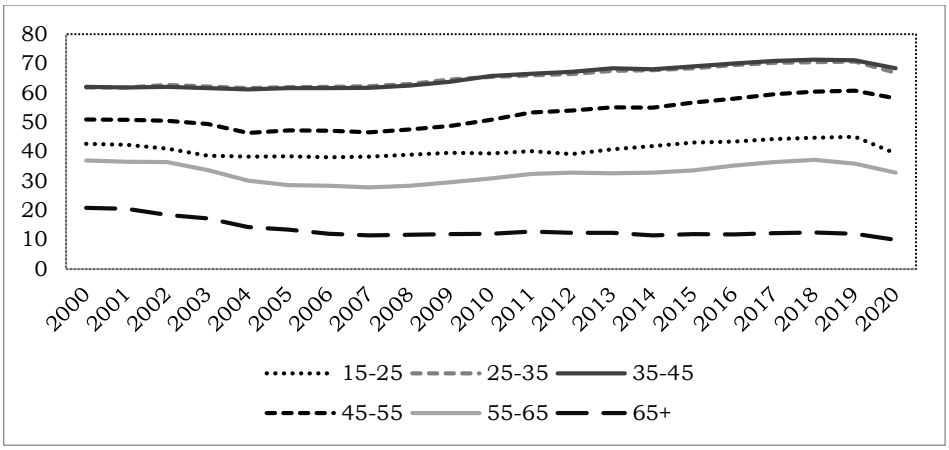
Graph 1: Employment Rate by Age Groups



Source: TURKSTAT 2022b.

Finally, the employment rate for 2020 was examined. The employment rate of young people aged 15-19 increased to 23.3 %. This rate is 45.3 % in the same year 20-24 age groups. The employment rate for the 25-34 age groups displayed an increasing graph with 60.4%. The employment rate for the 35-54 age group was 57.8 %.

Graph 2: Labor Force Participation Rate by Age Groups



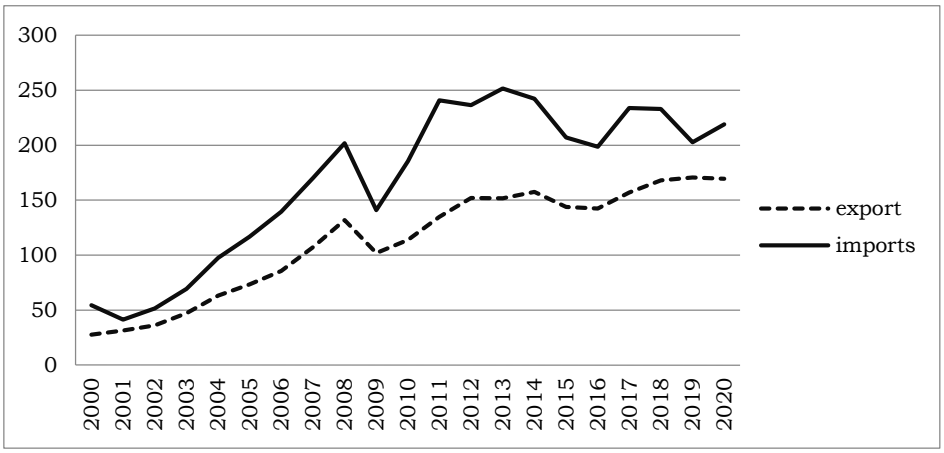
Source: TURKSTAT 2022b.

Foreign dependent exports and high foreign trade deficits explain the increase in employment rates and economic growth in Turkey after 2000. This growth resulting from unstable fluctuations needs to be improved to create permanent employment. In this case, more is needed for Turkey to have a young population and a good employment policy. Imports and exports should also support employment. In this direction, Turkey's export and import figures were examined and their distributions were discussed.

Having an export volume of 27 billion dollars in 2000, Turkey had an import volume of 54 billion dollars in the same year. There will need to be more for Turkey to have a young population and a good employment policy. Imports and exports must also support employment. In this direction, export and import figures were also examined and their distribution was discussed. Having an export volume of 27 billion dollars in 2000, Turkey had an import volume of 54 billion dollars in the same year.

