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THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND MIGRATION IN TERMS OF 14 EUROPEAN UNION COUNTRIES AND TURKEY

Efforts to get rid of poverty cause migration movements that have consequences not only for themselves, but also for future generations. Migration movements affect many economic variables such as human capital, demand, supply, the balance of payments, income distribution, wage level, and national income. The literature on migration is often studied in the economic, political and security fields. This study focuses on the relationship of migration with economic growth. There are studies that determine two-way causality in the relationship between economic growth and migration. It is seen that the country groups specified here can explain these different results.
In this study, our purpose is to investigate whether international migration affects the economic growth of the receiving country. Therefore, the actual relationship between migration and the economic growth rate in terms of economic size using 14 similar European Union countries and Turkey for the period 1978-2019 (with panel data analysis) was tested. It is seen that the test results explain the positive effects of migration in accordance with the literature.

Keywords: economic growth, immigration, unit root, causality, European Union
JEL Codes: F43, F22, C87, C01, N14

Introduction

The increase in welfare achieved with the industrial revolution is not shared equally among all nations and even among all regions within nations. The development differences between both countries and regions continued to increase in the post-war period. These development differences, which are also the subject of development economics, have also shown themselves in issues such as literacy rate, infant mortality rate, number of doctors per capita, job opportunities (which express better living conditions), as well as income level[1].

One of the most important results of development differences between regions is that it causes migration movements. While approximately two-fifths of the world's population lived in poverty in the post-war period, this rate had decreased to one-fifth by the 2000s

[1] H.B. Yavuz, E. Değerlendirmesi E.: Sürdürülebilir Kalkınmada İzleme ve Değerlendirme Perspektifi, Pelikan, Ankara 2019; S.A. Ertaş, A. Hayriye: Kalkınma göstergeleri bakımından Türkiye'nin Avrupa Birliği ülkeleri arasındaki yeri: İstatistiksel bir analiz, Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 48/2016, p. 199-218.; Y. Kubar: Az gelişmiş ve gelişmekte olan ülkelerin kalkınma göstergeleri ile ekonomik büyüme arasındaki ilişki: Bir panel veri analizi (1995-2010), Ardahan Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 2.4/2016, p. 65-99.

due to both international and interregional migration movements. However, considering the increase in the world's population, it is understood that the number of people still living in poverty is very high, and this excess will continue to cause migration movements[2]. As economies grow and nations develop, the problem of poverty makes itself felt more. In terms of development literature, in order to eliminate this problem, it is necessary to eliminate inequalities and provide equal opportunities for everyone[3].

Societies that can provide equal opportunities tend to be the center of socio-economic activities[4]. When the studies are examined, the United States of America is seen as the country where equality of opportunity has the most mobility. In fact, this situation has been called the "American Dream"[5].

The phenomenon of migration, in its simplest definition, is the geographical mobility of individuals. In order to change the socio-economic conditions and to reach better living standards, people leave a certain settlement individually or in groups and go to another settlement to live temporarily or permanently. So, this change of place not only affects the rest of the life of the person, but also emerges as a process that affects the socio-economic status of the next generations[6].

These migration movements are not only for countries that provide equal opportunity. At the same time, migration from rural areas to urban areas has accelerated with the phenomenon of urbanization. As urban areas grew, the workforce needed was first met by the workforce living in rural areas within the same country. However, as industrialization accelerated, the labor demand of industrialized countries reached a level that could no longer be met by local resources. This level has resulted in the process of promoting international migration. International migration has been demanded by the labor force in underdeveloped countries living in poor living conditions, and industrialized countries have encouraged the migration of specially qualified individuals to meet their labor needs. This incentive has two sources: (1) the income difference between rural areas and urban areas due to high wages, and (2) the excess of job opportunities provided by cities. These two sources have also led to high rates of unemployment in urban areas; thus, unemployment in urban areas is seen as both a cause and consequence of migration[7].

The phenomenon of migration has many economic consequences for countries. One of these results is human capital mobility, defined as brain drain. Apart from this, the phenomenon of migration increases the demand for domestic goods, increases per capita income by affecting income distribution, and affects the balance of payments[8].

