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The Relation Between International Movements and Development: Analysis of Cities in Turkey

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ABSTRACT

This study aims to analyse the extent to which international mobility impacts the socio-economic development of cities in Turkey. Firstly, a 27-variable principal component analysis was applied to determine the development index of the cities. The socio-economic development of the cities is classified into six categories. Primarily international mobility, international capital, and population mobility have been evaluated two-dimensionally within the accessible national data covering the years 2018-2019. In this study, the effect of the variables of international mobility on the cities' socio-economic development was identified through multivariate regression and geographic weighted regression (GWR) analysis. Global (OLS) and GWR analyses allow us to investigate the impact of and the relationship between international mobility on socio-economic development. GWR model, which can give place-based regression results and additionally the number of companies with foreign capital, the number of houses sold to foreigners, the number of incentive certificates issued to foreigners, the number of foreign workers, the number of foreigners granted residence permits, and the number of international students were used as independent variables. International capital mobility has a meaningful and positive relationship with the socio-economic development index. The variable of the number of international students used as a part of international population mobility does not have a meaningful effect on socio-economic development index (SEGE). Overall, international mobility has a positive impact on the level of socio-economic development of the cities. However, given the geographical distribution of international capital and population movements in Turkey, western and southern regions seem to have a higher mobility level than the rest of the country.

1. INTRODUCTION

The globalization process and the developments in information and communication technologies have led to a change in production mode and resulted in a significant increase in the mobility of international capital, people, and goods. Until the 1980s, the Fordist production system required all production stages to occur in the same location. The technological developments enabled production to become more fragmented and outsourced [1, 2]. In other words, the production process has become flexible. This flexible production mobilized the capital towards developing countries where production is cheaper, and the labor force is abundant. With the increase in international capital mobility, people became more mobile as well due to better living conditions, labor opportunities, access to education and health facilities [3, 4]. As of 1980, Turkey implemented an economic reform package that included a series of decisions to open up the economy, remove restrictions on foreign exchange and encourage exports. Turkey replaced the import-substitution industrialization policies of the pre-1980 period with outward-oriented policies. Quantitative restrictions on foreign trade were lifted and customs duties were reduced to a great extent, and then capital movements were liberalized and restrictions on foreign capital flows were lifted [5]. In short, production and consumption patterns and the accumulation regime changed and transformed in the post-1980 period in Turkey, which increased the inflow of foreign capital.

Both in developed and developing countries, the mobility of the international capital and population contributed to the host countries' economic growth and development [6, 7]. Especially in developing nations, the investments of international capital and employment of the highly skilled labour force became a political tool. These countries have been searching for ways that attract international capital. This is because these large-scale investments are advantageous for the countries' economic growth, and the technological developments, employment structure, entrepreneurship activities, and the development of a competitive environment greatly benefit [8]. OECD describes international investments as the engine of economic growth and supports the conditions that attract that sort of investment [9]. In Turkey, for the first

time in the 1950s, a series of legal adjustments to attract international investors have been made due to the lack of the country's equity. However, it was not until the 1980s the desired number of international investments found their way to Turkey. In 1980 Turkey shifted to the market economy, the international capital flow increased in small increments. In 2003, another set of legal adjustments was made, and the investment flow increased significantly compared to the previous attempts [4]. Even though international capital investments fluctuated due to the global financial crisis, political and economic instabilities, in 2018, they reached the level of 15 billion dollars [10].

Moreover, the neoliberal reformations increased the international workforce's mobility [11]. According to the International Organization for Migration (IOM), the number of international migrants is 272 million globally, which equates to %3.5 of the world population [12]. The mobility usually stems from economic reasons, and the number of migrants in middle-income countries increases [12]. Turkey is a target country of international migrants due to its historical and current position as a transit country. Until the 1990s, Turkey welcomed immigrants from Turkic countries. After the 1990s, the migrant profile changed drastically, and the origins of migrants became Middle-Eastern countries, Africa and Asia. In 2011, the Syrian war resulted in 3.6 million (2019) Syrian refugees mobilized and ended up in Turkey [13]. This number equals doubled Turkey's total migration since the foundation of the Turkish republic. In 2016, after the international labour law took effect [14], the number of Syrian refugees in the workforce increased significantly.

The studies that look into the economic impact of international capital and workforce primarily analysed the effects of international mobility on a country's economic growth and development over periods [15, 16]. These studies mainly analyse how the macroeconomic indicators change; however, they usually neglect how mobility differs among various regions and cities of the host country and its relationship with socio-economic development. To bridge this gap, this study aims to analyze international mobility concerning the socio-economic development on an urban scale in Turkey and contribute to the theory and practice of international mobility.

