



## Empirical Analysis of Emigration to Europe from Türkiye: Evidence from the Gravity Model Including the Covid-19 Effect for the Period 2015-2021

### Türkiye'den Avrupa'ya Göçün Ampirik Analizi: 2015-2021 Dönemi İçin Covid-19 Etkisini İçeren Çekim Modelinden Kanıtlar

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#### Abstract

With this study, we deal with the relationship between international migration and income, population and distance indicators within the scope of the gravity model, including the Covid-19 restrictions. The inclusion of the Covid-19 effect in a model is a novelty for scientific literature and represents the main contribution of this study for related field. We seek Turkish emigration to 10 European countries which Turkish emigrants most prefer by using static panel data analysis for the period of 2015-2021. Our findings from the GLS regression analysis indicate that the income level in the recipient country increases the migration, while the income level of the origin country and the Covid-19 restrictions decrease it. Moreover, the migrants tend to move to the crowded places. Increasing the population in destination countries is a positive function of the migration. Finally, the distance between regions and population of the origin country are insignificant for the migration. Explanatory variables of the gravity model including outbreak effect explains approximately 79% of the change in the migration movements. In the direction of our results, the policies being created by taking possible brain drain into consideration are recommended.

**Keywords:** International migration, gravity model, Türkiye, emigration to Europe

**JEL Codes:** B23; F22

#### Öz

Bu çalışma ile uluslararası göç, gelir, nüfus ve mesafe değişkenleri arasındaki ilişki, Covid-19 pandemi sınırlamalarını içeren çekim modeli kapsamında ele alınmaktadır. Covid-19 etkisinin modelde yeri alması, bilimsel literatür için bir yeniliği ve bu çalışmanın ilgili alana katkısını oluşturmaktadır. Türkiye'den, Türk göçmenlerin en çok tercih ettiği 10 Avrupa ülkesine göç hareketleri 2015-2021 dönemi için statik panel veri analizi ile araştırılmaktadır. GLS regresyon analizinden elde ettiğimiz sonuçlar belirtiyor ki; göç veren ülkedeki gelir düzeyi ve Covid-19 sınırlamaları göçü azaltırken, göç alan ülkedeki gelir düzeyi göçü artırmaktadır. Ayrıca, insanlar daha kalabalık bölgelere göç etme eğilimindedir. Varış bölgesindeki nüfus, göç hareketlerinin pozitif bir fonksiyonudur. Son olarak, mesafe faktörü ve göç veren ülkedeki nüfus, göç üzerinde anlamlı bir etki göstermemektedir. Salgın etkisini içeren çekim modelindeki açıklayıcı değişkenler, göç hareketlerindeki değişimin yaklaşık olarak %79'unu açıklamaktadır. Elde ettiğimiz sonuçlar doğrultusunda, oluşturulan göç politikalarının olası beyin göçünü dikkate alması önerilmektedir.

**Anahtar Kelimeler:** Uluslararası göç, çekim modeli, Türkiye, Avrupa'ya göç

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## 1. INTRODUCTION

It is estimated that approximately 281 million people are migrant and they represent 3,6 per cent of the world population (International Organization of Migration, 2022: 2). People takes welfare differences among regions and various indicators which represent social, economic and political conditions into consideration for migration decision (Çelik and Günay, 2021: 508). Therefore, individuals who will decide to migrate, make their final decisions about migration due to cost-benefit analysis (Massey et al., 1993: 433-434).

In the scientific literature, individual and mass migration movements have continued to be explained theoretically and empirically after the first approach constructed by Ravenstein in 1885. The general review of migration theories, although there is no consensus for migration in the theoretical approaches, it is possible to divide migration theories into groups. The first group consists of the causes and types of migration and the second group interests in the individual's migration decision process. The theories in the third and fourth groups puts forward its effects on the social structure after migration. In the fifth group theories, the migration is held as an explanatory variable (Tekeli, 2008: 24-27). However, in this study, due to the investigation of causes of migration and usage of migration as a dependent variable, we show the first group theories explaining the pushing and pulling factors of migration.