The foreign trade deficit was approximately 27 billion dollars. The year with the lowest foreign trade deficit was realized in 2001, with a difference of 10 billion dollars. The debt crisis that started in the euro area in 2009 affected the trade between the European Union (EU) and the countries that have relations with the EU. With the global economic crisis, imports decreased by 30.3 percent to 140 billion dollars. While the foreign trade deficit decreased by 44.8 percent to 38 billion dollars, the ratio of exports to imports increased from 65.4 percent to 72.6 percent. The most important difference between imports and exports was realized in 2011 at 105 billion dollars (TURKSTAT, 2022a). In 2020 figures, Turkey's exports are nearly 170 billion dollars; imports are 219 billion dollars and exports to imports ratio is 77.3 %. Import and export values for Turkey for the years 2000-2020 are shared in Graph 3.

Graph 3: Turkey's Export and Import Figures (Million USD)



Source: TURKSTAT, 2022a.

3. Literature

For Turkey, foreign trade and employment have always been among the subjects that have been studied intensively. When the literature on foreign trade and employment is examined, Erlat (2000) for Turkey investigated the effects of the 1963-1994 period, and the export and import flows on manufacturing industry employment. As a result of the study, it has been obtained that trade plays a more important role in the change in employment with the export-based growth strategy that was implemented after 1980. Polat and Uslu (2010) investigated the effect of foreign trade on manufacturing industry employment by using quarterly manufacturing industry data for the period 1988:1-2007:3. In line with the findings, they obtained the results that foreign trade does not significantly affect employment in the long run but that both import and exports have a significant and positive impact on employment in the short run.

Gözgör and Pişkin (2011) examined the relationship between the annual unemployment rate data from 2004-2009 and Turkey's foreign trade for twenty-six regions. Fixed effect panel data and the Generalized Moments Method (GMM) were used in the model analysis. According to the findings obtained, in the determination of unemployment between regions, it has been determined that there is a same-sided relationship between the unemployment rate of the previous period and the unemployment rate of the said period.

Gülmez (2019) investigated the effect of foreign trade on employment by considering the 2003-2018 import, export, and employment data for Turkey. In the study, a two-way relationship was found between GDP and imports. On the other hand, Çütçü and Cenger (2017) investigated the

relationship between foreign trade and unemployment with structural break time series methods using monthly data for the period 2005: 01- 2017: 03 in Turkey. According to the application results It has been determined that there is no long-term relationship between the variables. As a result of the analysis, only a causal relationship from export to import has been determined.

Tandoğan (2019) examined the effect of exports on employment in Turkey on a regional basis. For this purpose, the annual 2005-2016 export and employment data of all sub-regions in Turkey Level 2 are discussed. The effect of exports on employment was investigated with the help of the panel data method. According to the findings, it has been determined that regional exports in Turkey positively affect regional employment.

When the studies on other countries are examined, Greenaway et al. (1999), on the other hand, investigated the effect of increasing exports and imports on labor demand by using dynamic panel data analysis by taking the British (1979-1991) period. Employment of one percent increase in exports is 3.8% in the short run; in the long term, they determined that it decreased by 4.71%. Fu and Balasubramadan (2005) examined the effect of increased exports on labor demand by considering the 1987-1998 periods in their study. The study using panel data analysis found that the increase in exports for the economy, in general, had positive effects on labor demand and employment. It has been determined that the increase in exports creates new business opportunities. A 1 % increase in exports increases employment by 0.17%.

Welsum and Reif (2006) investigated the relationship between foreign trade and employment for 14 OECD countries by taking the period 1996-2003 in their study. In the study in which Dynamic Panel data analysis was used, no significant negative relationship was found between service imports and employment. It was concluded that a one-unit increase in exports increased employment by 0.90 %.

Gül and Kamacı (2012) In this study, the effect of foreign trade on growth for developed and developing countries (respectively 1980 – 2010; 1993 – 2010 periods) was tested with panel data analysis. Panel Unit Root Tests were performed to test the stationarity of the received data. Then, The Pedroni cointegration test and Granger causality test were performed. No causal relationship was found between growth in imports and exports in developed and developing countries in the analysis. On the other hand, it has been observed that there is a causal relationship between imports and exports to growth in both developed and developing countries.