The relationship between the level of socio-economic development and the number of foreign capital investments, the number of houses sold to foreigners, the number of incentive certificates issued to foreigners, the number of foreign workers, the number of foreigners with a residence permit, and the number of international students are analyzed in the scope of the study. Due to varying levels of socio-economic development in Turkey's cities, the study used the Geographically Weighted Regression (GWR) model that gives spatially customized results instead of the Ordinary Least Squares (OLS) which gives every city the same result.

In the second section of this paper, the theoretical and empirical background was established, and then the third chapter presented the fluctuations in investment and population flows towards Turkey and its relation to the socio-economic development indicators. The fourth and last chapter of this paper seeks the answer to the question of is the socio-economic development level has been affected by the international mobility of people and capital, and the last chapter discusses all the findings of the analysis.

2. LITERATURE REVIEW

While foreign direct investments contribute to the local and national economy in terms of capital, labour, and technology, portfolio investments contribute to the national economy as capital [10, 17]. The OECD argues that foreign investments are an alternative source of capital for a country and help develop production, enhance trade networks, increase the socio-economic development of regions technological developments, and contribute to the workforce's skill gain [18].

Hymer [19] argues that there are two main reasons why companies choose inter-national production in terms of foreign direct investment and industrial organization: First, companies want to minimize the risks of their investments and maximize returns. Due to the risks, transaction costs, and exchange rate instability associated with port-folio investment, companies prefer foreign direct investment. Second, they control foreign companies in order to use the monopolistic advantages over their competitors. Thus, companies that have the advantage want to remove the competition by controlling other companies and want to use the company's unique advantages (economies of scale, market share, technological superiority, access to capital, etc.) in a foreign country and also diversify their activities [19].

This explains Hymer's approach to the globalization process of companies through foreign direct investment. According to Dunning (1988), companies must have three advantages to attract foreign direct investment. These are ownership-specific advantages (O), internalization advantages (I), and location-specific advantages (L). The company that chooses to invest in a foreign country should have more advantages than its own country. Investment incentives, international transportation and communication costs, R&D, economic systems, and government strategies are seen as location-specific advantages [20, 21].

The neoclassical economic theory explains migration as international population mobility, approaches the reasons for migration in terms of the labour movement [22, 23]. Labour migration occurs due to wage differences between countries. He explains that the reasons for wage differences between countries are labor demand and geographical differences. Also, he emphasizes that labour migration will not occur if there is no wage difference between the two countries [24].

However, other migration theories contradict this. They note that even when there is no wage difference between countries, migration occurs due to capital and households. The new economics of migration theory has developed different hypotheses than the neoclassical economic theory [25]. It argues that migration is not a decision made by individuals alone, but a decision made by the family or household due to the lack of different market mechanisms in the originating country or the instability of its economy [26, 27].

Another theory that explains international population mobility is the dual labour market theory. According to this theory, international migration stems from the needs of modern industrial societies' domestic labour force [24]. Piore [28] says that migration is not caused by low wages or high unemployment rates in origin countries; it is triggered by the need for foreign workers in destination countries.

In modern industrial societies, the labour market has a primary and secondary segment. As the first segment includes a skilled workforce working in capital-intensive sectors, the second one consists of a low-skilled workforce clustered in labour-intensive sectors. The dual labour market theory states

that the international labour movement towards modern industrial societies originates from the labour-intensive segment demands [24, 28]. These theories explaining international mobility have a common approach: they assess the economic effects both from the point of migration receiving and sending countries [24].

