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The Effect of Unemployment and Urbanization on Migration in Turkey: An Evaluation in terms of the Harris-Todaro Model

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Türkiye'de İşsizlik ve Kentleşmenin Göç Üzerindeki Etkisi: Harris-Todaro Modeli Açısından Bir Değerlendirme

Abstract

This study tested whether there was a relationship between migration, unemployment, and urbanization based on the Harris-Todaro model in 12 regions of Turkey, which were formed according to NUTS-1 classification, in the period between 2008 and 2019. For this purpose, panel data methods that consider cross-section dependency were used in the study. As a result of the analysis, it was concluded that the Harris-Todaro model was valid in TR1, TR2, TR3, TR4, TR5, and TR6 regions. In TR7, TR8, TR9, TRA, TRB, and TRC regions, it was found that the Harris-Todaro model was not valid.

Keywords : Migration, Unemployment, Urbanization, The Harris-Todaro Model.

JEL Classification Codes : J61, J64, R10, O18, C23.

Öz

Bu çalışmada, Düzey 1 sınıflandırmasına göre Türkiye'nin 12 bölgesinde 2008-2019 döneminde Harris-Todaro modelinin geçerli olup olmadığı test edilmiştir. Bu amaçla çalışmada, yatay kesit bağımlılığını dikkate alan panel veri yöntemleri kullanılmıştır. Analiz sonucunda, TR1, TR2, TR3, TR4, TR5 ve TR6 bölgelerinde Harris-Todaro modelinin geçerli olduğu sonucuna ulaşılmıştır. TR7, TR8, TR9, TRA, TRB ve TRC bölgelerinde Harris-Todaro modeli geçerli değildir.

Anahtar Sözcükler : Göç, İşsizlik, Kentleşme, Harris- Todaro Modeli.

1. Introduction

Migration is generally defined as a permanent or semi-permanent change of residence due to urbanisation, industrialisation, and economic development (Lee, 1966: 49). Also, migration is a process that causes an increase in the number of cities and the growth rate of cities and creates a division of labour and specialisation and causes urban-specific changes in people's behaviour and relationships (Keles, 1972: 6).

Although migration has many aspects, such as economic, cultural, psychological, and legal, the economic dimensions of migration were investigated in our study. The economic dimensions of migration can be discussed mainly through urbanisation and unemployment rates. This discussion focuses on whether urban wages and rural wages differ. Migration from rural areas to urban areas is expected to increase when the urban salary is more than the rural wage. If the rural salary is more than the urban wage, the migration from rural to urban is expected to decrease. In this case, also known as Harris-Todaro (1970), migration from rural to urban continues as long as the urban wage is higher than the rural wage.

Migration in Turkey has been a phenomenon from rural to urban areas issue since the 1950s, and the rural population ratio has shown a continuous decrease within the total population. The rural population ratio that constituted 75% of the country's population back in 1950 was 56.1% in 1980 and fell to 41.1% in 1990 (Yılmaz, 2015: 163-64). The gap between the rural and urban populations got wider in years. According to TURKSTAT data, the ratio of the urban population in the total population was 64.9%, whereas the rural population ratio fell back to 35.1% in 2000. According to Address Based Population Registration System (ABPRS), the ratio of rural population was 25.04% in 2008, 8.65% in 2013, 8.25% in 2014, 7.9% in 2015, 7.7% in 2016, 7.49% in 2017, 7.73% in 2018, and 7.22% in 2019. On the other hand, the urban population was 74.96% in 2008, and this rate went up to 92.78% in 2019[1].

This study tested whether there was a relationship between migration, the urbanisation rate, and the unemployment rate according to the Nomenclature of Territorial Units for Statistics (NUTS-1) between 2008-2019 in Turkey. In this context, it can be commented on the causes of migration in these regions by determining which regions receive migration (or send migration). Therefore, it can be determined whether the increase in urban unemployment was caused by internal migration or other reasons. This determination allows policymakers to view different aspects of unemployment and urbanisation when implementing unemployment and migration policies. In this context, it is essential to accurately determine the causality relationship between migration, unemployment, and urbanisation for rural development and increase living standards in urban areas. Also, the accurate determination of the relationship among these variables can make it easier for policymakers to achieve their goals about policies that will be implemented to reduce

[1] *The main reason of the difference between 2008 and 2013 was the division changes in the Municipal Law according to law number 5747 and 6360.*

regional inequalities. Therefore, for Turkey and countries with intense migration movements like Turkey, this study provides essential information to policymakers about regional development, improved living standards, and reduced regional inequalities.

The main aim of this study is to determine whether there is a relationship between migration, unemployment rate, and urbanisation rate at the regional level in Turkey. In this context, we will try to determine the migration dynamics based on the Harris-Todaro model at the regional level. Also, it will be determined whether all these twelve regions receive or send migration, and the reasons for receiving and giving migration will be designated. Moreover, we will try to determine whether the migration occurs in each of the twelve regions from urban-to-urban or from rural to urban.

The possible contributions of this study to the literature are as follows: (I) This study is the first study to examine the migration dynamics based on the Harris-Todaro (1970) model in Turkey according to the NUTS-1 classification. (II) It is crucial to investigate the causes of migration in Turkey at the regional level for researching the problems and possible solutions about migration. This study also covers all regions of Turkey. Thus, this study is expected to guide policy authorities such as central and local authorities in Turkey and set an example for countries experiencing similar migration problems. (III) In the study, econometric methods that consider cross-section dependency were used. In the literature, the causes of migration are mostly estimated by traditional econometrics methods such as panel fixed effect, random effect, panel VAR, time-series VAR, Granger causality, and Johansen co-integration test. These methods do not take into account cross-section dependency. Therefore, the results of these methods can be biased.

2. Literature Review

2.1. Theoretical Literature Review

Although many definitions have been made in the literature on migration, studies on the theoretical basis of migration can be examined under two approaches. The first approach of the cost-benefit approach defends that individuals migrate when their costs surpass their benefits. This approach is interpreted differently from classical and neo-classical perspectives. Schultz (1961) and Sjaastad (1962), known as pioneers of the classical view, analysed migration with the concept of human capital. Besides, they stated that the utilities of migration and costs include personal and social factors and have monetary and non-monetary components. Todaro (1971) and Harris &Todaro (1970) are regarded as pioneers of the Neo-classical perspective. Todaro (1971) emphasised the social and economic inequalities and concluded that the reasons for migration between regions and countries were originated from socio-economic inequality.