Ko, et al (2015) In its work, the Association of Southeast Asian Nations (ASEAN) 5 assesses the effects of international trade on employment levels. The period of 1991-2012 was discussed and panel data analysis was applied. The estimated results show that world exports of ASEAN5 from world market trade have a negative impact on employment, depending on the type of trade.

Yılmaz (2021) the study uses data spanning from 2001 to 2019 and variables such as employment, exports, economic growth, per unit labor costs, trade openness, financial openness, and unemployment payment rates. The findings reveal that the exports of 28 OECD countries are significant and have a negative significant effect on their employment. The economic growth, employment level of the previous period, trade openness, and exports has an impact on employment. While economic growth, trade openness, and previous employment levels have a positive effect on employment in the current period, exports have a negative effect on employment.

4. Research Method

4.1. Spatial Econometrics

Spatial econometrics is one of the sub-branches of econometrics and deals with the interpretation of the spatial effect in econometric models (Anselin, 1988: 8).

Known in geography as Tobler's (1979) law, "*Everything is related to something, but near things are more concerned with things far away*." expression is the basis of spatial dependence (Anselin and Bera, 1998: 240). The nature of dependence can be associated with location and distance, both in a geographical area and in a more general economic or social network area. The spatial lag operator is also used to incorporate spatial dependence into the econometric analysis.

A neighborhood matrix is needed to show the neighborhood relations between spaces in spatial econometrics. In addition, the spatial autocorrelation test, which provides foresight in determining the neighborhood relations between spaces, is performed (Elhorst, 2013: 1637).

According to Anselin and Hudak (1992), the spatial weight matrix, a feature of spatial econometrics denoted by W, is the expression of observations using the spatial arrangement. It is well known that in regional analysis, due to the existence of similarities between neighboring regions, they cannot be considered independently of each other (Anselin, 1988; Anselin and Bera, 1998: 237). In this case, neighborhood relations are included in the model with the help of a spatial weight matrix. The strength of the interaction between the row element i position of the spatial neighborhood matrix (W□) and the column element j position is indicated by the element w_{ij}.

The strength of the relationship between the observations is related to the spatial weight structure is expressed. It is obtained as $w_{ij} = 1$ if i and j positions are adjacent, and $w_{ij} = 0$ if they are not (Lesage, 1999: 11). The row standardized neighborhood matrix is called the spatial weight matrix ($w_{ij} = w_{ij}/\sum j\, w_{ij}$).The spatial neighborhood matrix that is symmetrical is not it turns into a structure (Viton, 2010: 5). These matrices are called rook, bishop, or queen, similar to chess definitions (Anselin, 1988: 8).

After the non-spatial linear regression model is established, the necessity of expanding the model with spatial effect is tested. The assumption that the observations are independent is not appropriate because of the spatial dependence between the error terms. Spatial dependence; It can be seen in two different structures as spatial delay dependence based on spatial correlation and spatial error dependence based on spatial correlation observed in the error term. Observing the relationship structure in different ways makes it easy to distinguish between spatial model specifications (Terzioğlu et al, 2020:603).

4.2. Spatial Autocorrelation

Spatial autocorrelation analysis is one of the methods in which the aggregation and dispersal levels of those with similar spatial distribution are analyzed.

This analysis, known as the Moran's-I index, is used to determine the linear relationship between an observation and the mean values of its neighbors, that is, to measure the correlation between an observation and its neighbors (Ward and Gleditsch, 2008:12). Accordingly, all observations in the analysis are interconnected. A change in one will spread to all the neighbors.

The spatial autocorrelation test for variables is a forward-defining step in determining the spatial relationship before the spatial econometrics model (Anselin, 2001:310). The level of attachment to the place is calculated by

$$I = \left(\frac{N}{\sum_i \sum_j w_{ij}}\right) \frac{\sum_i \sum_j w_{ij}(X_i - \bar{X})(X_j - \bar{X})}{\sum_i (X_i - \bar{X})^2} \qquad (1)$$

4.3. Spatial Regression Models

Spatial regression models, Spatial Autoregressive Model (SAR), Spatial Error Model (SEM), and Spatial Durbin Model (SDM), are examined under three headings.