Many studies examine the relationship between international capital and population mobility with economic growth or development [6, 15, 16, 29-32]. While empirical studies mostly look into the effects of international capital and population mobility on the country's economy, few other studies measure their effects on the economic growth or socio-economic development level at the regional or urban level [16, 33]. Studies examining international capital mobility investigate the short or long-term effects of foreign investments on countries' or regions' economies. Mahalakshmi et al. [34] analysed the effect of foreign direct investments on India's different regions with a panel data analysis method. The study found that foreign capital investments prefer regions with a developed infrastructure and high human capital potential. Consequently, India could not reach its target of balanced regional economic development through foreign direct investments in the past two decades. Reichert and Weinhold [35] focused on whether significant increases in foreign direct investment in developing countries boost economic growth and found that the relationship between both foreign and domestic investment and economic growth in developing countries is highly heterogeneous and that estimation methods determining homogeneity between countries are misleading. These examinations revealed that foreign investment would increase growth in countries that have already adopted an open economic system. Zekarias [36] found that foreign investments positively and significantly affected economic growth by analysing 14 East African countries. He also found that foreign capital investments are a key factor in economic growth in East Africa, and sub-regions can attract even more foreign investors by improving the investment environment, strengthening regional integration, and developing human capital and basic infrastructure. Studies examining international population mobility investigate the economic and socio-political effects of mobility on various levels. Harris and Todaro [30] found that migration, directly and indirectly, affects the labour and housing markets in regional economies. Hofler and Murphey [37] argued that international migration is a factor that increases unemployment in 50 regions of the USA. Similarly, Badinger and Url [38] found in their analysis of Austria's 87 regions that international migration increased unemployment and lowered wages in Austria. Di Berardino et al. [33] analysed the relationship between international migration and economic growth regions of Poland by using panel data. The study covers the period 1999-2005 and they tested whether migration flows with different levels of education have an impact on economic growth. The migration of high-skilled people has a positive impact on the growth dynamics of Polish regions. On the other side, the outflow of skilled people has a negative impact on regional income and decreases the regional skill-intensity [33].

The research examining foreign capital investments in Turkey [39, 40] focuses on the impacts on economic growth, development, labor costs, real exchange rate, and foreign trade. Some of these studies argued that foreign capital investments contribute to economic growth [41, 42] and that Turkey needs foreign investment for economic growth. However, they revealed that the way to attract more investment is to ensure that the country has the necessary infrastructure for investments to flourish [39, 40, 43, 44]. There are also studies proving otherwise [45, 46]. These studies argue a negative relationship between economic growth and short-term foreign capital investments [45-47]. Şen and Karagöz [39] measured the effects of foreign direct investments and exports on economic growth using causality analysis/causal analysis and found that foreign direct investments do not significantly affect economic growth. Yapraklı [48] analysed the relationship between foreign direct investments and economic variables using multiple cointegration analysis and an error correction model. She found that while GDP and openness positively affect foreign investment, labour cost, exchange rate, and foreign trade deficit variables have a negative effect. Kar and Tatlısöz [44] identified the factors that impact direct foreign capital investments in Turkey. They found that while gross national product, openness, electricity production index, and investment incentives have a positive impact, real exchange rate and labour costs have a negative one.

Studies on international population mobility in Turkey [15, 49, 50] primarily focused on the effect of inter-regional mobility on economic growth. İçduygu et al. [15] examined the relationship between socio-economic development and international migration at the district level and observed that people from regions with low socio-economic development immigrate more, and these regions are relatively more impoverished. They added that the socio-economic development variable alone is insufficient to explain the migration rate; therefore, political, cultural, and demographic factors should also be included in the model [15]. Sevinç et al. [51] examined the relationship between migration and economic growth in developing countries between the years of 1962-2012. They found that in Turkey, there is a significant and negative relationship between economic growth and migration. Demirtaş et al. [16] investigated the effect of international migration on regional development of Turkey by using panel data analysis. The main result of the study is that international migration inflows have a positive impact on regional development. In other words, an increase in the number of international legal immigrants to a region increases the welfare level of regions [16]. In recent years, there has been a spike in studies that examine the effect of forced migration from Syria to Turkey on the economy, politics, and national security on a regional and urban scale. Esen and Binatlı [52] examined the impact of Syrian refugees on regional and labor markets and found that Syrian refugees increased unemployment and caused a decrease in both formal and informal employment. Türkcan [53] analysed the effect of international migration to Turkey on regional economies in terms of Syrian refugees. She found that the unemployment rate, inflation, and property rates increased at a higher rate in regions where Syrians live most. The studies focused on Syrian refugees mostly examined housing and labour market changes and inflation [51, 54].

2.1 International movements to Turkey?

To encourage foreign venture capital flows and address the capital deficiency problem, The Law for Encouragement of Foreign Capital entered into force in 1954, but it could not be put into practice until the 1980s due to political and economic instabilities. In 1980, "the principles of stability" entered into force, and Turkey adopted "the market economy" and

neoliberal policies. After the 1990s, the number of foreign capital investments in Turkey started to increase, but these investments have been short-term portfolio investments, not direct investments. With the changes made in the Foreign Direct Investments Law in 2003, permission and minimum capital requirements for foreign investments were removed, and an information system was introduced instead [55]. With this arrangement, the number of foreign companies in Turkey has increased by over one hundred percent [56]. In Turkey, foreign capital investors prefer partnerships or real estate investments rather than opening a new company [46]. The economic crises occurring at different times in the world resulted in sharp decreases in Turkey's foreign capital investments; however, the total value of these investments in 2018 reached 18 billion USD [10].