However, there is no consensus on the economic effects of migration. In other words, economic theories differ on whether the migrating population grows the target country's

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[2] M.P. Todaro, S.C. Smith:. Economic Developtment, Pearson Education, Boston 2015.
[3] A.B. Atkinson: Bringing income distribution in from the cold, The Economic Journal, 107 (441)/1997, p. 297-321.
[4] A. Tyree, M. Semyonov, R.W. Hodge: Gaps and glissandos: inequality, economic development, and social mobility in 24 countries, American Sociological Review, 1979, p. 410-424.
[5] J.P.: Ferrie: History lessons: The end of American exceptionalism? Mobility in the United States since 1850, Journal of Economic Perspectives, 19.3/2005, p. 199-215.
[6] Lee E.S.: A theory of migration, Demography, 3.1/1966, p. 47-57; H. Haas, S. Castles, M. Miller: The Age of Migration: International Population Movements in the Modern World 5th edition, Bloomsbury Publishing, 2019.
[7] M.P.Todaro, S.C. Smith:. Economic Developtment, Pearson Education, Boston 2015.
[8] L. Epstein: Some economic effects of immigration: a general equilibrium analysis, Canadian Journal of Economics, 1974, p. 174-190.

economy and creates added value. For example, in the neoclassical growth model, it has been stated that migration will negatively affect economic growth because it reduces the amount of wealth per capita. However, in the Romer growth model, it is stated that migration can provide growth due to the contribution it will make to the human capital of the target country. Again, in the theories of endogenous growth, it is stated that the low-paid workforce will increase profitability by reducing a firm's costs and even provide the opportunity to develop new products by directing the firm's resources to R&D activities in the long run[9].

The phenomenon of migration has not only occurred for the least developed countries or individuals working with the lowest incomes. It is stated that people with a certain income or education level tend to migrate. For example, the study by Caponi showed that individuals working in low-status occupations in Mexico are 14% more likely to migrate than low-income families when they receive social assistance. It has been revealed that the incentive factor here is that the Mexican government's social assistance to the children of low-income families, on the condition that they receive education, increases their desire to emigrate because it eliminates the education level and borrowing constraints. Accordingly, low-skilled workers may find the same employment opportunities in the countries to which they will migrate and achieve similar living standards. However, high-skilled workers may not be able to reach similar living standards due to various losses such as language or social networks when they migrate. Due to human capital stock they will lose, these people may have to work in lower-paid jobs and live with lower standards of living[10].

The phenomenon of migration is not always something that includes negativities. Just as the balance of international trade affects the economy positively, balanced migration will affect the economy positively. For example, Costa et al.[11] stated [in their study] that 13% of the American population and 5.2% of the workforce are composed of immigrants, and the share of immigrants in the US national product is around 15%. It is also seen that second-generation immigrants among these immigrants earn higher wages by working in better jobs than first-generation immigrants. Again, it has been revealed that while the phenomenon of immigration decreases local employment in the short term, it increases employment in the long term as it opens new business areas[12].

Literature Review

The literature on migration has expanded significantly, especially since the 1980s. In the literature, various features of migration – such as economic, political, and security – have been focused on. This study has tried to draw attention to the relationship between international migration movements and economic growth.

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[9] Y. Kang, K. Byung-Yeon: Immigration and Economic Growth: Do Origin and Destination Matter?, Working Paper Series 1/2012, p. 1-30.

[10] Adhikari S., Ugo G.: Should I stay or should I go: do cash transfers affect migration?, World Bank Policy Research Working Paper 8525/2018, p. 12-13; V. Caponi: Heterogeneous Human Capital and Migration: who migrates from Mexico to the US?, Annals of Economics and Statistics/Annales d'Économie et de Statistique, 2010, p. 207-234.

[11] D. Costa, D. Cooper, H. Shierholz: Facts about immigration and the US economy, Economic Policy Institute, 2014, p. 1-14.

[12] Ibidem.