On the other hand, Harris & Todaro (1970) investigated migration to cities in developing countries. They stated that the main reason for migration was better wages and employment opportunities in urban areas than in rural areas. The second approach that explains the phenomenon of migration is the approach of push-pull factors. Push factors can

force people to leave their homes and are related to the country from which a person migrates. Push factors include poverty, rapid population growth, "primitive" or "poor" living conditions, desertification, famines/droughts, fear of political persecution, inadequate healthcare, loss of wealth, and similar factors (Aydemir & Sahin, 2018: 120). Pull factors, which attract people to a specific location, are the opposite of push factors. Typical examples of pull factors are more job opportunities and better living conditions, easy availability of land for settling and agriculture, political or religious freedom, superior education system and level of welfare, better transportation and communication facilities, better healthcare system, stress-free environment, and security (Lee, 1966: 49-54). Lee (1966) and Ravenstein (1985), who are the pioneers of this approach, emphasise that the primary sources of migration are insufficiency in economic opportunities and social areas such as education, health, and transportation.

Theoretical studies in the literature are primarily based on the Harris-Todaro model. In the works of Brueckner (1990) and Brueckner & Zenou (1999), they argue that the Harris-Todaro model is a model where rural and urban migration equalise expected wages. Besides, they state that the escalation in urban land rents is an element that should not be ignored. They emphasise that the increase in urban land rents in developing countries is an additional factor limiting migration size. The most striking result of this modified model, which defends the validity of the Harris-Todaro model, is the limitation to the additional migration from the countryside by escalating land prices. The reason is that despite the chance to find a formal job, land rental increases reduce the expected benefit of immigrants. In another study supporting the Harris-Todaro model, Brueckner & Zenou (1999) defended that the increase in formal employment did not cause the expansion of the informal sector in the urban economy. This situation originates that the rise in informal employment is not large enough to offset the first increase in formal employment. Escalation of urban land rent, which Brueckner and Zenou (1999) added to the Harris-Todaro model, and the impact of the expected utility model on migration balance may be ambiguous. However, land price increases can play an essential role in the migration balancing process, especially in developing countries, by increasing urban living costs. Brueckner & Kim (2001) evaluated the part of land rent increase within the scope of urban living costs in balancing the rural-urban migration process. The authors also emphasise that, while making the immigrants' migration decision, the transition between formal and informal employment is made considering the expected wages. Also, they defend that the Harris -Todaro condition equates to the real income between the urban and the rural areas in developing countries.

2.2. Empirical Literature Review

The literature shows that the relationship between migration movements and unemployment is mostly reviewed in terms of international and country scale. In the empirical literature, national and international studies focusing on migration and unemployment within the scope of migration from rural to urban areas are very limited. Although migration and immigration have different dynamics, national and international

literature focusing on the relationship between unemployment and migration types is included.

In the literature, independent from the Harris-Todaro (1970) model, some studies applied econometric models examining the relationship between international migration and unemployment. Jean & Jimenez (2007) investigated the effects of migration on unemployment between 1984-2003 in eighteen OECD countries. They applied the Generalised Method of Moments (GMM). As a result of the research, it was concluded that migration has no permanent effect on unemployment, even in the short term. Heid a& Larch (2012) analysed the relationship between migration and unemployment using dynamic panel data methods in their study between 1997-2007 for 24 OECD countries. As a result of the analysis, it was determined that migration negatively affected the average unemployment rate in the countries. Boubtane et al. (2013) examined the relationship between migration, unemployment, and economic growth between 1980-2005 in twenty-two OECD countries using GMM and Granger causality methods. As a result of the analysis, the authors concluded that unemployment negatively affected migration only in Portugal, and migration did not cause unemployment in other countries. Chuikina & Fard (2012) investigated whether the migration rate was effective on the unemployment rate between 1997-2011 in the United Kingdom (U.K.) and Sweden by multiple regression methods. The study's findings showed that the migration rate did not significantly impact the unemployment rate of England and Sweden. Fromentin (2013) investigated the relationship between migration and unemployment in France by using the co-integration and vector error correction model (VECM) between 1970 and 2008. The analysis results showed no observed increase in total unemployment due to migration in the long term. It was also concluded that migration negatively affected unemployment quickly but positively affected wages.

In the national literature, in Altunc et al. (2017) study, the relationship among immigration, economic growth, inflation, and unemployment rates in Turkey was analysed using Granger causality tests. According to the study's findings, while a bilateral causality relationship between immigration and economic growth, no indications of causality were found between unemployment and inflation. Ceritoglu et al. (2017) estimated the effect of immigration from Syria on the workforce of Turkey using DID (Difference-in-difference) method for nine regions of NUTS 2 (located in East and South-eastern Anatolia) for the period between 2010-2013. The findings obtained from the study showed that immigration from Syria had increased the registered employment and unemployment rates in the 9 NUTS 2 region. Also, it was seen that the contribution of the local population to the workforce, unregistered work, and the ability to find a job were all receded. Aksu et al. (2018) studied the effects of mass immigration from Syria on the workforce in Turkey using the data of the 2004-2015 period for overall NUTS 2 (26 regions) regions. The 2SLS (Two-Stage Least Squares) results show that immigration from Syria does not negatively affect total male employment in Turkey but creates a negative effect on female work. Köseoğlu & Artan (2020) tested the relationship among migration, unemployment, and GDP between 2000 and 2016 using a panel data analysis method for 27 OECD countries. The study's findings

showed that the unemployment rate has a negative effect on migration. It was concluded that a 1% increase in the employment rate decreases migration at 0.3% in OECD countries.

In the international literature, Tripathi & Kaur (2017) investigated the determinants of rural migration in India. They tested the relationship between migration, employment, unemployment, and consumption in 2001 in the 51 major cities of India using the OLS method. As a result of the analysis, the authors concluded that rural migration had a negative impact on employment and unemployment at the urban level. Zeng & Xia (2016) investigated the relationship between urbanisation and services sector employment using SVAR (Structural vector autoregressive) model and the Granger causality test between 1978-2013 in China. The study's findings showed that employment in the services sector was not a Granger cause of urbanisation. Also, in national literature, some studies analyse the relationship between migration and unemployment within the country. To illustrate, Celik & Arslan (2018) studied the relationship between migration and unemployment using the 2014-2016 data of NUTS 2 (26 regions) regions of Turkey. The results of the study in which Spearman correlation analysis was used showed a strong positive relationship between migration and general unemployment for the region overall.

Sancar & Akbas (2020), in their studies, analysed the relationship between net migration rate and unemployment between 2008 and 2018 using panel data method for 26 Level 2 regions and regions overall. The study's findings showed that an increase in net migration rate in the short term in TR21, TR41, and TR42 Level 2 regions of Marmara leads to a decrease in the employment rate. In the TRA1 and TRA2 Level 2 regions of eastern Anatolia, unemployment rises the higher the migration rate. The migration towards the TRC2 Level 2 region of the South-eastern Anatolian region increases this unemployment. When migration occurs in TR61 and TR62 Level 2 regions of the Mediterranean Region, the unemployment rate also rises. All over the Level 2 regions of Aegean, Central Anatolian, and Blacksea regions, no relationship was found between migration and unemployment variables in the short term. The overall Marmara, Mediterranean, Blacksea, East Anatolia, and Southeastern Anatolia showed that migration increases unemployment in the short term.