In 2011, the number of foreign jointly owned companies in Turkey was around 3500. Nevertheless, in the following years after a big migration wave came from Syria, the number of jointly owned companies by Syrians increased drastically. In 2019 the number of foreign jointly owned companies increased four times and reached 13500 [57].

Istanbul (8221) has the highest number of jointly owned companies with a foreign partner (Figure 1). The number of companies with Syrian partners is 1595, and they constitute 12% of jointly owned companies founded in 2018 in Turkey.

Istanbul has a leading position in the jointly owned companies with Syrian partners. Mersin, Hatay, and Bursa follow Istanbul, respectively [58]. One of the main reasons for the higher numbers of jointly owned companies in Mersin, Gaziantep, and Hatay is the increase in the number of companies with Syrian joint capital. In contrast with these regions, the number of companies with foreign joint capital is lower in the Black Sea and Eastern Anatolia Regions.

With the Regulation Regarding Acquisition of Immovable Properties by a foreigner in 2012, house sales to foreigners increased from 2 billion USD to 5.9 billion USD (2019), 6.3 billion USD (2022), [10]. According to the 2018 data of the TCMB, foreign direct investment inflows for real estate investment reached 5.9 billion USD. In 2018, 4% (2022: %5) of total housing sales were made to foreigners, and the city with the highest number of houses sold to foreigners was Istanbul, with 14,270 (2018), 24,953 (2022) houses [59]. The cities such as Istanbul, Ankara, Antalya, and Bursa, where the number of sales is the highest, are the country's most developed cities. The other cities with relatively higher numbers, like Antalya and Aydın, are coastal touristic cities [59].

To ensure that international capital mobility towards Turkey spread equally, several incentives to foreign investors were provided. Cities are divided into six regions according to their socio-economic development levels, while the cities with the highest level of development are located in the 1st region; the 6th region consists of underdeveloped cities. Even though the number and variety of incentives were higher to promote investment in the less developed regions, investors prefer the western regions where the first and second level developed cities are located (Figure 2). The difficulty of geographical conditions, insufficiency of transportation infrastructure, migration rates, lack of skilled workforce are among the reasons for lower investment rates [60].

The international migration to Turkey can be analyzed in two periods. Until 1990, most of the migrants were coming from the neighboring Turkic nations. In the 90s, the total number of migrants in Turkey was 1.3 million. 36% of the total foreign population was from Bulgaria, 30% from Greece, 22.1% was from Yugoslavia, and 8,9% was from Romania [61]. However, after the 1990s, African, middle eastern, and Asian populations mobilized. İstanbul has the highest international migrant population. Ankara and Antalya follow İstanbul, respectively. The number of migrants concentrated in western regions is relatively higher than in the rest of the country (Figure 3).