Tubadji et al.[13] tested the socio-economic success of immigrants in the Netherlands in the period 2007-2009 in their study. The study by Tubadji et al. concluded that among migrant workers, those with higher levels of education found higher-paying jobs and had better economic outcomes. People who receive adequate education have the same employment and working opportunities as local people. Again, it is stated in the study that there are differences between first- and second-generation immigrants. It has been stated that first-generation immigrants generally earn less income by working in low-skilled jobs because they have a lower education level than second-generation immigrants[14]. Similarly, Muysken and Ziesemer[15] stated that immigrants contribute positively to economic growth, provided they are employed. A similar study was conducted by Akbari and Haider[16] for the Canadian economy, considering the period from 2006-2013. In Akbari and Haider's study, it was stated that immigrants with university education contributed more to economic growth than locals. In the distinction made in terms of provinces, it has been concluded that the economic contributions of locals and immigrants living in small cities are also small[17].

In Boubtane, Dumont, and Rault's study[18], the effect of migration on economic growth in 22 OECD countries was tested using the Neoclassical Solow-Swan model. As a result, it is stated that the human capital of immigrants has a significant positive effect on productivity and economic growth. However, it seems possible through the implementation of unique and selective policies regarding immigrants by the countries that achieve this effect. It is understood that active labor market policies should focus on vocational training activities for immigrants; however, it has been concluded that the net effect of this training on the human capital of immigrants is quite low[19].

Ottaviano and Peri[20] investigated the effect of immigration (that took place) in the 1990-2004 period on the wages of American workers. To understand the impact, the physical capital and different types of labor used in the Cobb-Douglas production function are taken into account. In the model in which the general equilibrium approach is used, it has been revealed that immigrants cannot replace the domestic workforce with the same characteristics. It has been shown that the reason for this is that immigrants have different skills and, therefore, they have to choose other professions from the domestic workforce with the same characteristics. According to these results, it is revealed that immigrants have positive effects on the wages of locals in the short and long term[21].

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[13] Tubadji A., Gheasi M., Nijkamp P.: Immigrants' socio-economic achievements and cultural diversity: Economic effects of individual and local cultural capital, International Journal of Manpower, 2017, p. 722-724.
[14] Ibidem.
[15] J. Muysken, T.H.W. Ziesemer: A permanent effect of temporary immigration on economic growth, Applied Economics, 45.28/2013, p. 4050-4059.
[16] A.H. Akbari, H. Azad: Impact of immigration on economic growth in Canada and in its smaller provinces, Journal of International Migration and Integration, 19.1/2018, p. 129-142.
[17] Ibidem.
[18] E. Boubtane, J.-Ch. Dumont, Ch. Rault: Immigration and economic growth in the OECD countries 1986-2006, IZA Discussion Paper, 8681/2014, p. 19.
[19] Ibidem.
[20] G.I.P. Ottaviano, G. Peri: Rethinking the Effects of Immigration on Wages NBER Working Paper, 12497/2006, p. 34.

[21] G.I.P. Ottaviano, G. Peri: Rethinking the Effects of Immigration on Wages NBER Working Paper, 12497/2006, p.17-19, 34

An explanatory study on the contribution of skilled migration to economic growth was made by Bashier and Siam[22]. In the study, the contribution of immigrants to economic growth in Jordan during the 1980-2012 period was analyzed using the Cobb-Douglas production function. According to the results of the analysis, it was concluded that the amount of capital and domestic labor force, which are the independent variables of the Cobb-Douglas production function, positively affected economic growth. Still, although immigrant labor had a positive effect on economic growth, this effect was statistically insignificant. The authors attributed this insignificant effect to the fact that immigrants are unskilled workers and work only in the agricultural sector[23].

In another study, Dustmann et al.[24] analyzed the effects of immigrants on the wages of domestic workers in the UK for the period 1997-2005 using the CES production function. As a result of the analysis, it was concluded that the wages of domestic workers working in low-wage groups decreased in accordance with the literature. Still, it did not have a significant effect on the wages of domestic workers working in the high-wage group. This result, following the literature, leads us to the conclusion that immigrants work in unskilled jobs or have low capital stock as human capital[25]. A similar study was conducted by Manacorda et al.[26] for the period 1970-2000. In the study, in which the CES production function was tested using the skilled-unskilled labor distinction, it was concluded that the migration during the period increased the labor supply in the United Kingdom, but did not significantly affect the wages of the domestic labor force. According to this result, migrant workers in the UK do not replace domestic workers. This result shows that there are different results for immigrants who have received university education. Accordingly, immigrants work in unskilled jobs in the United Kingdom[27].