The first theoretical explanations for migration appeared in Ravenstein's study in 1885. Ravenstein revealed the factors that cause internal migration. According to the study's findings, the distance between the regions is significant for migrating people. According to Ravenstein, the broad majority of people migrate only to close distances. Besides, the universal mobility, experienced toward large industrial and commercial centers and the displacement of the population, creates new migration flows (Ravenstein, 1885: 198-199).

In 1940, Stouffer drew attention to the distance variable being one of the most important determinants of migration. He stated that all regions where people go to find a job, commit crimes, and shop were directly related to the distance factor. Stouffer indicated that migration analysis, in which the distance variable was not considered, was insufficient (Stouffer, 1940: 845-846). However, Wolpert, who examined migration movements within the scope of a model and developed the Behavioral Model Approach, focused on the heterogeneous structure of migration movements in 1965. He criticized the situation that the determinants of migration were not sufficiently considered in the transition from micro to macrolevel. Wolpert argued that features such as occupation, income, race, and age should have been included in the analysis (Wolpert, 1965: 159-166).

Everett Lee put forward the push and pull factors related to migration in his study. Lee claimed that indicators increasing and decreasing migration were attractive and pushing factors respectively. Also factors which had no effect for migration was called as neutral. According to Lee, people migrate for rational reasons and irrational reasons. He emphasizes that irrational reasons are more than rational reasons (Lee, 1969: 284). Wilbur Zelinsky (1971) explained migration with the Mobility Transition Hypothesis in 1971. Zelinsky related to the phenomenon of mobility transition and the effect of human beings on their development. While the concept of migration was not independent of social and economic features in this hypothesis, on the other hand, it affected the social and economic movement of people (Zelinsky, 1971: 222-223).

The World Systems Theory explained migration process with colonial activities and stated that the labor factor tended toward the regions with a developed industrial and technological structure. While the countries that received immigration were described as the

core and countries that sent them as the periphery countries, it was indicated that the colonial activities that started in the 16th century still exist today (Aksoy, 2012: 295).

The Migration Systems Theory is an approach that is shaped around the system that countries mutually establish through migrant exchanges, and its economic and political aspects predominate. The supporters of the Theory state that the commercial proximity of the countries in this connection is an important connection point of migration movements (Bean ve Brown, 2015: 142). It is not significant that the countries in migration system are geographically close to each other. For migration, political and economic proximity is more important than physical proximity. While geographical distance does not reduce migration movements in this type of migration; proximity does not increase (Güllüpmar, 2017: 22).

Network Theory, which counted as a prerequisite for explaining migration movements, emphasized the migrant networks and expressed the relationship between those who would migrate and those who had migrated to a certain region before. It is stated that migrant networks, which also defined as social capital, would provide benefits for new immigrants to reduce migration costs and to reach other economic conditions easily (Massey et al., 1993: 448-450).

In the theoretical structure, the approaches have the features of the period and region in which migration occurred. All assumptions for migration include economic, social, and political factors and make migration a complex field. For instance, as a part of the ideological statements; the capitalist economies strain to provide from migration movements, the Socialist approach criticizes capital-intensive countries in the labor exploitation.

In the empirical literature, studies generally focus on the factors that create migration or the effects of migration movements on the origin and destination regions. In first group, studies have concentrated on migration by researching it with a single or multiple factors; in other words, with a model or variable(s). In this study, we prefer the gravity model which provides to study of bilateral migration and panel data analysis allowing to analysis both for time series and unit cross-sectional data analysis. In the framework of the gravity model approach, while the number of migrants is determined as the dependent variable; the independent variables cover the income level and population in the two regions. Moreover, the distance factor represents the way to the residential country from the origin region (Greenwood, 2005: 727).