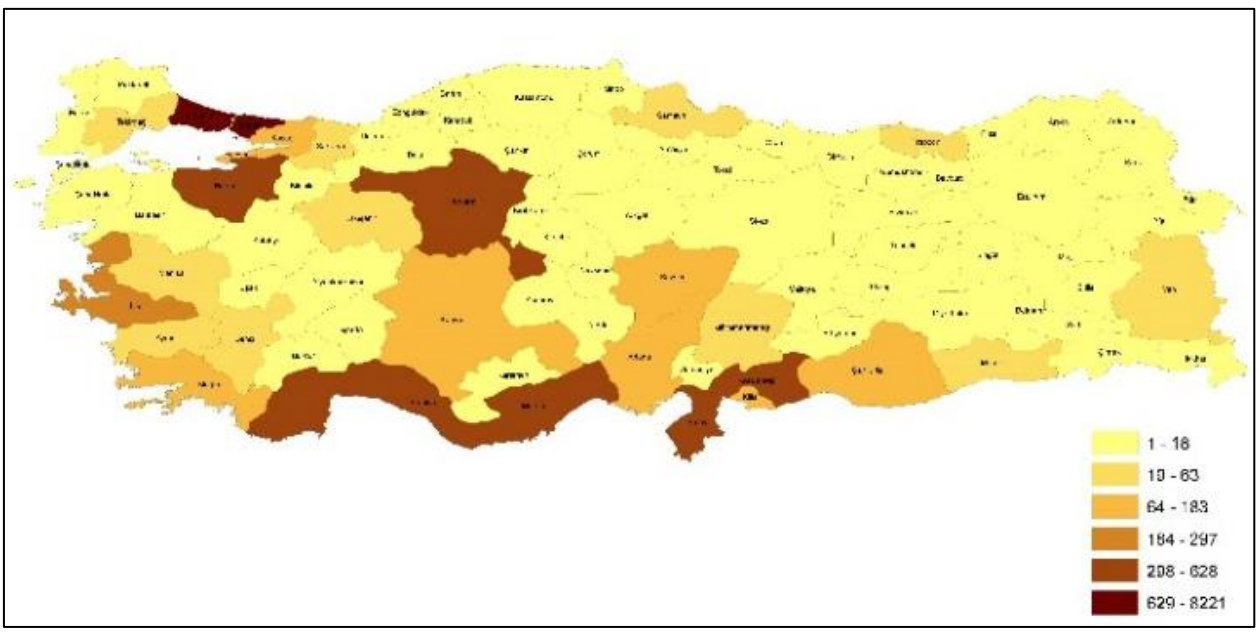

Figure 1. Number of companies with foreign capital [62]

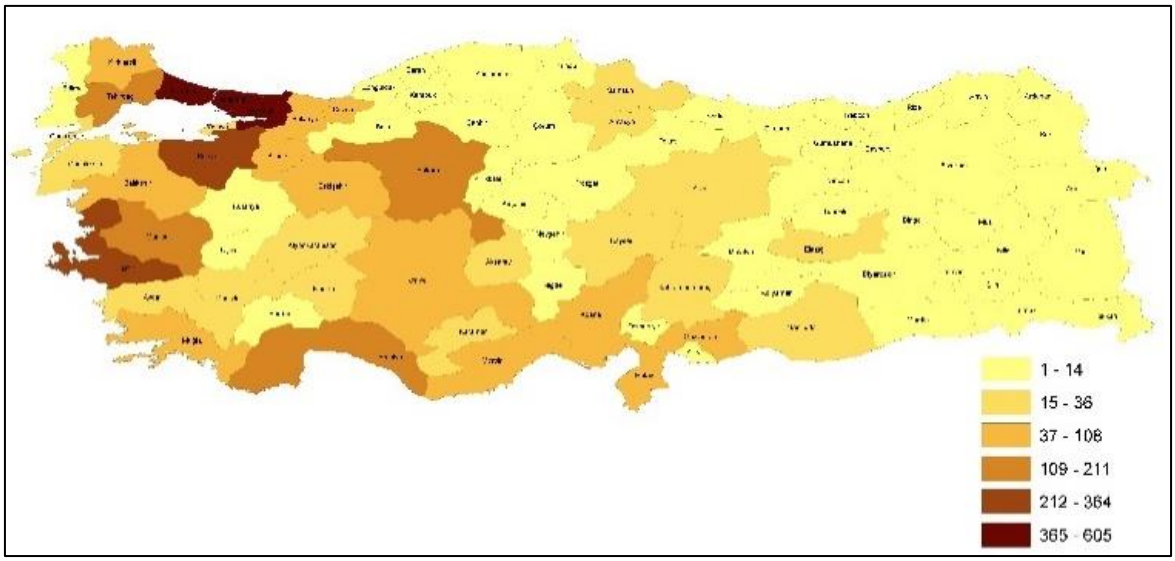

Figure 2. Investment incentive certificate issued to foreigners, 2018 [62]