One of the studies that tests the effects of immigrants on labor wages separately according to education level is the Llull[28] study. The study analyzed the effects of immigrants in the United States of America in the period of 1967-2007 on labor market wages according to education level. Accordingly, immigrants negatively affect the markets in terms of the labor force earning the lowest income. In other words, it causes wage decreases in unskilled jobs. However, this effect decreases in the medium and long term, especially with the immigrants' demand for education. Again, this negative effect in the lower income group is reversed in the upper-income groups (i.e., it causes wage increases)[29].

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[22] Bashier Al-A., Siam J.A.: Immigration and economic growth in Jordan: FMOLS approach, International Journal of Humanities Social Sciences and Education, 1.9/2014, p. 87-90.
[23] Ibidem.
[24] Ch. Dustmann, T. Frattini, I.P. Preston: The effect of immigration along the distribution of wages, Review of Economic Studies, 80.1/2013, p. 145-173.
[25] Ibidem, p. 159-166.
[26] M. Manacorda, A. Manning, J. Wadsworth: The impact of immigration on the structure of wages: theory and evidence from Britain, Journal of the European economic association, 10.1/2012, p. 120-151.
[27] Ibidem, p. 145-148.
[28] J. Llull: Immigration, wages, and education: A labour market equilibrium structural model, The Review of Economic Studies, 2017, p. 1-46.
[29] Ibidem, p. 28-29.

In the study of Izquierdo et al.[30], the role of immigrants in the realizations obtained in terms of employment, production increase, investments, current account balance and financing of the social security system in Spain between the years 1995-2006 was tested. In the study using the general equilibrium model, it was pointed out that immigration has a positive effect on the elderly population structure of Spain and increases the workforce. However, this increased workforce had negative effects on productivity because immigrants mostly work in unskilled jobs, and this reduces the productivity calculated per worker. When the increase in employment and the decrease in productivity are evaluated together, it is concluded that although the effect on growth is positive, it is limited. It is stated in the study that human capital investments can reduce these negative effects on productivity. It was also stated that immigration positively affected investment, but did not affect savings rates much. Finally, it reveals that the phenomenon of immigration increases retirement expenditures and, therefore, has negative effects on the deficits of the social security system[31].

In another study, Manole et al.[32] analyzed the effect of migration on economic development in 28 European Union member countries for the period 2008-2014. In the analysis, per capita gross domestic product data was used as the development variable. While the results are considered to have an increasing effect on the GDP, it is stated that immigrants are generally paid in unskilled jobs and less than the average domestic worker[33].

Boubtane et al.[34] tested the relationship between migration, unemployment and economic growth for the period 1980-2015 in 22 OECD countries with the Granger Causality analysis. In the study, they concluded that immigration does not cause economic growth in France, Iceland, Norway, and the United Kingdom; on the contrary, economic growth increases immigration. In terms of unemployment, it is stated that immigration causes unemployment in Portugal, but immigration does not affect employment in other countries. A causal relationship was found not from migration to economic conditions, but from economic conditions to migration. In other words, the economic conditions of the countries and the immigration policies they implement affect migration to those countries. As a matter of fact, some countries want immigration, albeit limited, in order to provide labor supply because of their aging population. In countries where such policies are implemented, migration does not have a negative impact on the labor market. Again, it was concluded that more immigration from such countries would positively affect the economic results[35].

Peter and Verikios[36] tested the effect of immigrants who came to Australia in the years 1991-1992 on the incomes of residents using the standard neoclassical model.