In this context, we examine Turkish emigration to the European Union countries, in the scope of the gravity model which include the Covid-19 outbreak variable for the period 2015-2021. Thanks to inclusion of the Covid-19 pandemic effect, we contribute to scientific literature as a novelty. To this scope, the research questions are as follows: Does the gravity model explain the human movements between Türkiye and European countries? Are income, population and distance the pulling/pushing factors for migration in the reference period? Is this migration a brain drain and how does the Covid-19 outbreak effect the movements? As following to theoretical background, empirical literature review and Turkish emigration historically evaluated are shown. Subsequently, empirical findings are represented, results are discussed and finally, suggestions for policy-makers of the migration are explained.

## **2. EMPIRICAL LITERATURE REVIEW**

The studies which investigate reasons of migration have been built on a model or in the scope of independent (exogen) variables in the scientific literature. As for studies which use the gravity model are consisted by basic or augmented gravity model (Çelik, 2022: 4). We see

that the factors being used to explain migration have a broad pool thanks to previous studies albeit they do not show same effect on migration by period, year and country. In this study, we preferred to divide the studies in empirical literature into two parts: Those using basic gravity model and investigating the relationship between migration and independent factors.

When we discuss the literature in terms of the basic gravity model context, it is seen that no consensus has been formed related to findings of the studies. Nevertheless we can indicate that almost of the factors represent similar results. Essentially the studies using gravity model is not included the same factors due to having flexible qualification or augmented form of gravity model. In terms of the income factor, in general review, studies found that people migrate for a higher level income (Karemera et al. 2000; Clark et al. 2007; Dinçer and Muratoğlu, 2014; Muratoğlu and Muratoğlu, 2016; Zülfikar Savcı, 2016; Dedeoğlu and Genç, 2017; Çetin, 2019; Koç and Solmaz, 2019). This proof is coherent with assumption of the gravity model. It can be stated that rationalist people seek possibilities to have better living conditions and the income factor is one of the most factors of having more welfare. However a study from our literature review states that difference among the income levels is not significant factor for migration (Fitzgerald et al. 2014). That result (according to their explanations) is based on a function of model specification as they dummy out all push factors that vary over time in addition to time-invariant destination influences on immigration.

If we handle the population factor symbolising a demographic determinants, it is pointed in the studies that population is generally significant for migration decision. However population in origin and destination region differs in terms of the result (Karemera et al. 2000; Clark et al. 2007; Dinçer and Muratoğlu, 2014; Muratoğlu and Muratoğlu, 2016; Koç and Solmaz, 2016; Dedeoğlu and Genç, 2017). That situation is likely related to meaning of population. For population that means labour force, an increasing of population in origin region might increase the migration. However people who migrate due to social problems have tendency to regions high population.

As the final factor in the basic gravity model, results from the distance factor represent similar findings. It is clear that difference between origin and destination region is a significant factor. In other words, as the cost of migrating increases, the migration reduces (Karemera et al. 2000; Clark, et al. 2007; Dinçer and Muratoğlu, 2014; Fitzgerald et al. 2014; Acar, 2017; Çetin, 2019). Just as the result indicated in first migration theory, Ravenstein (1885), majority of people migrate only to close distances. Empirical evidences support this assumption strongly.

As for second group, we can see that many factors which can affect migration used in studies containing empirical analysis. In those studies, further factors related to economic, socio-cultural, geographical and political factors are included. For example, while Espinosa (1997) pointed out the presence of family and siblings; Hatton and Williamson researched the relationship between inability to control the diseases and migration. On the other hand, Pazarcık (2010) sought the migration in terms of the academic freedom conditions, research funding and opportunities, marital status, and the desire to have an investment. Adult literacy, income distribution justice, unemployment and freedom are another factors using in the studies (Agbola and Acupan, 2010; Baylan 2017; Simon, 2018).

The literature review clearly states that determinants of migration movements consist a broad working area. However, there is no study has examined Turkish emigration to Europe for the period of 2015-2021. Besides, the most concentrated migration corridor that Turkish migrants follow for European countries is not examined in the empirical literature yet. To our knowledge, this scientific literature does not include any migration analysis taking the Covid-

19 effect into account for reference countries and period and we aim to fill these gaps. In sum, we foresee these as contributions of our study to the empirical literature.