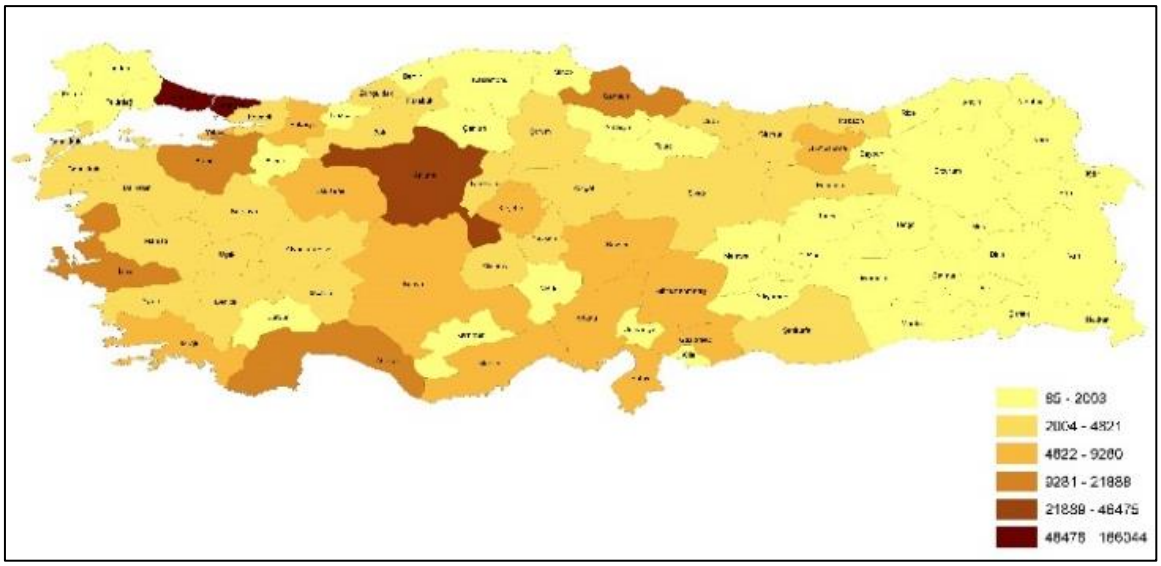

Figure 3. Distribution of foreigners with a residence permit by the province, 2018 [63]

Some legislations restrict the work permit of foreigners. In 2016 [10], the International Labour Law entered into force. One of the main arguments supporting this law is to record the Syrian refugees already a part of Turkey's workforce since 2011 [64]. Between 2012 and 2018, the number of foreign workers quadrupled. İstanbul has the highest numbers in terms of foreign workers (Figure 4).

In Turkey, cities located in the south and western regions have higher mobility in international capital and population. Turkey's socio-economic development at the provincial level also shows similar results, with western and southern cities being more developed. In the socio-economic development study conducted by the Ministry of Development [65], the cities' development level was examined in six categories. The Ministry's study shows that the first and second-category cities are located in Turkey's southern and western parts. The same study found that the eastern cities' development levels where international capital and population mobility are lower are in the fifth and sixth categories. Other province-level socio-economic development studies performed in Turkey yield similar results [66, 67]. Studies demonstrate that whereas cities in Marmara and Aegean regions' have the highest socio-economic development level, cities located in Eastern and South-eastern regions have the lowest [65-67]. The international capital and population mobility are concentrated in developed regions as well.

Shortly, studies analyzing capital and population movements generally examine their effects on the national economy. In addition, the relationship with the income per capita is emphasized. However, in this study, the relationship between capital and population mobility is tried to be revealed by calculating the development index of the cities. When we look at the flow of international movements to regions, not only income but also other social and economic variables become important. In this sense, revealing the relationship by calculating the SEGE is an important feature that distinguishes it from other studies. In addition, international movement studies generally discuss the effects on the national economy. However, provinces and regions show different characteristics from each other and this difference causes differences in international capital and population mobility.

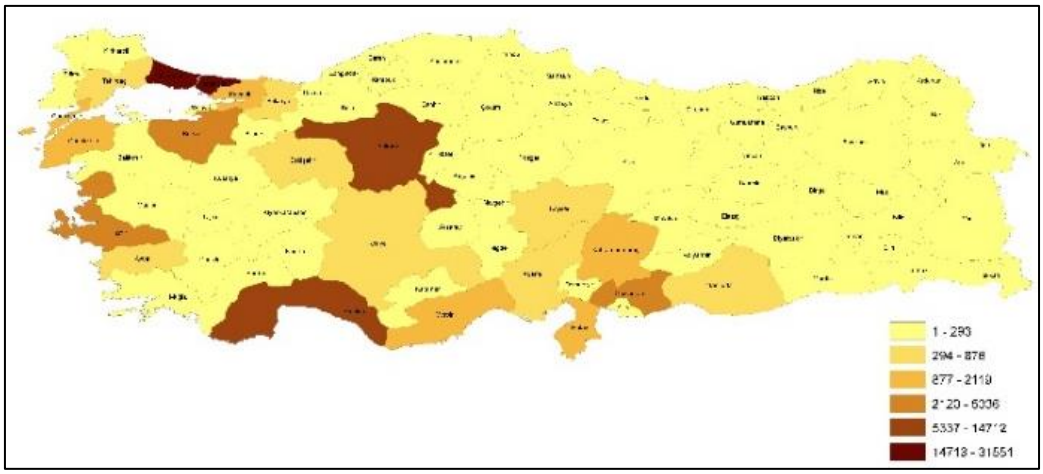

Figure 4. Number of work permit given to foreigners by provinces, 2018 [68]