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[30] M. Izquierdo, J.F. Jimeno, J.A. Rojas: On the aggregate effects of immigration in Spain, SERIEs, 1.4/2010, p. 409-432.
[31] Ibidem, p. 422-430.
[32] S. Manole, L. Pănoiu, A. Păunescu: Impact of migration upon a receiving country's economic development, Amfiteatru Economic, 19.46/2017, p. 670.
[33] Ibidem, p. 676-678.
[34] E. Boubtane, J.-Ch. Dumont, Ch. Rault: Immigration and economic growth in the OECD countries 1986-2006, IZA Discussion Paper, 8681/2014, p. 18-19.
[35] Ibidem, p. 16-22.

[36] M.W. Peter, G. Verikios: The effect of immigration on residents' incomes in Australia: Some issues reconsidered, Australian Economic Review, 29.2/1995, p. 171-188.

Neoclassical theory states that an increase in employment will increase national income; however, there are many important factors that determine the relationship between migration and income growth. In terms of the Australian economy, the amount of foreign capital and publicly owned capital comes to the fore in determining this relationship. In the study, it is assumed that the workforce is homogeneous. For this reason, the assumption in the literature that immigrants have an unskilled labor force is abandoned here. As a result, it has been concluded that the migration movement has a positive effect on national income, but the amount of this effect in terms of the Australian economy is determined by capital ownership[37].

Research material and methodology

In this study, the relationship between economic growth and migration in 14 European Union Countries and Turkey has been examined. The data on the variables used in the study were obtained from the World Bank database. The GDP variable, which is determined as the dependent variable, is the annual growth rate of the GDP calculated at constant prices in national currency. Again, the migration variable was calculated as the annual total net migration. This variable is obtained by subtracting immigration from the total number of immigrants. In the study, panel data analysis was conducted on the variables calculated by taking five-year averages covering the period 1972-2019. The study covers 14 European Union countries (Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, and Sweden) and Turkey.

The model considered in the study is: $GDP_{it} = \alpha_i + \gamma_i t + \beta_i \, GOC_{it} + \varepsilon_{it}$

Where:

GDP = Gross Domestic Product Growth rate;
GOC = immigration rate;
α_i = Countries;
γ_i = Trend effect;
β_i = estimate parameter;
ε_{it} = Error term;
t = 1, 2, …, T time period;
i = 1, 2, …, N the number of observations.

There are some points to be considered while performing panel data analysis. First, unit root tests are used to determine whether variables are stationary because it will also be determined whether the analyses made with non-stationary series reveal an imitative regression relationship. Second, most panel data applications assume that the series is homogeneous; therefore, this assumption also needs to be tested. Consequently, the homogeneity test should be applied to determine whether the slope coefficients in the model are different between the horizontal sections.

[37] Ibidem, p. 13-16.

The Delta Homogeneity test developed by Pesaran and Yamagata[38] was used in the study. This test, $Y_{it} = \alpha_i + \beta_i X_{it} + \varepsilon_{it}$, is calculated with the equation.
Where:

$i = 1, 2, \ldots\ldots N$ and $t = 1, 2, \ldots\ldots T$;

H_0: $\beta_i = \beta \rightarrow$ The slope coefficient for all β_i is homogeneous;

H_1: $\beta_i \neq \beta \rightarrow$ The slope coefficient for at least one '*i*' is not homogeneous.

Cross-section dependency tests developed by Pesaran[39] were used to determine whether there is a cross-sectional dependence between the series. Since the H_0 hypothesis was rejected in this test, the presence of cross-section dependence was determined, and second-generation tests were used.

One of the unit root tests for the variables used in the study recommended by Levin et al.[40] and Im et al.[41] (IPS) were used.

The establishment of hypotheses in these tests and the calculation of test statistics are based on the Dickey-Fuller (1979) and Extended Dickey-Fuller (ADF) unit root tests. In these tests, the autoregressive (ρ) coefficient is accepted as homogeneous for all units in the Levin et al.[42] test, but the coefficient is allowed to be heterogeneous in the Im et al.[43] test. In the IPS test, the unit root test is applied to the time series separately for each unit without combining the data, and the IPS test statistics are obtained by taking the average of the statistics obtained[44].

After the unit root tests, cointegration tests were applied to determine the existence of a long-term relationship between the series. Among these tests, Pedroni[45], Kao[46] and Johansen Fisher cointegration tests were used.