Aktas & Sahin (2019) studied the validity of the Harris-Todaro migration model using the Vector Autoregression (VAR) model within the scope of migration movements from rural areas towards urban areas between 1970 and 2014 in Turkey. The result of the study revealed that the Harris-Todaro model could explain the migration movements within Turkey. Using the panel data method, Evin et al. (2020) attempted to determine the relationship between urbanisation and migration between 2008-2019 in 12 regions in Turkey created according to Level 1 classification. The study results showed that in Level 1 regions of Southeastern Anatolia, Istanbul, Western Marmara, Eastern Marmara, Western Anatolia, Mediterranean, Western Blacksea and Easter Blacksea there is a statistically significant positive relationship between urbanisation and migration. The relationship between urbanisation and Northeastern Anatolia, Central-Eastern Anatolia, and Aegean was insignificant.

Aydın & Levent (2021), in their study, focused on the socio-economic factors of migration between 2008 and 2018 for Level 1 regions of Turkey using panel data analysis. The study's findings showed a long-term positive relationship among unemployment, education level, and migration rate. An increase in the level of unemployment leads to a 1.80 increase in migration.

There are differences in the empirical studies that focus on migration and unemployment in terms of country/countries, period, and econometric method used. With this respect, some studies could not find the relationship between migration and unemployment (Jimenez, 2007; Chuikina & Fard, 2012; Fromentin, 2013; Altunc et al., 2017), that could find a negative relationship (Ceritoglu et al. 2017; Esposito et al., 2019; Tripathi & Kaur, 2017; Köseoğlu & Artan, 2020), and that could obtain a positive relationship (Heid & Larch, 2012; Celik & Arslan, 2018; Aydın & Levent, 2021) between the variables. While studies reveal the positive relationship between migration and the unemployment rate within this scope, some studies claim a negative relationship. In addition to this, the results obtained from a limited number of studies on the subregional scale in Turkey show differences in the relationship between unemployment and migration or urbanisation at a regional scale (Sancar & Akbas, 2020; Evin et al., 2020). In the literature, no other study that focuses on the relationship between migration, unemployment, and urbanisation using the Harris-Todaro model and that makes inferences at Level 1 regional scale could be found. In the national literature, the study of Aktas & Sahin (2019) only tested the Harris-Todaro model on Turkey overall scale. This study is thought to have contributed to the literature thanks to the fact that the study, being the first study, to test migration, urbanisation, and unemployment phenomenon using Harris-Todaro model and at Level 1 regional scale.

3. Model Specification

The model used in this study is based on the Harris-Todaro (1970) migration model. The Harris-Todaro model investigates the migration process of employees in the economic system, which consists of 2 sectors called the rural and urban sectors[2].

A Cobb-Douglas production function can describe the production process of the rural sector:

$$Y_r = A_r N_r^{\varphi} \tag{1}$$

[2] *Since the industrial sector is intense in the urban area, the urban sector represents the industrial sector in the urban area. In addition, the agricultural sector is intense in a rural area. Therefore, the rural sector was used to represent the agricultural sector in the rural area.*

Where Y_r is the production level of the rural sector, N_r is the number of workers used in the rural sector. $A_r>0$ and $0<\varphi<1$ are parametric constants.

Similarly, the urban sector can also be described as a Cobb-Douglas production function as follows:

$$Y_u = A_u N_u^{\alpha} \tag{2}$$

Where Y_u is the production level of the urban sector, N_u is the number of workers employed in the production of the urban sector. $A_u > 0$ and $0<\alpha<1$ are parametric constants.

The primary hypothesis of the Harris-Todaro model is that immigrants react mainly to earnings differentials, economic incentives, and the probability of getting a job to influence the migration decision. In other words, it is posited in this model that migration from rural to urban will occur as long as the urban expected wage exceeds the rural wage. It can be deduced from this crucial assumption of the Harris-Todaro model that the migratory dynamics lead the economic system toward an equilibrium with urban concentration and high urban unemployment (Espindola et al., 2006: 603). In this model, the equilibrium condition can be provided with the following equation:

$$w_u^e = w_r = 0 \tag{3}$$

Where w_u^e and w_r represent the expected urban wage and rural wage, respectively. w_u^e can be expressed as follows:

$$w_u^e = \frac{N_m}{N_u} w_m \tag{4}$$

Where N_m represents the population working in a sector in the urban area and N_u represents the total urban population. Hence, $\frac{N_m}{N_u}$ is an estimate of the probability that a worker living in the urban will find work in the urban sector. w_m means minimum wages in the urban area. Also, w_m is assumed fixed institutionally at a level above equilibrium in this labour market, so w_m can be written as follows:

$$w_m = \alpha A_m N_m^{\alpha-1}, \text{ such that } N_m \leq N_u \tag{5}$$

While the urban wage is calculated in this way, the rural wage can be expressed as follows:

$$w_r = \varphi A_\alpha N_\alpha^{\varphi-1} p \tag{6}$$

In equation (6), *p* is the price of the rural sector. Also, w_r is perfectly flexible and equal to the marginal productivity of the labour market. Therefore, the model assumes full employment in the rural sector. Thereby, urban unemployment is taken into account when the unemployment rate is calculated for the model.

Equation (3), known in the literature as the Harris-Todaro condition, implies that long-term equilibrium will be achieved when the expected urban wage reaches the level where it will be equal to rural salary. Therefore, in $w_u^e > w_r$, migration from rural areas to urban areas is expected to occur, while in the case of $w_u^e < w_r$, migration from urban areas to rural areas is expected to occur. If the urban wage converges to the rural wage, migration between the rural and urban areas will likely remain constant; it will not change (Espindola et al., 2006).

Harris and Todaro (1970) argue that the differential of expected wages in equation (3) can be a constant value ($\delta \neq 0$). When this differential reach (δ), the net migration ceases. This generalised Harris-Todaro condition can be expressed as follows:

$$w_u^e - w_r = \delta \tag{7}$$

The following equation is obtained if equations 4 and 6 are written into equation 7.

$$\frac{N_m}{N_u} w_m - \varphi\rho A_\alpha^{1-\eta} A_m^{\frac{\eta}{1-\alpha}} \left(\frac{\alpha}{w_m} \right)^{\frac{\alpha\eta}{1-\alpha}} X \frac{1}{\left(N - N_u\right)^{1-\varphi+\varphi\eta}} = \delta \tag{8}$$

Where $0 < \varphi < 1$, $\rho > 0$, $A_m > 0$, $\eta > 0$ and $0 < \alpha < 1$ are parametric constants.