3. MATERIALS AND METHODS

In this study, to reveal the relationship of international capital and population mobility with socio-economic development at the provincial level, provincial data covering the years 2018-2019 were used, and spatial analysis was performed. First, the principal component analysis was applied using a data set with 27 variables to determine the cities' development index. A standardized data matrix was used to reduce the dependency structure between variables due to the large number of variables used, the existence of relationships between the variables, and the fact that the variables consist of different units such as km, TL, and person. In Turkey, there are studies that calculate the socio-economic development index at the regional, provincial and district levels using variables that represent different dimensions of economic and social development. In this study, 27 variables were identified by using the variables used in previous studies for Turkey. The economic indicators include variables such as per capita income, employment, sectoral distribution of labour force, agricultural production, public investment and the social indicators include variables such as demography, education, health and infrastructure.

Previous studies [16, 32, 41, 47, 69-71] mostly used per capita income or gross domestic product as dependent economic growth variables. This study aimed to determine the relationship of international capital and population mobility with development rather than income and economic growth. Therefore, the development index was used, including economic, demographic, health, and education indicators. Independent variables used to evaluate international capital and population mobility were determined by examining similar studies [16, 33, 72]. Three independent variables were used to determine the impact of international capital mobility on socio-economic development. These are the number of foreign companies per thousand people, the percentage of houses sold to foreigners, the number of incentive certificates issued to foreigners. Again, three variables were used to determine the impact of international population mobility on socio-economic development: the percentage of foreigners residing in Turkey and the percentage of work permits granted to foreigners, and the percentage of international students in higher education (see Table 1).

Table 1. Definition of variables

Dependent Variable	Abbreviations	Description	Unit	Year	Source
Socioeconomic development level	LSE_DEVELOPMENT_I	Socio-economic development index		2018	Obtained by the author
Independent Variables	**Abbreviations**	**Description**	**Unit**	**Year**	**Source**
Companies with foreign capital	LPC_FDI	The number of foreign companies per 1000 population	Thousandth	2018	[57]
House sales to foreigners	LF_HOUSE	The ratio of houses sold to foreigners to total house sales	Percentage	2018	[59]
Investment incentive certificate issued to foreigners	LF_INCENTIVES	The ratio of the investment incentive certificates issues to foreigners	Percentage	2018	[62]
Work permits of foreigners	LF__WORKER	The ratio of the number of workers granted work permit	Percentage	2018	[68]
Foreigners with a residence permit	LF_NUMBER	The ratio of the number of foreigners granted residence permit	Percentage	2019	[63]
The ratio of international students	LF_STUDENT	The ratio of the international students to total students	Percentage	2018	[73]

Source: The data sources regarding the variables used in this study and some other specifications can be found in Table 1. The data of the independent variables are accessed from Turkey Statistical Institute (TurkStat), The Union of Chambers and Commodity Exchanges of Turkey (TOBB), Council of Higher Education, The Ministry of Labor and Social Security the Republic of Turkey, and Ministry of Industry and Technology's official websites

In this study, the effect of the variables of international population mobility on the cities' socio-economic development was identified through multivariate regression and geographic weighted regression (GWR) analysis. Global (OLS) and Geographical Weighted Regression (GWR) analyses allow us to investigate the impact of and the relationship between international mobility on socio-economic development. Since the global regression model (OLS) ignores the geographical differences [74], the geography factor is included in the global regression models. Thus, the "Geographical Weighted Regression Model" was developed, which describes the regression value for each area. Like other statistical analysis, GWR analysis has several limitations, including multicollinearity in local coefficients, strong correlations in estimated coefficients for multivariate regression terms, multiple hypothesis testing, and the incapability of decomposing the global estimates into local estimates [75, 76] However, most of these limitations have been discussed in the literature, and many solutions have been proposed. Despite concerns, it is a useful tool for explaining spatial non-stationarity and interpolation [77].

The impact of international population mobility on socio-economic development is analyzed using the global regression method. Regression analysis needs to prove some assumptions in order to be efficient. These are normality, multiple linearity, and the absence of autocorrelation [78]. In order to prove the normal distribution assumption, the logarithm of each variable was taken, and it is seen that the model provided all the assumptions in the applied regression analysis.