It is estimated in the Pedroni[47] cointegration test, Panel v-statistics, Panel rho-statistics, Panel pp-statistics, and Panel ADF-statistics are used as "within" estimators, and Group rho-statistics, Group pp-statistics, and Group ADF-statistics as "between" estimators.

Similarly, Kao[48] and Johansen Fisher Panel cointegration tests were also performed. Kao[49] suggested the result of the ADF test statistic to test the hypothesis of H_0: there is no

[38] M.H. Pesaran, T. Yamagata: Testing slope homogeneity in large panels, Journal of econometrics, 142.1/2008, p. 50-93.
[39] M.H. Pesaran: General diagnostic tests for cross section dependence in panels, Cambridge Working Papers in Economics, 0435/2004, p. 9.
[40] A. Levin, Lin Ch.-F., Ch.-Sh.J. Chu: Unit root tests in panel data: asymptotic and finite-sample properties, Journal of Econometrics, 108, (1)/2002, p. 1-24.
[41] K.S. Im, M. Pesaran, Y. Shin: Testing for unit roots in heterogeneous panels, Journal of Econometrics, 115, (1)/2003, p. 53-74.
[42] A. Levin, Lin Ch.-F., Ch.-Sh.J. Chu: Unit root tests...., *op. cit*., 2022, p. 1-24.
[43] K.S. Im, M. Pesaran, Y. Shin: Testing for unit...., *op. cit.*, 2003, p. 53-74.
[44] S. Güven, M. Mert: Uluslararası Turizm Talebinin Eşbütünleşme Analizi: Antalya İçin Panel Ardl Yaklaşımı, Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi, 17.1/2016, p. 141-142.
[45] P. Pedroni: Critical Values for Cointegration Tests in Heterogeneous Panels with Multiple Regressors, Oxford Bulletin of Economics and Statistics, 61/1999, p. 653-670, https://doi.org/10.1111/1468-0084.61.s1.14
[46] C. Kao: Spurious Regression and Residual-Based Tests for Cointegration in Panel Data, Journal of Econometrics 90/1999, p. 144.
[47] P. Pedroni: Critical Values for..., *op. cit*., 1999, p. 653-670.
[48] C. Kao: Spurious Regression and..., *op. cit.*, 1999, p. 144.
[49] Ibidem.

cointegration between the variables. A lagged value of 1 was used in the Johansen Fisher Panel cointegration test.

In the study, analyses were made with the Gauss 10 and Eviews 11 package programs.

Research results

The results of the Delta homogeneity test, which was developed by Pesaran and Yamagata[50] in the study, are given in Table 1.

Table 1. Delta Homogeneity Test Results

N =15 T = 10		
Test	**Test Statistic**	***p*-value**
Delta_tilde	1.671	0.047
Delta_tilde_adj	1.960	0.025

Source: Gauss 10 package program application result.

According to these test results, the H_0 hypothesis – which states that the slope coefficient is homogeneous – is rejected. This result shows that the slope coefficients for each β_i are heterogeneous. In this case, it can be said that the cointegration tests that we will do separately for each section are reliable and valid.

In the second stage of the study, the results of the test performed to determine whether there is a cross-sectional dependence between the variables are given in Table 2.

Table 2. Horizontal Cross-Section Dependence Test

N =15 T = 10		
CD-Test for GDP	**Test Statistic**	***p*-value**
CD LM1 (Breusch, Pagan, 1980)	210.770	0.000
CD LM2 (Pesaran 2004, CDLM)	7.299	0.000
CD LM (Pesaran, 2004 CD test)	-1.414	0.079
CD-Test for GOC	**Test Statistic**	***p*-value**
CD LM1 (Breusch, Pagan, 1980)	201.995	0.000
CD LM2 (Pesaran 2004, CDLM)	6.693	0.000
CD LM (Pesaran, 2004 CD test)	0.147	0.442

Source: Eviews 11 package program application result.

The test results show that the H_0 hypothesis is rejected. This result, which shows that there is a cross-section dependency between the variables, can be interpreted as a development in one country that may affect other countries as well.