Equations 7 and 8 state the relationship between the urban population and migration. We can deduce from these equations that the urban population positively affects the net migration rate. Therefore, the urbanisation rate is expected to increase the net migration rate. If there is no change in the urbanisation rate, the net migration rate is expected to remain stationary. There is a unidirectional causal relationship between the unemployment rate and

the Harris-Todaro model's migration rate. Individuals who have been unemployed for a long time due to the increase in the unemployment rate are expected to migrate to more economically favourable places. This event lowers the net migration rate, as this will cause emigration (Chaudhuri, 2000: 353-354). Due to these relationships between urbanisation rate, unemployment rate, and migration rate, the Harris-Todaro model can be modified in econometric form as follows:

$$NMR_{it} = a_i - b_1 UER_{it} + b_2 UR_{it} + u_{it} \quad (9)$$

NMR represents the net migration rate, and the U.R. and UER represent the urbanisation rate and urban unemployment rate. According to Equation 9, the unemployment rate and the urbanisation rate coefficients are negative and positive, respectively. According to this result, if there is an increase in the unemployment rate, the net migration rate in that region decreases; that region sends migration. Also, if the urbanisation rate increases in an area, the net migration rate increases in that region. That is, that region receives migration.

4. Data[3] and Methodology

In this study, based on the Harris-Todaro model, we investigated a relationship between net migration, unemployment, and urbanisation rate between 2008-2019 in 12 regions of Turkey. We used the data from 12 regions[4] that were determined according to the NUTS[5] in the study. The net migration rate represented the internal migration rate (NMR). We used the urban unemployment rate to proxy (UER). A number of people per kilometre square (U.R.), which is also used by the United Nations (United Nations, 2019), was used in the study to represent the urbanisation rate. We used annual data in the study. Also, the data of NMR and UER are proportional (%). The data were obtained from the website of the Turkish Statistical Institute (TURKSTAT). We preferred the data according to their availability in the database. For the analysis, panel data methods that considered cross-section dependency and homogeneity were used.

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[3] *According to the official data of the Directorate General of Migration Management of the Republic of Turkey <https://multeciler.org.tr/turkiyedeki-suriyeli-sayisi/> in 2020, there are 4 million people in total living in Turkey under Temporary Protected Status after the ongoing civil war that started in 2011 (3.6 million people from Syrians and 400 thousand people from other nations). TURKSTAT pays attention to individuals' conditions in a household in terms of job, migration, and urbanization, not to individuals' nationalities, while preparing data regarding migration and unemployment. Therefore, in this study, the data regarding the Turkish citizens and the data for individuals under Temporary Protected Status were used.*

[4] *TRA: North-eastern Anatolia, TRB: Central East Anatolia, TRC: South-eastern Anatolia, TR1: İstanbul, TR2: Western Marmara, TR3: Aegean, TR4: Eastern Marmara, TR5: Western Anatolia, TR6: Mediterranean, TR7: Central Anatolia, TR8: Western Black Sea, TR9: Eastern Black Sea.*

[5] *Nomenclature D'unités Territoriales Statistiques (NUTS).*

4.1. Panel Unit Root Test

Pesaran (2006) prepared the panel unit root test that considers the correlation between cross-section units. This test, derived from the IPS test, called for the cross-sectionally IPS (CIPS) test. The CIPS test calculates the stationarity of all units forming the panel. It does not calculate the stationarity of each unit in the panel. Therefore, this test does not allow for heterogeneity.

The CIPS test statistic can be calculated as follows:

$$\overline{CADF} = CIPS = \frac{\sum_{i=1}^{N} t_i}{N} \tag{10}$$

Where N indicates the number of observations, t is time, and i is the number of units. In the CIPS test, the null hypothesis expresses that all countries forming the panel have included unit root, while the alternative hypothesis states that whole countries are stationary. (Akbas et al., 2012: 356).

4.2. Panel Co-integration Test

Westerlund (2008) developed a test known as the Durbin-Hausman (D.H.) test, which can be used both in cross-sectional dependency and when the stationarity of the series is different. Thereby, the D.H. test allows for the stability ranks of the independent variables to be different. In other words, the D.H. test allows the series has a different order of stationarity. Common factors are taken into account in this test. Westerlund did not model the D.H. test on the assumption of cross-section dependency.

On the other hand, Monte Carlo simulations show that the power of the D.H. test is high even when there is a cross-sectional dependency in the model (Akbas et al., 2013: 797). D.H. test has two statistics. The group statistic obtains the results under heterogeneity, while the panel statistic estimates under homogeneity (Westerlund, 2008: 203). According to Table A1, it is concluded that all of the models are homogenous. Therefore, we preferred the panel statistic in this study for analysis.

The hypothesis of the panel statistics are as follows:

$H_0 : \phi_i = 1$ No co-integration for all i

$H_0 : \phi_i < 1$ Co-integration for all i

The DH test can be calculated as follows:

$$DH_g = \sum_{i=1}^{n} \hat{S}_i \left(\hat{\phi} - \tilde{\phi}\right)^2 \sum_{t=2}^{T} \hat{e}_{it-1} \tag{11}$$

$$DH_p = \hat{S}_n = \left(\hat{\phi} - \tilde{\phi}\right)^2 \sum_{i=1}^{n} \sum_{t=2}^{T} \hat{e}_{it-1} \tag{12}$$

Where $\hat{\phi}$ is the OLS estimator of ϕ, $\tilde{\phi}$ is the Instrumental Variable estimator of ϕ. DH_p states the panel statistic, while DH_g expresses the group statistics.

4.3. CUP-FM OLS Estimator

Bai & Kao (2006) proposed the panel co-integration test takes cross-section dependency and endogeneity into consideration. This test assumes that the units forming the panel are homogeneous. Thereby, this test does not allow the co-integration relationship to differ from cross-section to cross-section. Besides, the limit distribution of the fully modified estimator for cointegrating panel coefficients is derived. Bai & Kao (2006) developed a continuous, updated, fully modified (CUP-FM) estimator based on these assumptions. Monte Carlo results indicate that the CUP-FM estimator's size and power are big enough even in the small sample properties. Moreover, the CUP-FM OLS estimator allows the variables to be I (1) or I (0).

Standard panel regression analysis is as follows:

$$y_{it} = \alpha_{it} + \beta x_{it} + e_{it},\ i = 1,....,N,\ t = 1,.....,T \tag{13}$$

Where y_{it} is 1 × 1, β is a 1 × k vector of the slope parameters, α_{it} is the intercept, and e_{it} is the stationary regression error. It is assumed that x_{it} is a k × 1 integrated process of order one for all i, where

$$x_{it} = x_{it-1} + \varepsilon_{it}$$

Under these specifications, equation (13) describes a system of cointegrated regressions, i.e., y_{it} is cointegrated with x_{it}.

To model the cross-section dependency, it is presumed that the error term, e_{it}, follows a factor model (e.g., Bai & Ng, 2006: 1142):

$$e_{it} = \lambda_i^{'} F_t + u_{it}$$

Where F_t is a r × 1 vector of common factors, λ_i is a r × 1 vector of factor loadings, and u_{it} is the idiosyncratic component of e_{it}.