### 3. A REVIEW OF TURKISH EMIGRATION TO EUROPE

Until the 1960s, emigration from Türkiye was mostly provided by individual initiatives and private intermediaries, but this was limited. With the bilateral labor agreements that started in the 1960s, migration from Türkiye, especially to Europe, became regular and planned. The increase in labor demand due to the acceleration of industrialization in European countries and high unemployment in Türkiye during those years played an important role in the realization of bilateral labor agreements. These agreements have made Türkiye is a country that can meet the increasing labor demand of Europe and have caused the regular and planned migrations from Türkiye to Europe (İçduygu et al., 2014: 182). Because of the regular and irregular migration that has lasted until today, more than 6.5 million citizens of the Republic of Türkiye live abroad and approximately 5.5 million have settled in Western European countries (mfa.gov.tr, 2021). Having a long experience of emigration, Türkiye's citizens abroad have not always been migrant workers but have become employers in the country they migrated to overtime (İŞKUR, 2011: 5).

The years between 1960 and 1970 had an important place in the history of migration from Türkiye. This period includes the regular and planned migrations based on bilateral agreements. In this period, after Turkish-German Worker Exchange Agreement was signed on October 31, 1961, labor agreements were made with Austria, Belgium, and the Netherlands in 1964, France in 1965, and Sweden in 1967, respectively (Aydın, 2014: 16). The migration in this period was temporary labor migration and contributed to the employment problem in Türkiye. However, since the immigrants left the agricultural sector with the lowest tax burden, it did not have a negative effect on tax revenues, and the remittances they sent to their families stay in Türkiye contributed positively to the economy (İŞKUR, 2011: 7).

The period of 1970-1980 is important to Türkiye's migration history in two respects. First, the skilled workforce, who have a profession, have started to migrate. Secondly, people have moved to has oil-rich countries from Türkiye. The Oil Crisis in 1973 caused Western European countries to reduce their labor demands in this period, therefore labor migration from Türkiye shifted to oil-rich countries, particularly Saudi Arabia, Libya, and Iraq (İŞKUR, 2011: 4). However, due to achieving legal status to illegal migrants and allowing family reunification continued to increase the migration to Europe. The migration occurred to Germany in a large proportion (Yavuz, 2013: 613).

In the 1980s, migration to Europe continued, mostly through family reunification and marriages. Thus, migrated people turned toward a permanent society in the European countries. Again in this period, the increasing political tension in Türkiye and the martial law declared afterward made those who would migrate as guest workers as refugees in these years (İçduygu et al., 2014: 2012). However, 250 thousand Turkish workers who benefited from the law of "encouraging the return of foreigners" in 1983 returned to their homelands (Kütük, 2015: 630).

The fact that the group who left as temporary workers did not return and became a permanent society further increased xenophobia in Europe in the 1990s. Again, in this period, most workers were brought with Turkish contracting firms, which received tenders from countries such as Saudi Arabia, Iraq, and Libya. Additionally, while the immigration to the Middle East countries decreased due to the negative conditions created by the Gulf Crisis in this period, the wave of immigration toward the United States of America has an important

place in the history of migration from Türkiye to other regions (İçduygu et al., 2014: 204). However, globalization actors such as freedom of travel accelerated the migration in this period (İŞKUR, 2011: 5).