4.3.1. Spatial Autoregressive Model

The spatial correlation of observations is handled by the endogenous spatial lag variable Wy in this model. Wy is used as an explanatory variable in the spatial econometric model to highlight the variation in the dependent variable across observations in the spatial sample. Spatial Autoregressive model for the random variable y at position *i;*

$$y = \rho Wy + X\beta + \varepsilon \quad (2)$$

is in the form. Where y is a vector of observations on the dependent variable, X is a N×K matrix of observations on explanatory variables, ε a vector of error terms, ρ the spatial autoregressive coefficient, and β a K×1 vector of regression coefficients (LeSage, 2008:19).

4.3.2. Spatial Error Model

The spatial error model examines the correlation between the remnants of adjacent regions and states that an excluded variable creates spatial dependence (Elhorst, 2014:5). Spatial error models for the random variable y at position i;

$$y = X\beta + \varepsilon \quad (3)$$

is in the form. Where y is a vector of observations on the dependent variable, X is a N×K explanatory variables matrix that may or may not include a constant term, ε a vector of error terms, λ the spatial error coefficient, and β a vector of regression coefficients (Ord, 1975:120). It shows the effect of the unit change in the independent variable at a certain location on the dependent variables at all locations (LeSage, 2008:19).

4.3.3. Spatial Durbin Model

A linear combination of the SEM and SAR respective data generating process leads to the spatial Durbin model (LeSage, 2008:46), which implements a spatially lagged dependent variable Wy as well as spatially lagged explanatory variables WX. Spatial Durbin model for the random variable y a position I

$$y = \rho Wy + X\beta + WX\theta + \varepsilon \quad (4)$$

is in the form. The WX variable expresses the external influence among the decision makers. Accordingly, the dependent variable in the i position is affected by the independent variables in the j position (Elhorst, 2014:5).

It can be investigated by the Wald test whether the spatial Durbin model should be reduced to the spatial autoregressive or spatial error model. To this end, the null hypotheses that can be created for the spatial Durbin model are:

$H_0: \theta = 0$ and $H_0: \theta + \rho\beta = 0$

If both hypotheses are rejected at the specified significance level, the spatial Durbin model is estimated, and the model does not need to be reduced. If the first hypothesis $(H_0: \theta = 0)$ cannot be rejected, the spatial Durbin model is reduced to the spatial autoregressive model. On the other hand, if the second hypothesis $(H_0: \theta + \rho\beta = 0)$ cannot be rejected, the spatial Durbin model is reduced to the spatial error model (Elhorst, 2014:5).

Tests that are used to reveal spatial error and autoregressive dependency together are referred to as one-way tests. It is used to test a single specification under the assumption that the residual of the model is in the correct specification (Bera and Yoon, 1993:649).

5. Data and Empirical Results

Statistical data on foreign trade are calculated in two different systems general and special in the trade system. In the general trading system, while the goods entering and leaving the country's economic area are handled, Goods located in free zones, customs warehouses, and free circulation areas are added to the calculations. In the private trade system, while customs warehouses and free zones are not included in the statistics, they cover the goods in the free circulation area (https://data.tuik.gov.tr/Bulten).

Empirical analyzes were made for annual data for the period 2009-2020. All data or 81 provinces were obtained from the Turkish Statistical Institute (TURKSTAT-Foreign Trade Statistics Database and Workforce Statistics Database- Address-Based Population Registration System Results) and Social Security Institution (SSI). In the study, the employment variable is included as the dependent variable. In the model, there are import, export and population variables as independent variables. The harmony between the variables was observed by taking the logarithmic values of the variables in the model.