After these assumptions, the CUP-FM estimator can be described. Before identifying the CUP-FM estimator, defining the feasible F.M. estimator is necessary.

$$\hat{\beta}_{FM} = \left[\sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{y}_{it}^{+} \left(x_{it} - \overline{x}_i \right)' - T \left(\hat{\lambda}_i' \hat{\Delta}_{F\varepsilon i}^{+} + \hat{\Delta}_{u\varepsilon i}^{+} \right) \right) \right]$$

$$\left[\sum_{i=1}^{N} \sum_{t=1}^{T} \left(x_{it} - \overline{x}_i \right)' \right]^{-1} \tag{14}$$

Where $\hat{y}_{it}^{+} = y_{it} - \left(\hat{\lambda}_i \Omega_{F\varepsilon i} + \hat{\Omega}_{u\varepsilon i} \right) \hat{\Omega}_{\varepsilon i}^{-1} \Delta x_{it} . \hat{\lambda}_i$ is the corresponding matrix of the estimated factor loadings.

Following the Feasible FM estimator, CUP-FM can be obtained as follows:

$$\hat{\beta}_{CUP} = \left[\sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{y}_{it}^{+} \left(\hat{\beta}_{CUP} \right) \left(x_{it} - \overline{x}_i \right)' - T \left(\hat{\lambda}_i' \left(\hat{\beta}_{CUP} \right) \hat{\Delta}_{F\varepsilon i}^{+} \left(\hat{\beta}_{CUP} \right) \right) \right) \right]$$

$$\left[\sum_{i=1}^{N} \sum_{t=1}^{T} \left(x_{it} - \overline{x}_{it} \right) \left(x_{it} - \overline{x}_i \right)' \right]^{-1} \tag{15}$$

In this test, it is assumed that the number of factors, r, is known. Bai and Ng (2006) indicated that the number of factors could be found by minimising the following:

$$IC(k) = \log\left(V\left(k \right) \right) + k \left(\frac{N+T}{NT} \right) \log\left(\frac{NT}{N+T} \right) \tag{16}$$

After these calculations, t-statistic can be obtained as follows:

$$t_j = \frac{\sqrt{N} T \left(\hat{\beta}_{jFM} - \beta_0 \right)}{s_j} \text{ , } N(0,1) \tag{20}$$

5. Empirical Findings

This study used panel data methods to determine whether the Harris-Todaro model is valid in Turkey. Before using panel data methods, whether cross-sectional dependency and homogeneity in the data set should be determined. Different panel data methods are used

depending on the problems of cross-section dependency and homogeneity situations. Therefore, identify whether there are econometric problems such as cross-section dependency and homogeneity in the data set. Table A1 shows the results of the cross-sectional dependency and homogeneity tests. According to these results, the null hypothesis of no cross-sectional dependence is rejected for all regions' net migration rate, unemployment rate, and urbanisation rate in CD tests. There is a cross-sectional dependency problem for three variables in each of the 12 regions.

Moreover, the results of Delta tests analysing the homogeneity under the null hypothesis show that each of the 12 regions has a homogeneous structure. As a result, TR1, TR2, TR3, TR4, TR5, TR6, TR7, TR8, TR9, TRA, TRB, and TRC regions include cross-sectional dependency, and these regions have a homogeneous structure. The fact that there is a cross-sectional dependency problem in any region shows that a shock in one of these regions may also affect other cities forming the region. That is to say, an immediate change of unemployment or urbanisation rate in any of these regions may influence the other cities in the region. The results of Delta tests confirm the homogeneity of regions that prove the consistency of NUTS-1 classification. The homogeneous regions indicate that the cities have similar structures regarding migration, unemployment, and urbanisation.

After cross-sectional dependency and homogeneity are tested, we can apply the panel data analysis. In panel data analysis, stationarity and co-integration should be tested at first to estimate the model because these tests are preliminary analyses. Since there is a cross-sectional dependency problem in NUTS-1 regions and these 12 regions have a homogeneous structure, methods that consider cross-sectional dependency and assume homogeneity were used.

Unit root test was performed initially to test the Harris-Todaro model's validity. The panel unit root test results are shown in Table 1.

Table: 1
The Results of CIPS Panel Unit Root Test

Variables			
Regions	NMR	UER	UR
TR1	-0.8085	-3.3791	-3.0720
TR2	-1.289	-1.596	-3.0882
TR3	-3.3871	-1.2362	-0.7797
TR4	-2.0612	-1.2175	-1.9927
TR5	-1.7197	-3.3535	-1.7847
TR6	-3.3674	-2.1431	-1.4696
TR7	-2.6759	-1.6104	-2.8529
TR8	-0.2249	-2.2434	-1.9117
TR9	-1.5895	-1.6847	-1.7661
TRA	-0.5708	-2.3511	0.1295
TRB	-1.5895	-1.6616	-2.6007
TRC	-1.9549	-1.7327	-0.4308

Note: The critical values for the CIPS test were obtained from Pesaran (2007), Table II(b) Case II.

According to Table 1, the assumption that a unit root under the null hypothesis cannot be rejected in 12 regions for all three variables. According to this, the migration rate,

unemployment rate, and urbanisation variables include unit root in these 12 regions. Therefore, the migration, unemployment, and urbanisation rates are not stationary in each of the 12 regions. Therefore, when there is an instantaneous change in migration, unemployment, and urbanisation in any of these 12 regions, this shock cannot return to the pre-shock period by itself in the long term. In this case, external intervention is necessary to eliminate this shock. Therefore, the migration, unemployment, and urbanisation rate in these 12 regions can be affected by government policies. With this respect, policy implementation such as development policies against inequalities among regions, programs for fighting against unemployment, and urbanisation policies can affect migration.

Following the unit root test, we used the co-integration test to determine whether there is a relationship between migration, unemployment, and urbanisation in the long term. The results of the co-integration test are indicated in Table 2.

Table: 2
Panel Co-Integration Test Results

Dependent variable: NMR	t-stat	
Regions	DHg	DHp
TR1	3.845	6.3089***
TR2	9.500	12.944***
TR3	3.010	9.286***
TR4	0.313	3.153***
TR5	1.701	2.707***
TR6	2.831	2.679***
TR7	0.647	5.762***
TR8	10.876	9.768***
TR9	2.445	6.230***
TRA	1.465	0.453
TRB	9.083	7.687***
TRC	3.952	-1.329

*Note: ***, **, * determine significance at 1%, 5%, and 10% level respectively.*

According to the co-integration test results, the null hypothesis states that no co-integration is rejected for all regions except TRA and TRC. According to this, there is a long-term relationship between migration, unemployment, and urbanisation rate in these ten regions. With this respect, changes in unemployment and urbanisation for each of the ten regions can affect the cities' migration rate forming these ten regions. Thus, the precautions and the policy implementations for urbanisation and fighting against unemployment by the central authority or local administrations can affect the migration rate in these regions.