The global crisis of the 2000s and the recovery in Turkish economy revealed return migration. However, as this recovery in the economy did not last long, it is seen that the tendency to migrate in well-educated and qualified part of the population increased, and they migrated (Durmaz, 2021). As a major discussion, it is witnessed that economic, social and political conditions turned dramatically in Türkiye. On August 10, 2018, Turkish Lira crashed due to trade spat among Türkiye and USA and various economics, political and financial factors (Arbaa and Varon, 2019: 372). This crash brought about various economic problems such as increasing inflation and damaging real income of people. On the other hand, as a trouble which is not only economic but also social and political, after 2011, millions refugees and assylum seekers who escaped from the war in Syrian Republic migrated to Türkiye. Moreover, from Afghanistan and other regions, too many irregular migrant/refugees/asylum seekers arrived in Türkiye. According to United Nations Refugee Agency (UNHCR), officially, more than 4 million people (refugees and asylum seekers) reside in Türkiye (UNHCR, 2023). Additionally, renting costs and prices of good and services, social conflicts and diverse environmental problems have enhanced due to population and demand shocks. Turkish Statistical Institute (TURKSTAT) released the inflation rate in December, 2022 and indicated it as %64,27 (TSI, 2023). This rate also symbolizes the highest inflation rate in last 20 years. As for food inflation rate, OECD statistics shows that Türkiye has the highest food inflation rate (%102,5) between OECD countries (OECD, 2023: 4). Finally, as for major political problem, the coup attempt on July, 15 of 2016, left a huge impact on Türkiye's economic, social, political and institutional structure. As result of those, it can be assumed that Turkish emigration, which started with temporary labor migration, continues with the brain drain today. Because a brain drain generally occurs after the breaking the economic and social conditions.

#### 4. EMPIRICAL ANALYSIS: MODEL, METHOD AND FINDINGS

The scope of this study was determined as the gravity model approach, which is used frequently to explain many concepts in the literature. Also, we can claim that the gravity model matches first group migration theory (causes and types of migration) indicated by Tekeli (2008). In this direction, migration movements from Türkiye to Europe were examined with panel data analysis for the period of 2015-2021. Germany, France, Netherlands, Austria, Switzerland, Great Britain, Sweden, Belgium, Italy and Poland (10 countries) were chosen as both the most developed economies of Europe and the most migrant recipient European countries from Türkiye. The reasons why we chose these countries is related to many factors. First is that these countries receive Turkish emigrants intensely. In other words, Turkish migrants prefer these countries to migrate mostly. That makes the migration from Türkiye to the reference countries worthwhile to analyse. Moreover, strong economic structure in reference countries in addition to the deterioration in economic conditions of Türkiye economics after 2015 could be pulling Turkish migrants to reference countries. That is also the reason why we examine 2015-2021 period. Finally, the Covid-19 outbreak is another justification of choosing this reference period.

The series used in analysis, LM represents the size of migration (refugee and refugee-like situation) between two regions,  $LY_1$  and  $LY_2$  show income levels (Gdp per capita) of origin and destination region(s) respectively. LD is distance (mile) between two regions and  $LP_1$  and  $LP_2$  consist population of origin and recipient countries. Finally we add a dummy variable

which represents effect of the Covid-19 outbreak which has begun 2019 into the model. All series in analysis represent their transformed logarithmic form. In Table 2, the sources of data and the expected findings for the relationship between migration and explanatory variables are shown.

**Table 1:** Assumptions and Sources For Data in the Analysis

Variable	Expected Result	Data Source
LP <sub>1</sub> ,LP <sub>2</sub>	People migrate to the regions where population is low (-) or prefer places where the population is crowded (+).	World Bank
LY <sub>1</sub> ,LY <sub>2</sub>	People tend to go to countries which have high level income and leave from the low income countries. We assume a positive relation between migration and income level in the destination and negative within origin country.	World Bank
LD <sub>1,2</sub>	It is assumed that as distance increases, migration reduces.	CEPII
Dummy <sub>the Covid-19</sub>	Dummy variable represents the restriction effect over migration movements. For the years that pandemic is valid, data is 1; for other years, it is 0.	Author's Compilation
LM		United Nations