Employment figures for Turkey were obtained from the social security institution. The employment level of the provinces was represented by considering the sum of insurance records classified as 4A, 4B, and 4C in the Social Security Institution. 4A, 4B, and 4C are insurance systems that enable people who are Turkish citizens and involved in working life to benefit from social security. The scope of the 4A system is people who work on a contractual basis in a private workplace. Persons registered in the 4B system are those who practice their own profession, that is, those who work independently. Tradesmen (business owners), craftsmen, or self-employed groups can be included in the 4B system. Finally, the 4C system covers permanent employees serving as civil servants (www.sigortam.net). The descriptive statistics of the data set of the variables are presented below.

The descriptive statistics of 972 data, consisting of employment, import, and export values for the period of 2009-2020 of Turkey's 81 provinces covering the 12-year period, are calculated and presented in Table 1. When the variables were examined, it was determined that they had a similar mean. The maximum value of import and export values has been obtained very close. There were differences between the variables between the min values.

Table1: Descriptive Statistics

Variable	Obs	Mean	Std. Dev	Min	Max
Export	972	11.883	2.536	0	18.302
Import	972	11.481	2.704	-1.114	18.799
Employment	972	11.681	1.026	9.514	15.547
Population	972	13.227	0.946	11.217	16.557

GeoDa and Stata 15 programs were used in the analysis of the model. Spatial analysis application and econometrics application was examined under three headings. Models were estimated using the Maximum Likelihood (ML) method. In the study, primarily Moran's-I index values for employment data were examined. The data obtained are presented in Table 2. There was no great difference between the years according to the calculated Morans'I index values.

Table 2: Moran's-I Index Values by Years

Year	Index	Year	Index
2009	0.267	2015	0.234
2010	0.255	2016	0.236
2011	0.251	2017	0.221
2012	0.236	2018	0.218
2013	0.242	2019	0.224
2014	0.244	2020	0.216

If the obtained value approaches +1, there is a positive correlation. There is spatial clustering of high or low values with their surroundings. If it approaches -1, the distribution has a negatively correlates with randomness in space. According to Moran's-I analysis results, probe values were determined below the 0.05 significance level. It has been reached that it is meaningful

In the Hausman test, the hypotheses are established as follows,

H_0: There is a random effect

H_1: There is no random effect

According to the Hausman test result applied to decide whether the model is random or fixed,

Spatial Durbin Model for;$(\chi^2 = 80.84 \;\; p = 0.000)$

Spatial Autoregressive Model for; $(\chi^2 = 225.81 \;\; p = 0.000)$.

Spatial Error Model for; $(\chi^2 = 135.37 \;\; p = 0.000)$

has been obtained. It was seen that the fixed effect estimation method gave more effective results in the spatial model application. The spatial models are calculated with the fixed effect, and the model prediction results are shown in Table 3. While the neighborhood effect of the import variable, which is one of the variables discussed in the study, is expressed with Wx (imp); the neighborhood effect of the export variable is represented by Wx (exp). The neighborhood effect of employment and population variables in the model is expressed in the table with Wx (emp) and Wx (pop).

Table 3: Spatial Panel Model Estimation Results in 2009-2020

Variables	SDM	SAR	SEM
Wx(*emp*)	0.8336*** (0.000)	0.8467*** (0.000)	
Export	-0.0110*** (0.000)	-0.0120*** (0.024)	-0.0090*** (0.000)
Import	0.0020 (0.329)	0.0040** (0.058)	-0.0019 (0.337)
Pop	0.5881*** (0.000)	0.5721*** (0.000)	0.5342*** (0.000)
Wx (exp)	-0.0008 (0.986)		
Wx (imp)	0.0199*** (0.000)		
Wx (pop)	-0.0448 (0.530)		
Wxε			1.0321*** (0.000)
Chi2(4)	0.0017	0.0017	0.0016
Prob>Chi2	0.000	0.000	0.000
Wald		24.57 (0.000)	99.63 (0.000)

Note: Values in [ ] represent the P-value; *, **, *** symbols mean statistically significant at 1%, 5%, and 10% significance levels, respectively.

In line with the results obtained to determine whether the model is a spatial Durbin, spatial Autoregressive, or spatial error model, the Wald test was applied to the hypotheses $H_0: \theta = 0$ and $H_0: \theta + \rho\beta = 0$. Testing is carried out on these hypotheses. According to these test results, probe values of SAR and SEM models are presented in Table 3. At the determined α significance level (0.05), both hypotheses were rejected and it was determined that the spatial Durbin model was suitable for model estimation.