After testing whether there is a long-term relationship between migration, unemployment, and urbanisation, we can estimate the validity of the Harris-Todaro model. The estimation results of this model are shown in Table 3.

Table: 3
The Results of CUP-FM OLS Estimator

Regions	CUP-FM-OLS			
	UER		UR	
	Coefficient	St.Error	Coefficient	St.Error
TR1	-0.5845***	0.8363***	0.1974	0.253
TR2	-7.300***	109.56***	0.795	30.96
TR3	-0.638***	13.699**	0.178	6.567
TR4	-0.190**	2.865***	0.079	0.987
TR5	-3.276***	2.639***	0.698	0.881
TR6	-0.919**	9.596**	0.349	4.438
TR7	-0.756	632.6***	0.506	59.039
TR8	-0.428	1.596	0.334	1.126
TR9	-0.973	0.10483	0.8023	0.9767
TRA	0.511	9.624	0.687	68.96
TRB	0.336	44.25	0.215	30.11
TRC	-0.047	2.891	0.106	2.010

*Note: ***, **, * determine significance at 1%, 5%, and 10% level respectively.*

According to the results in Table 3, the unemployment rate in the TR1 region is statistically significant and negative (-0.5845). Also, the urbanisation rate is statistically significant and positive (0.10483). This result may result from the price level index being too high in the TR1 region. According to a report by TURKSTAT in 2017, Istanbul, which is the largest urban in Turkey in terms of population, has the highest price level index in Turkey. Therefore, the cost of living in the TR1 region is exceptionally high. It isn't easy to live in the TR1 region for individuals who cannot find any job. Hence, individuals prefer to return to their hometowns when they cannot find a job in the TR1 region. We can explain the relationship between the net migration rate and the unemployment rate in this way. The fact that the urbanisation rate coefficient is positive indicates a positive relationship between urbanisation and net migration rates. As the urbanisation rate rises, the net migration rate grows as well. In other words, as the urbanisation rate increases, the TR1 region receives migration while the urbanisation decreases, the TR1 region sends migration.

Moreover, the central population and the total district population of the TR1 region have increased for a long time. That is, there is an increase in the urban population[6] of the TR1 region. Besides, the population growth rate in the TR1 region is higher than the average of Turkey. Also, the TR1 region is among the regions receiving migration in Turkey. The TR1 region has a high population growth rate and a high net migration growth rate, indicating that migration originates mainly from urban-to-urban. The Harris-Todaro model is valid in the TR1 region according to these results.

The results for TR2 indicate that the unemployment rate and urbanisation rate in the TR2 region are statistically significant. Results show that an increase in the unemployment rate in the TR2 region leads to a decrease in the net migration rate. An increase in the unemployment rate leads the TR2 region to send migration. Also, the urbanisation rate coefficient has a positive sign indicating that an increase in the urbanisation rate increases

[6] *See <https://www.tuik.gov.tr/Home/Index> (TURKSTAT) for detailed information about population, migration and urbanization of the twelve regions included in the NUTS 1 classification.*

the net migration rate. That is, the TR2 region receives migration as the urbanisation rate increases. The external economies hypothesis can explain the rise of the urbanisation rate in the TR2 region. According to External Economies Hypothesis (Marshall, 1890; Pigou, 1956; Markusen, 1996), industry concentration in a region increases industrial activities and populations in regions close to this region. TR1 (Istanbul) and TR4 (Bursa, İzmit) regions, neighbouring TR2 regions, are where the industry sector is concentrated. Therefore, the growth of the population and thus increasing urbanisation in the TR2 region can originate that the industrial sector is focused on TR1 and T.R. 4 regions. The urban population grows in connection with industrial activities increasing. It can be expected to see an increase in the urbanisation rate for the TR2 region, similar to this situation.

On the other hand, the urbanisation rate's increase may also result from increased migration. Also, the central population and the total district population of the TR2 region show an increase. That is, there is an increase in the urban population of the TR2 region. Besides, the population growth rate in the TR2 region is higher than the average of Turkey. These conditions show that the population growth in the TR2 region does not originate from migration from rural to urban. Besides, the TR2 region is among the regions receiving migration in Turkey. The TR2 region has a high population growth rate and a high net migration growth rate, indicating that migration originates mainly from urban-to-urban. The Harris-Todaro model is valid for the TR2 region according to these results.

The relationship between migration, unemployment, and urbanisation in the TR3 region is similar to the results in the TR2 region. The unemployment rate and the urbanisation rate are statistically significant. Coefficients are -0.63 and 13.70 for unemployment and urbanisation, respectively. Accordingly, when there are an increase in the unemployment rate, the net migration rate decreases. As the unemployment in the TR3 region increases, this region sends migration. The cities in the TR3 region (İzmir, Aydın, Manisa) are where the industry sector is intensive in Turkey. Also, the TR3 region is a region receiving migration. The difference between the urban and rural populations in the TR3 region did not change significantly between 2015 and 2019. While the rural population rate is 5% and the urban population rate was 95% in 2015, these rates were still approximately valid in 2019. These results show that unemployment causes giving migration in the TR3 region.

The fact that the population growth rate is over the average of Turkey and the rural and urban population rates didn't show significant differences show that migration is not from rural to urban but from the urban-to-urban pattern. The statistically significant and positive coefficient of urbanisation indicates that the migration rate increases as the urbanisation rate increases. This condition shows that rapid urbanisation in the TR3 region leads to the fact that this region receives migration. TR3 region is among regions where industrialisation is high, and the population growth rate is over the average of Turkey, just like TR4 and TR1 regions. The TR3 region is also more developed in terms of socio-economic structure from the other nine regions except for TR4 and TR1. This condition is one of the pull factors that make the TR3 region attractive. Hence, this region is exposed to

the flow of migration both as a requirement of industrialisation and since it is more developed than other regions in terms of socio-economy. These results indicate that migration originates mainly from urban-to-urban in the TR3 region. The Harris-Todaro model is also valid in the TR3 region, according to these results.

The unemployment rate and urbanisation rate are statistically significant in the TR4 region. According to these results, there is a negative relationship between the unemployment rate and the migration rate. As the unemployment rate increases, the net migration rate decreases. As unemployment increases, the TR4 region sends migration or vice versa. Also, there is a positive relationship between the urbanisation rate and the net migration rate. As the urbanisation rate increases, the TR4 region receives migration. The Harris-Todaro model is valid in the TR4 region according to these results. The fact that similar results were obtained with TR1, TR2, and TR3 regions originates from the fact that these regions show a great deal of similarity in socio-economy. Economic activities, mainly the industry sector, and social opportunities in these four regions (TR1, TR2, TR3, and TR4) are more developed than in other regions.