#### 4.1. Model

Ravenstein's study puts forth first approach for pushing and pulling factors in terms of migration. However Ravenstein created his theoretical thoughts related to reasons of an internal migration from rural to urban region without setting a model (Ravenstein, 1885: 198-199). On the other hand, gravity model, which was first used by Tinbergen (1962) in the analysis of foreign trade and expanded by Linnemann (1966), became used for areas such as financial flows and migration between countries in the following years. With the inclusion of the time dimension in the cross-section analyzes performed for a single time period in the following stages, the gravity model has also been frequently encountered in panel data analyzes (Gül and Yerdelen Tatoğlu, 2019: 50-51). Gravity models derived from the variables assumed to have an effect on migration are also used in scientific literature (Bindak, 2015, p. 113). The gravity model approach is used to explain many economic concepts. includes the functions of migration movements and is defined as below:

$$M_{ij} = X_{ij} \cdot Y_{ij} \cdot f(D_{ij}) \quad (1)$$

I and j in the model represent the variables belonging to origin and destination regions. While M denotes migration between two regions, X shows attractive and Y presents repulsive factors. The D variable is used for the distance variable (Ravenstein, 1885: 198-199). In the gravity model, the income and population of the sending and receiving regions and the distance variables between these regions are included. It is assumed that people tend to migrate to regions where income and population are relatively high. Moreover, the distance variable is defined as a negative function of migration.

#### 4.2. Method

In this study panel data analysis was used as method. The reasons why we used panel data analysis is as following (Baltagi, 2005: 4-7):

1. Panel data takes individual heterogeneity into account.
2. Panel data provides further examination in terms of the tuning dynamics.
3. Panel data can better describe effects that are not easily detectable in pure time series or cross-sectional data.
4. Panel data models allow creation and testing of highly complex behavioral models.

5. Micro panel data collected about individuals, firms and households give more accurate results than similar variables measured at macro level.
6. Panel data at macro level includes longer time series and unlike distribution problem seen in time series, panel unit root tests have a more standard asymptotic distribution.

Additionally, panel data analysis allows both time series and cross-section analysis (Yerdelen Tatoğlu, 2018: 1) and is a frequently used method today. In panel data model,  $Y$  represents dependent variable and  $X$ 's represent explanatory variables;  $\alpha$  refers to coefficients of the constant and  $\beta$  independent variables (Baltagi, 2005: 1).

$$Y_{it} = \alpha + \beta_{1it}X_{1it} + \beta_{2it}X_{2it} + \dots + \beta_{kit}X_{kit} + u_{it} \quad (2)$$

$$i = 1, 2, \dots, N$$

$$t = 1, 2, \dots, T$$

Thus, the reference model of this study is defined as follows:

$$LM_{it} = \alpha + \beta_1LY_{it} + \beta_2LD_{it} + \beta_3LP_{it} + \beta_4Dummy_{the\ Covid-19} + u_{it} \quad (3)$$

### 4.3. Findings

We firstly present (in Table 2) descriptive statistics of variables in the model. Following this, we determine the characteristic features of the model used in the analysis and use LR test that tests whether the model includes unit and/or time effect. Table 3 shows the LR test results.

**Table 2:** Descriptive Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
M	70	5120.514	8056.601	17	35953
Y1	70	9895.679	884.4863	8538.169	11006.28
Y2	70	45968.45	17353.37	12447.44	91991.6
D	70	1922.958	413.6745	1275.02	2501.886
P1	70	8.26e+07	1676190	7.96e+07	8.48e+07
P2	70	83.86e+07	2.68e+07	8282396	8.32e+07

**Table 3:** LR Test Results

LR Test Statistic	Result
chi2: 52.44	The model includes unit and/or time effects.
	Prob>F: 0,0000 - Number of Observations: 70

Basic assumption is that the Pooled Least Squares Method can be used if all the parameters of equation representing model are homogeneous and the equation shows the characteristics of a classic model. According to the results obtained from the LR test, series contain unit and/or time effects; in other words, hypothesis stating that it has a classical model feature is strongly rejected. Therefore, it is necessary to use the Fixed or Random Effects Model that is consistent with the LR test. Table 4 shows the test results showing unit and/or time effect under assumption of the Fixed and Random Effects Model.