[50] M.H. Pesaran, T. Yamagata: Testing slope homogeneity in large panels, Journal of econometrics, 142.1/2008, p. 50-93.

In the third stage of the study, the unit root test results used to examine the stationarity of the variables in the model are given in Table 3.

According to the Fisher ADF and PP unit root test results given above, the H_0 hypothesis that all panels contain unit root is rejected. This result indicates that the series is stationary (i.e., they do not contain a unit root). In other words, a change in the GOC variable will permanently affect the GDP variable.

Table 3. Levin et al. and Im et al. Unit Root Test Results

Series: GDP H_0: All panels contain a unit root H_1: At least one panel is stationary.		
Method	Statistic	Probability
Levin, Lin and Chu	-9.49999	0.0000
Breitung t-Stat	-3.09016	0.0010
Im, Pesaran and Shin W-stat	-2.16094	0.0153
ADF-Fisher χ^2	68.4053	0.0001
PP-Fisher χ^2	120.317	0.0000
Seri: GOC H_0: All panels contain a unit root H_1: At least one panel is stationary.		
Method	Statistic	Probability
Levin, Lin and Chu	-9.51645	0.0000
Breitung t-Stat	-3.98440	0.0000
Im, Pesaran and Shin W-stat	-1.44839	0.0738
ADF-Fisher χ^2	53.8534	0.0048
PP-Fisher χ^2	54.1155	0.0045

Source: Eviews 11 package program application result; Levin A., Ch.-F. Lin, Chu Ch.-Sh.J.: Unit root tests in panel data: asymptotic and finite-sample properties, Journal of Econometrics, 108, (1)/2002, p. 1-24; Im K.S., Pesaran M., Shin Y.: Testing for unit roots in heterogeneous panels, Journal of Econometrics, 115, (1)/2003, p. 53-74.

According to the Fisher ADF and PP unit root test results given above, the H_0 hypothesis that all panels contain unit root is rejected. This result indicates that the series is stationary (i.e., they do not contain a unit root). In other words, a change in the GOC variable will permanently affect the GDP variable.

Finally, Pedroni, Kao and Johansen Fisher cointegration tests were conducted to investigate the existence of a long-term relationship between the variables. The results of these tests are given in the Table 4. According to the results of Pedroni's[51] cointegration test given in Table 4, since the p-value of the statistics other than the Panel v-statistics and the Group rho statistics is less than 0.01, we can say that it is significant at a level of 1%. In this case, we can reject the H_0 hypothesis – which is expressed as there is no cointegration between the variables. As a result, it will be accepted that there is a cointegration relationship between migration and growth variables in the long run.

[51] P. Pedroni: Critical Values for..., *op. cit*., 1999, p. 653-670.

Table 4. Pedroni Cointegration test results

Series: GDP GOC				
Included observations: 150				
Cross-sections included: 15				
Null Hypothesis: No cointegration				
Trend assumption: No deterministic trend				
Automatic lag length selection based on SIC with a max lag of 1				
Newey-West automatic bandwidth selection and Bartlett kernel				
Alternative hypothesis: common AR coefs. (within-dimension)				
	statistic	prob.	weighted Statistic	prob.
Panel v-Statistic	-0.764758	0.7778	-0.895890	0.8148
Panel rho-Statistic	-2.777184	0.0027	-2.705482	0.0034
Panel PP-Statistic	-10.18377	0.0000	-9.705776	0.0000
Panel ADF-Statistic	-9.444207	0.0000	-8.861221	0.0000
Alternative hypothesis: individual AR coefs. (between-dimension)				
Group rho-Statistic	-0.750652	0.2264		
Group PP-Statistic	-12.46450	0.0000		
Group ADF-Statistic	-9.721558	0.0000		

Source: Eviews 11 package program application result.

Table 5. Kao Test Statistics Results

Kao Residual Cointegration Test		
Series: GDP GOC		
Included observations: 150		
Null Hypothesis: No cointegration		
Trend assumption: No deterministic trend		
Automatic lag length selection based on SIC with a max lag of 1		
Newey-West automatic bandwidth selection and Bartlett kernel		
	t-Statistic	Prob.
ADF	-3.311123	0.0005

Source: Eviews 11 package program application result.