When the TR5 region is assessed, it is shown that the unemployment rate and the urbanisation rate are statistically significant. According to this result, when there is an increase in the unemployment rate, the TR5 region sends migration. The cities that include the TR5 region are Ankara and Konya. The industry sector in Konya is intensive. Ankara has an intense bureaucracy due to being the capital of Turkey. The industry sector in Ankara is less developed than in İstanbul and İzmir. Therefore, the economy of the TR5 region is less developed than TR1, TR2, TR3, and TR4 regions. Thus, employment possibilities in the TR5 region are less than in these regions.

Besides, in the report published by TURKSTAT in 2017, Ankara is in the third-order following Istanbul and İzmir in terms of an urban price index. Both the fact that industrialisation's intensity in Ankara is less than the cities in the first four regions and the high price index may lead individuals to migrate because the cost of living is heightened when they are unemployed. However, the TR5 region has received migration for a long time. Besides, a negative relationship between the unemployment rate and net migration rate in the TR5 region indicates that this region has a higher amount of receiving migration than giving migration. Also, the positive relationship between the urbanisation rate and the net migration rate in the TR5 region reveals that an increase in the urbanisation rate leads to migration towards this region. As a result, Ankara has an intense bureaucracy that has a significant effect. The population growth rate in the TR5 region is higher than the average of Turkey. In addition to this, the urban population of the TR5 region showed a partial increase while the rural population showed a partial decrease in years. This result indicates that the population growth in the TR5 region is partially from rural areas to urban areas, but mainly the migration is originated from other cities and regions. Therefore, the migration in the TR5 region is both rural and urban-based. These results show that the Harris-Todaro model is valid in the TR5 region.

In the TR6 region, Table 3 shows that the unemployment rate is statistically significant and negative (-0.919). This result shows similarity with the TR1, TR2, TR3, TR4, and TR5 regions. The similarity of this result with the results of these five regions is originated from the fact that industrialisation is high in the TR6 region. Also, the urbanisation rate is statistically significant and positive (9.596). Therefore, the migration rate increases as the urbanisation rate increases in the TR6 region. TR6 region comprises the cities of Antalya, Adana, Mersin, and Hatay. The industry, agriculture, and tourism sectors are developed in these cities, which increases employment possibilities. In this region, while Antalya and Mersin are receiving migration, Adana and Hatay are giving migration. However, the TR6 region generally received migration in 2019. The fact that there is a negative relationship between the unemployment rate and net migration rate can be explained because the tourism sector affects the labour market seasonally. When the tourism sector is intensive, the unemployment rate decreases because the employment possibilities are high. This condition leads to the receiving migration of this urban. During seasons when tourism activities are low, employment possibilities fall. This case leads to giving migration. Also, the population growth rate in the TR6 region did not show significant changes.

Additionally, the urban and rural population has not changed significantly after 2013. Therefore, it can be understood that the migration TR6 region receives is not from rural to urban but from urban to urban. The Harris-Todaro model is valid in the TR6 region according to these results.

For the TR7 region, only the urbanisation rate is statistically significant and positive. This result shows that the TR7 region receives migration as the urbanisation rate increases. The TR7 is a region giving migration, and the population growth rate is decreasing slowly. In addition to this, the urban population rate of the TR7 region shows a partial increase over the years, while the rural population rate shows a decrease. The urban population rate of the TR7 region increases, although TR7 is a migration giving region, which indicates that the TR7 region receives migration from rural to urban. According to these results, only the urbanisation rate affects the net migration rate in the TR7 region. Therefore, the Harris-Todaro model is not valid for the TR7 region.

The unemployment and urbanisation rates in the TR8, TR9, TRA, and TRB regions are insignificant. The TR8 region is a migration giving region. Also, the population growth rate is negative in this region. That is, the population in the TR8 region has decreased since 2010. Additionally, the population in the rural area decreases over the years, while the urban population increases. This condition shows that the TR8 region gives migration from rural areas to urban centres and other regions. These results show that the Harris-Todaro model is not valid in these regions.

TR9, TRA, and TRB regions also show similar results with the TR8 region. These three regions show similarity with TR8 in terms of demographics. Accordingly, in these three regions, the rural area population decreases in years while the urban population increases. This result indicates that the TR9, TRA and TRB regions give migration from

rural areas to urban centres and other regions. Also, rural areas are not developed sufficiently since the geographical conditions are unfavourable for industry and agriculture investments in these regions. This situation limits employment, especially in rural areas. In these three regions, geographical conditions are more favorable than rural areas in urban areas, which may reverse the relationship between migration, unemployment, population, and, consequently, urbanisation. Even though there is a significant relationship between migration, unemployment, and urbanisation in urban areas, there is no meaningful relationship between these variables in rural areas that may cause the relationship between these three variables to be insignificant throughout TR9, TRA, and TRB regions.

Finally, Table 3 indicates that the unemployment rate in the TRC region is statistically significant and negative. According to this result, the net migration rate decreases as unemployment in the TRC region increases. This region gives migration as the unemployment rate in the TRC region increases. The TRC is an emigrating region. Moreover, the population growth rate in the TRC region has gradually decreased, and while the urban population increases, the rural population decreases. This condition shows that the migration in the TRC region occurs from rural areas to urban areas. Besides, since the TRC region is a migration giving region, migration from the urban to the urban or the other regions occurs. Similarly, the urbanisation rate does not have a significant effect on migration. According to these results, the Harris-Todaro model is not valid in the TRC region.

6. Results and Discussion

This study tested whether the Harris-Todaro model was valid between 2008 and 2019 in 12 regions determined according to the NUTS-1 classification. We used panel data methods considering cross-section dependency to analyse the Harris-Todaro model. As a result of the analysis concluded that the Harris-Todaro model was valid in TR1, TR2, TR3, TR4, TR5, and TR6 regions. These findings obtained from the study shows that the Harris-Todaro model is also valid for the regions under discussion, as in parallel to the results obtained by Aktaş & Şahin (2019) for Turkey overall. In addition, in the study in which Aydın & Levent (2021) analysed the socio-economic effects of migration, it was concluded that Level 1 regions send migration when there is an overall unemployment increase. Meanwhile, the study's positive bilateral relationship between urbanisation and migration in TR1, TR2, TR3, TR4, TR5, and TR6 regions were also found in Evin et al. (2020) study for TR1, TR2, TR4, and TR5 regions. On the other hand, we concluded that the Harris-Todaro model was not valid in TR7, TR8, TR9, TRA, TRB, and TRC regions.

According to these results, the Harris-Todaro model is valid in socio-economically developed regions in Turkey. On the other hand, this model is not valid in TR7, TR8, TR9, TRA, TRB, and TRC regions less developed socio-economically than TR1, TR2, TR3, TR4, TR5, and TR6 regions. According to these results, it is understood that the Harris-Todaro model is valid in socially and financially developed regions in Turkey.