**Table 4:** Fixed and Random Effects Models Results

Model	Test Statistic	Result
Fixed Effects	0.0000	The model contains unit effects.
	0.3951	The model does not include time effects.
Random Effects	0.0000	The model contains unit effects.
	1.0000	The model does not include time effects.

According to the findings, both the Fixed and Random Effects Model are consistent with the LR test. Here, these two models are consistent in terms of the reference model. Hence, the



Hausman and Rhausman Test are used to determine effective model among the two models and test results are shown in Table 5.

**Table 5:** Rhausman Test Results (Estimation of Effective Model)

Test	Test Statistic	Result
Hausman	Chi-Square Test Stat.: 0.9997	Random-effects model is effective.
Rhausman	Chi-Square Test Stat.: 0.9995	Random-effects model is effective.

According to the findings shown in Table 3, both the Hausman and Rhausman Test show that the Random Effects Model is effective for the basic equation of the study. After this stage, characteristic features of model are revealed by using diagnostic tests under assumption of the Fixed Effects Model. Table 6 shows findings of diagnostic tests.

**Table 6:** Diagnostic Test Results

Assumption	Test and Statistic	Result
Model is normally distributed. <i>There is no heteroscedasticity in the model.</i>	Jarque-Bera (Ki-kare): 0.41 <i>Modified Wald: 0,0000</i>	Unrejectable <i>Rejected</i>
<i>There is no autocorrelation in the model.</i>	<i>Durbin-Watson: 0,57 &lt; 2</i> <i>Baltagi-Wu LBI: 0,91 &lt; 2</i>	<i>Rejected</i>
There is no cross-section dependency in model	N>T; Friedman: 0,2927	Unrejectable
There is no multicollinearity problem in model.	Mean VIF: 2.13 < 5	Unrejectable

According to the findings obtained from the diagnostic tests, there are both heteroscedasticity and autocorrelation problems in the model. While reference model shows a normal distribution feature; it does not include cross-section dependency and multicollinearity problems. Thus, to have regression results Random Effects Generalized Least Squares (GLS) regression analysis which is resistant to heteroscedasticity and autocorrelation problems is used and the results are given in Table 7.

**Table 7:** GLS Test (Regression Analysis) Results

Dependent Variable: LM			
Independent Variables	Coefficient	Standard Error	Probability Value
LY <sub>1</sub>	-2.181539	0.8170628	0.008*
LY <sub>2</sub>	3.617642	0.7191669	0.000*
LD	0.4901703	1.481604	0.108
LP <sub>1</sub>	-5.935079	3.697287	0.741
LP <sub>2</sub>	1.532829	0.4343837	0.000*
Dummy <sup>the Covid-19</sup>	-0.4121945	0.1255323	0.001*
R <sup>2</sup> : 0,7861 - F <sub>ist</sub> : 0,0000			

Note: \* signifies 1 percent (%) significant level.

According to the results, the gravity model for the 2015-2021 period is generally significant (F<sub>ist</sub>: 0.0000). While people migrate to high income and population regions; they leave those regions as the income level and population reduce. Additionally, the Covid-19 outbreak is a reduction factor for the migration and the changes in the factors used to explain migration movements within the model explain approximately 0,79 of changes in the migration movements for the same period. In final, we found that there was no significant effect of distance for migration.

## 5. CONCLUSION

Migration has been accepted as a way to increase welfare of humanity in every period of history, particularly in the 21st century. Migration which arises with different reasons, from

desire to survive to idea of having better economic conditions, either occurs within a country's borders or turn to different countries/regions.