According to Kao[52], because of the cointegration test results given in Table 5, at a 1% significance level, the H_0 hypothesis is rejected. This result shows that the variables come to equilibrium by acting together in the long run.

[52] C. Kao: Spurious Regression and..., *op. cit.*, 1999, p. 144.

Table 6. Johansen Fisher Panel Cointegration Test Results

Johansen Fisher Panel Cointegration Test				
Series: GDP GOC				
Included observations: 150				
Trend assumption: Linear deterministic trend				
Lags interval (in first differences): 1 1				
Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized	Fisher Stat.*		Fisher Stat.*	
No. of CE(s)	(from trace test)	Prob.	(from max-eigen test)	Prob.
None	87.06	0.0000	79.70	0.0000
At most 1	48.27	0.0186	48.27	0.0186
* Probabilities are computed using asymptotic χ^2 distribution.				

Source: Eviews 11 package program application result.

As in the other two tests, the Johansen Fisher cointegration test results also indicate a long-term relationship between the variables.

Conclusion

The fact that the increase in welfare achieved after the industrial revolution could not be shared equally caused wars, social unrest, and migration movements. The center of these migration movements is generally towards developed countries that provide more equal opportunities.

Migration has features that affect not only immigrants, but also future generations, increases the demand for domestic goods, the gross domestic product, and improves the balance of payments by causing human capital mobility.

Different economic theories explain the effects of migration differently. For example, while neoclassical theory talks about the negative effects of migration because it reduces the capital stock per capita, Romer argues that it has positive results in the growth model due to its contribution to human capital. Again, the endogenous growth theories, which consider wage levels, say that they positively affect economic growth due to the low-paid workforce. Despite these different implications, the literature concludes that a balanced migration movement can positively affect the economy through the policies to be implemented.

Differences in the human capital of migrants are the main differences that explain the economic effects of migration. For example, unskilled labor migration appears to provide a substitute for low-wage workers in the country of origin while increasing the wage level in high-paid jobs. In other words, while migration causes wage decreases in unskilled jobs, it causes wage increases in skilled jobs. In general equilibrium models, this is explained by looking at the total effect. In other words, since the amount of labor increases with the migration movement, but the productivity decreases, the economic effects are evaluated in terms of the total impact.

As a result of working following the literature, we can say that a positive development in one country in terms of countries with similar economic conditions also affects other

countries, and they become a center of attraction in terms of migration movements. In addition, the migration movement does not only have consequences for the migrant. This has consequences for the person's family, that is, for future generations. Therefore, we can say that migration has positive and long-term effects on economic growth. In other words, migration and growth variables show a cointegration relationship in the long run.

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Związek pomiędzy wzrostem gospodarczym a migracją w ujęciu Unii Europejskiej i Turcji

Streszczenie

Ruchy migracyjne wpływają na wiele zmiennych ekonomicznych, takich jak kapitał ludzki, popyt, podaż, bilans płatniczy, podział dochodów, poziom płac i dochód narodowy. W literaturze przedmiotu migracje są często badane pod kątem ekonomicznym, politycznym i bezpieczeństwa. Niniejsze opracowanie koncentruje się na związku migracji ze wzrostem gospodarczym. Istnieją badania, które określają dwukierunkową przyczynowość w relacji pomiędzy wzrostem gospodarczym a migracją. Widać, że określone tu grupy krajów mogą wyjaśnić te różne wyniki.

W tym badaniu testowano rzeczywiste relacje między migracją a tempem wzrostu gospodarczego w ujęciu wielkości ekonomicznej przy użyciu podobnych 14 krajów Unii Europejskiej i Turcji dla okresu 1978-2019 z panelową analizą danych. Widać, że wyniki testu wyjaśniają pozytywne efekty migracji zgodnie z literaturą.

Słowa Kluczowe: wzrost gospodarczy, imigracja, pierwiastek jednostkowy, przyczynowość, Unia Europejska
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