In addition to the fact that regions where the Harris-Todaro model is not valid, are less developed than regions where this model is valid, the rural population is more intense than the urban population in regions where the model is not valid. In these six regions where the Harris-Todaro model is valid, the policies implemented to encourage urban employment can increase migration from rural to urban areas and cause more significant migration, unemployment, and urbanisation problems. However, the rural development policy implementations by policy authorities for TR7, TR8, TR9, TRA, TRB, and TRC regions may help the development of these regions and cause a reverse migration from TR1, TR2, TR3, TR4, TR5, and TR6 regions to rural areas. Thus, the people living in TR1, TR2, TR3, TR4, TR5, and TR6 may have a chance to benefit from infrastructure investments such as education, health, and clean water in a better way. Moreover, the migration of individuals with no job or low living standards to rural areas from TR1, TR2, TR3, TR4, TR5, and TR6 regions where the population is dense may help decrease unemployment in these six regions. Thus, rural development policies are important in effectively and efficiently using Turkey's sources.

Regional conditions should be taken into consideration while implementing rural development policies. For example, in TRA, TRB, and TRC regions, the security problem is felt more intensively than in other areas due to terror actions. This situation has forced the individuals to migrate from these three regions to other regions for a long time. Therefore, if the policy authorities implement policies that can make these three regions more secure in terms of terror, these regions may grow faster. Also, taking the migration from these regions towards regions that are socio-economically more developed under control can only be possible by practising financial development and social development policies that complement each other simultaneously. Region-specific spatial dimensions should be considered when social and economic policies to solve migration and unemployment problems are implemented in TRA, TRB, and TRC regions. In planning and executing the social policies by considering regional dynamics, the target should be increasing employment. Areas like poverty, education, health, and social security, targeted to be developed in terms of social development, are sectors open for growth in these regions.

In TR7, TR8, and TR9 regions, where the Harris-Todaro model is not valid, economic activities cannot develop since geographical conditions are unfavourable for investment. Thus, improving transportation infrastructure conditions like roads, railways, and airlines is of great importance in TR8 and TR9 regions so that rural development policies can succeed. Both geographical conditions and low population growth lead to a lack of new employment areas in these regions. Apart from that, there is severe socio-economic disequilibrium between rural and urban areas in the TR8 and TR9 regions.

While implementing policies regarding employment and urbanisation, apart from regional conditions, taking the living conditions of individuals from other nations into consideration is of capital importance, starting from Syrians under Temporary Protected Status (TPS). According to the Directorate General of Migration Management of the Republic of Turkey, most Syrians will live in Istanbul, Hatay, Gaziantep, Kilis, and Mardin

in 2020. Therefore, the TR1, the TRC1, and the TR2 are the regions where most Syrian populations live. Since employment possibilities in the TR1 region are higher than in the other regions, it is realised that Syrians prefer living in this region. Also, it is thought that individuals under Temporary Protected Status prefer living in TRC1 and TRC2 regions since these regions are near to Syria. According to these results, while the relationship between migration, unemployment, and urbanisation in Turkey is investigated, Syrian people, who constitute a significant majority of individuals from other nations under Temporary Protected Status, play an essential role. Thus, to test the validity of the Harris-Todaro model in a healthy manner in Turkey, it is necessary to determine why Syrians migrate and employment conditions and shelter conditions. Syrians' religion, language, traditions, and cultures who have migrated to Turkey show similarity with Turkish citizens. Also, civil war has been going on in Syria since 2011. Because of these reasons, it is expected that Syrians will settle in Turkey permanently. Therefore, policy authorities should carry out diplomatic activities to facilitate the Syrian's return to their homeland and implement policy measures to enable Syrians' participation in the labour market who cannot return to their homeland. One of the most critical steps to ensure Syrians' integration into the labour market is to create the skill profile of the immigrant labour force. Moreover, immigrants should be provided with Turkish language courses to eliminate the language deficiencies they encounter in the labour market. Such practices can stabilise the migration activities of Syrians' by integrating them into the labour market.

It is also possible that the Syrian emigration that is expected to be permanent has a circular migration movement in years due to cultural, historical, religious connections, and geographical proximity, all of which were aforementioned. Within the scope of this probability, whether fixed programs designed for circular migration or flexible practices will be preferred is a significant topic that policymakers should decide. Provided that circular migration is practised in regular programs, practices regarding the limitation of workers and sectors can be opted for. An alternative policy preference can be a natural and evolving one rather than circular migration being practised regularly. However, our country would be more rational to practice regular programs rather than liberating the circular migration movement. This policy recommendation seems to be inevitable in terms of solving the possible problems in the workforce market.

On the other hand, one of the most significant steps to be taken to integrate both Syrian refugees and migrating population from rural areas to urban workforce market is to activate thew workforce programs. Within the scope of active workforce programs, compulsory labour training for those who migrate from rural areas to access the workforce market must be the first step to be taken. Furthermore, aids for job seeking, counselling on job and profession, utility programs must be provided for migrants. Also, to alleviate the negative effects of migration in Turkey, non-agricultural employment facilities must be created in rural and less industrialised regions. Providing the rural areas with social and economic conditions that will decrease the off-putting of such areas will minimise the negative effects of migration on the workforce market and urbanisation.

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Appendix

Table: A1
The Results of Cross-section Dependency and Homogeneity Tests

Regions	CD_{LM1}			CD_{LM2}			Delta	Delta_tilde
	NMR	UER	UR	NMR	UER	UR		
TR1: Istanbul	0.000	0.000	0.000	0.001	0.001	0.001	0.562	0.575
TR2: Western Marmara	0.010	0.163	0.018	0.012	0.044	0.026	0.500	0.500
TR3: Egean	0.000	0.000	0.000	0.001	0.001	0.001	0.835	0.879
TR4: Eastern Marmara	0.000	0.000	0.000	0.001	0.001	0.001	0.269	0.229
TR5: Western Anatolia	0.000	0.008	0.098	0.027	0.012	0.009	0.676	0.709
TR6: Mediterranean	0.000	0.000	0.000	0.001	0.001	0.001	0.841	0.885
TR7: Central Anatolia	0.000	0.136	0.000	0.033	0.001	0.017	0.719	0.757
TR8: Western Blacksea	0.000	0.041	0.000	0.056	0.003	0.035	0.807	0.851
TR9: Eastern Blacksea	0.000	0.034	0.000	0.044	0.002	0.027	0.751	0.754
TRA: North Eastern Anatolia	0.000	0.000	0.000	0.001	0.001	0.001	0.890	0.930
TRB: Central East Anatolia	0.000	0.000	0.000	0.001	0.001	0.001	0.597	0.616
TRC: South Eastern Anatolia	0.001	0.012	0.002	0.012	0.024	0.044	0.754	0.796