In the study, firstly when the spatial Durbin model is considered. According to the results obtained, while the export and population variables were significant in the Spatial Durbin model, the import variable could not be determined as significant. It has been determined that a 1% increase in the export rate in a region will cause a 0.011% change in the employment rate of that province in the opposite direction. As a result of the researches, the negative relationship between exports and employment is among the results discussed. However, it is seen in many studies that this situation occurs depending on the macro-economic characteristics of the countries. As Aksöz-Yılmaz (2021) stated in their study, the inverse relationship between exports and employment is the result of different policies and practices in the labor market of countries. It was concluded that the increase in the population of the region increased employment. It has been determined that a 1% increase in the population rate in a region will cause a 0.58% change in the employment rate of that province in the same direction.

When the variables of neighboring provinces were examined, it was concluded that the import and employment variables were significant. It has been determined that the 1% change in the employment of neighboring provinces will increase the employment of the said province by 0.83%.

For the spatial autoregressive model, it was determined that the population, import and export rates of the province in question have a significant effect on employment. All three variables were determined to be significant. Export variable was found to be significant in the opposite direction as in SDM. Similarly, in the spatial error model, it was found that exports were significant in the opposite direction, while imports did not affect employment.

LeSage and Pace (2009) state that it would be wrong to directly interpret the coefficients obtained from spatial models. For this, a partial derivative approach is proposed. This method can be calculated as direct, indirect and total effects. Direct effects refer to the effect of an explanatory variable in the region in question on its dependent variable. Indirect effects refer to the effect of the explanatory variable in the region in question on the dependent variable of neighboring regions. The total effect refers to the sum of the two effects.

Spatial regression models take advantage of the complex structure of dependencies that exists between units. The effect changing the explanatory variable for a particular unit will affect the unit itself and its potential. All other units will be indirectly affected. Except for the SEM model, it means that the indirect and total marginal effects calculated using these effects exist directly. The command automatically separates short- and long-term marginal effects when a dynamic spatial model is appropriate.

Direct and indirect effects were estimated for the Spatial Durbin Model and the Spatial Autoregressive Model, which are thought to provide effective model estimation and presented in Table 4. According to the findings, the existence of direct and indirect effects of exports on employment in the short term has been determined. It has been found that this effect is in the opposite direction. In the SAR dynamic model, it was determined that imports do not have a significant effect on employment. For SDM, it has been determined that exports have an indirect effect on employment. In this case, it means that explanatory variables affect regional

unemployment directly and indirectly (Greenaway, 1999:485; Jenkins, 2004:13). The population variable was found to be significant for both models in the short run.

Table 4: Direct and Indirect Effect

Variables		SDM	SAR
Wx(emp)		0.3225*** (0.000)	0.3043*** (0.000)
Wx(emp) L1		0.9630*** (0.000)	0.7189*** (0.000)
Export		-0.0079*** (0.000)	-0.0114*** (0.012)
Import		-0.0003 (0.859)	0.0011 (0.604)
Pop		0.4702*** (0.000)	0.3549*** (0.000)
Wx (exp)		0.0191*** (0.000)	
Wx (imp)		0.0103** (0.025)	
W x (pop)		-0.6745*** (0.000)	
Chi2(4)		0.0015	0.0016
Prob>Chi2		0.000	0.000
Direct Effect	**Exp**	-0.0067*** (0.001)	-0.0117*** (0.000)
	Imp	0.0006 (0.753)	0.0013 (0.512)
	Pop	0.4287*** (0.000)	0.3623*** (0.000)
Indirect Effect	**Exp**	0.0232*** (0.000)	-0.0047*** (0.000)
	Imp	0.0146** (0.023)	0.0005 (0.534)
	Pop	-0.7317*** (0.000)	0.1481*** (0.061)
Total Effect	**Exp**	0.0164** (0.033)	-0.0165*** (0.013)
	Imp	0.0152** (0.037)	0.0019 (0.517)
	Pop	-0.3030*** (0.006)	0.5105*** (0.000)

Note: Values in [ ] represent the P-value; *, **, *** symbols mean statistically significant at 1%, 5%, and 10% significance levels, respectively.