In this study migration from Türkiye to European countries was examined. We have chosen the European countries as developed economies of Europe which receive heavy migrants from Türkiye. We present findings from the study in which panel data analysis was used for the 2015-2021 period within scope of the gravity model approach as follows:

- ✓ The income level of European countries is statistically significant for migration. 1% increase of the income in European countries increases the migration to Europe by 3.61%.
- ✓ The income level in Türkiye is statistically significant on the migration. 1% increase in Türkiye's income reduces the migration to Europe by 2.18%.
- ✓ The population level in the European countries is statistically significant on the migration movements. 1% increase in the population of European countries rises up the migration by 1.53%.
- ✓ The dummy variable representing the the Covid-19 restriction indicates that outbreak decreases the migration among regions.
- ✓ Finally, the population and the distance between Türkiye and European countries factors are statistically insignificant on the migration.

According to the results, while the decrease in income level in Türkiye is a pushing factor; income growth in European countries is an pulling factor for migration. However, the distance factor is not statistically significant. As for the population, people tend to move the regions where the population is high although the increase in population makes the employment harder for migrant while that labor demand is constant. According to this result, we can result that labour demand is not constant. As compared to previous studies, we support almost of the studies in the literature for income level. Pazarçık (2010), Karemera et al. (2000), Hatton and Williamson's (2003), Clark et al. (2007), Dinçer and Muratoğlu (2014), Muratoğlu and Muratoğlu (2016) and Dedeoğlu and Genç (2017) found similar result according to our study. However our result for distance factor contradicts the general literature review. We can match this result with the great development in transport networks between the reference countries and during the period in which the analysis sheds light. Cost reductions in airlines concerning migration from Türkiye to European countries make affect the distance insignificant factor for migration. Thus, the gravity model approach for the current period may include new/current situations in the explanation of migration movements between regions where transportation networks are developed. Because the people no longer (mostly) migrate on foot as in the first migration theories and can travel to long distances in a short time by the high-technological vehicles. Furthermore we would like to draw attention to the fact that the countries (Türkiye and European countries) are symbolizing the countries with high family and historical connections. Therefore it is likely that people migrate destination countries regardless the distance. Finally, we see that results support the Migration Systems Theory because this Theory claims that the distance is not as important as economic, political and historical linkages.

We point out that regular and planned labor migration from Türkiye to European countries, which started in the 1960s, and based on bilateral agreements, continues today and even looks to have evolved into a brain drain. Additionally, the result of being insignificant of

the population of Türkiye and significant (positive) of European population represent that migrants do not have any concerns about unemployment. That is further evidence to possible brain drain from our study. Low income appears to be one of the main reasons for migration, within the limits of the study. Therefore, all policies that increase income and employment will likely stop and reduce the migration from Türkiye to Europe and even initiate reverse migration. Attracting more foreign direct investments to Türkiye is seen as one of effective ways to reduce the migration from Türkiye to Europe and even to initiate reverse migration. However, foreign direct investments should be encouraged and directed to real sector, not in form of mergers and acquisitions, but in form of establishing a new facility. It is considered important to continue the support given to research and development activities until prototype product is commercialized. Another factor is that it is recommended to provide job creation motivation instead of job finding motivation for all levels of education and especially for those who are of working age. We indicate that having a wage policy that maintains a strong and positive relationship between education level and wages in private and public sectors will provide more benefits for Turkish economy. Finally, as consequence from the Covid-19 effect variable, new intense migration movements might occur after removing the restriction effect of the pandemic.

The policies need to take comments into consideration: For example, Türkiye and countries such as Türkiye have to constitute policies to prevent emigration. Otherwise, brain drain means the losing of human capital/high-skilled workers and that can bring about socio-economic problems. In terms of European countries, policies must be ready to have more labour supply because results indicate that income level in the destination countries is significant. If not, migration from Türkiye to Europe increases the unemployment, forces the people to informal economy and reduces the wages for native workers in Europe.

For future research, we suggest a model construction which includes more variables and destinations. It is clear that the distance factor is not significant in this study. That means the Migration System Theory is appropriate and sounds analysis requires to include more independent variables representing social, economic, cultural and historical factors.

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**Ethics Statement:** The authors declare that ethical rules are followed in all preparation processes of this study. In case of detection of a contrary situation, BİİBFAD Journal does not have any responsibility and all responsibility belongs to the authors of the study.

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