6. Conclusion

One of the main goals that countries want to achieve is improving the employment rate because the positive indicators in the employment rate indicate that the country's economies are also positive. Considering the employment data for Turkey, the desired figures have not been reached yet. Many studies have been conducted investigating the leading causes of unemployment in this direction. However, very little work has been done at the provincial level.

The study examines the relationship between employment and foreign trade. Which is directly proportional to economic growth? The data from 81 provinces of Turkey has been examined by considering the period from 2009 to 2020. The neighborhood mentioned above of the provinces is included in the model using the bishop border neighborhood matrix. Spatial econometrics application; remarkable results were obtained in the study which was examined under three headings, Spatial Autoregressive, Spatial Error and Spatial Durbin Model.

In the study, firstly, the Moran's-I index was calculated to examine the employment rates between provinces. The effect of foreign trade on employment was examined by applying three different models. Then, dynamic spatial effects were investigated, and short-term effects were determined. Analysis results were evaluated according to the findings obtained. In the study, it was determined that the export figures of the province had a significant effect on employment, while imports did not have a significant effect on employment. The negative relationship between exports and employment, as mentioned before, is due to the macro-economic characteristics of the countries. This is also supported by the liberalization of trade. Although the increase in exports resulting from this process improves competitiveness, the export sector experiences significant decreases in employment, especially in unskilled labor. The decline in employment reflects the restructuring of production to increase labor productivity of exporting firms. On the other hand, the re-production of production among exporting sectors. Restructuring and adoption of new technology increase the demand for skilled labor. With the skilled labor demand of the exporting sectors, export growth is achieved and unskilled employment does not occur (Edwards, 2004:45).

When the variables of neighboring provinces were examined, it was concluded that the import and employment variables were significant. It was determined that the change that will occur in the import and employment of the regions located in the neighborhood of a province affects the employment of that province positively.

Considering the study results, it is seen that the relationship between employment and trade is very important. It has been seen that the right policies to be applied in any province will similarly affect the surrounding provinces. As stated in the TURKSTAT 2021 report, the region with the highest unemployment rate was 33.5% (Mardin, Batman, Şırnak, Siirt), while the region with the lowest unemployment rate was 6.6% (Kastamonu, Çankırı, Sinop) this case (TURKSTAT, News Release-37484). It showed that the eastern and southeastern provinces of Turkey had the highest unemployment rates. To provide development in these regions, a focal province can be identified, and aimed to reduce unemployment with appropriate policies. These policies should be aimed at increasing human capital. Considering the demographic characteristics of Turkey, it is known that migration from rural to urban has increased.

It is observed that the population in rural areas especially those engaged in agriculture, has moved to urban areas. That is, to the industry and service sector, his process is one of the main factors that increase regional unemployment rates. Şahin et al. (2021) showed in their studies that the positive effect of increasing employment opportunities in cities in Turkey to reduce the unemployment rate decreases with migration from rural to urban areas. In another saying; the increase in employment opportunities in the city accelerates the migration from rural to urban and this migration creates an increasing effect on urban unemployment.

To reduce these transitions, development programs should be prepared to consider regional characteristics. Appropriate grants and loan payments should be provided to individuals engaged in agriculture in rural areas. Policymakers should implement policies that promote job creation.

Statement of Support and Appreciation: No external support has been received during the conduct of this study.
Researchers' Contribution Rate Statement: The research was conducted by a single author.
Conflict of Interest Statement: I don't have any conflict of interest declaration as the author of the study.
Research and Publication Ethics Statement: All the rules stated in the "Higher Education Institutions Scientific Research and Publication Ethics Directive" were strictly considered at every stage of this research. None of the actions specified under the heading "Actions Against Scientific Research and Publication Ethics" of the directive has not been carried out. During the writing process of this study, the citations were made in accordance with the ethical rules and a bibliography was created. The study was subjected to plagiarism control.

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