The regression model was created with Ordinary Least Sequares (OLS) analysis method and applied as follows Eq. (1) and Eq. (2).

$$LSE\_DEVELOPMENT\_I = \alpha + \beta_1 LPC\_FDI + \beta_2 LF\_INCENTIVES + \beta_3 LF\_HOUSE + \varepsilon \quad (1)$$

$$LSE\_DEVELOPMENT\_I = \alpha + \beta_1 LF\_WORKER + \beta_2 LF\_NUMBER + \beta_3 LF\_STUDENT + \varepsilon \quad (2)$$

4. RESULTS

4.1 Relationship between international mobility and socio-economic development at provincial level

The correlation between dependent and independent variables used in the study is positive. In addition to the lack of a high (r> 0.80) level relationship between the independent variables, there is no multiple linear connection problem which is one of the assumptions of the regression analysis (see Table 2).

Table 2. Correlations

	LF_WORKER	LF_NUMBER	SE_DEVELOPMENT_I	LF_INCENTIVES	LF_HOUSE	LKB_FDI	LF_STUDENT
LF_WORKER	1	.548	.632	.532	.366	.600	.495
LF_NUMBER	.548	1	.696	.532	.521	.530	.408
SE_DEVELOPMENT_I	.632	.696	1	.673	.395	.527	.431
LF_INCENTIVES	.532	.532	.673	1	.265	.458	.260
LF_HOUSE	.366	.521	.395	.265	1	.295	.086
LPC_FDI	.600	.530	.527	.458	.295	1	.269
LF_STUDENT	.495	.408	.431	.260	.086	.269	1

Table 3. OLS diagnostics

	Model-1 (Capital Movement)		Model-2 (Population Movement)	
Dependent Variable	**Socio-Economic Development Index (SEGE)**			
# of Observations	81			
Multiple R-Squared	0.54		0.57	
Adjusted R-Squared	0.52		0.56	
Joint F-Statistic	30.7	0.000000*	52.5	0.000000*
Joint Wald Statistic	91.3	0.000000*	67.4	0.000000*
Koenker (BP) Statistic	10.03	0.018253*	6.01	0.049395*
Jarque-Bera Statistic	6.19	0.050025	3.77	0.151634

(*) indicates that test is statistically significant (p < 0.05).

Table 4. Summary of OLS results (Dependent variable: LSEGE)

Model - 1 (Capital Movement)	**B**	**t**	**Sig.**	**VIF**
(Constant)	1.763348	17.924524	0.0000***	
LKB_FDI	0.085425	2.67351	0.0000***	1.31928
LF_INCENTIVES	0.333658	5.878951	0.0229**	1.295414
LF_HOUSE	0.08444	2.320483	0.0091***	1.122037
Model - 2 (Population Movement)	**B**	**t**	**Sig.**	**VIF**
(Constant)	2.072585	17.975919	0.0000***	
LF_NUMBER	0.277864	5.655452	0.0000***	1.429
LF_WORKER	0.158222	4.053264	0.0001***	1.431

*** significant at 99% level (p<0.01), ** significant at 95% level (p<0.05)

Table 5. OLS and GWR analysis results

		Moran's I	Z-Score	AIC	Adjusted R2	Residual Squares	Effective Number	Sigma
Model-1	**OLS**	0.033	0.5135	-41.07	0.52			
	GWR	-0.074	-0.693	-49.3	0.59 **Min:0.44 Max: 0.77**	1.99	10.03	0.16
Model-2	**OLS**	0.1547	1.8826	-48.69	0.56			
	GWR	0.0638	0.857	-58.5	0.62 **Min:0.33 Max:0.72**	1.84	8.89	0.15

The assumptions required for regression analysis are proved in both models. In order to be able to evaluate the results, their accuracy, reliability, and validity have been tested. The F test result, which tests the significance of the regression models, was found to be statistically significant. If Jarque-Bera test results are not significant, it means that the data show a normal distribution [79]. The models prove the normal distribution assumption (Table 3).

The independent variables in the model have a statistically significant effect on the SEGE. While the number of foreign companies per thousand people, the percentage of houses sold to foreigners, the percentage of the number of foreigners, and the number of foreign workers were found to be statistically significant at the level of 1%; the number of incentives issued to foreigners was found to be significant at the level of 5% (Table 4).

In the analyses for residues in GWR and OLS models, Moran's I value results were obtained very close to 0. This shows that there is no spatial autocorrelation in both models. In Model 1, the AIC value is -41.07 due to the OLS analysis, and -49.3 as a result of the GWR analysis; In Model 2, AIC value was found -48.69 in OLS analysis and -58.5 in GWR analysis. On the other hand, higher results were obtained in GWR analyzes in Model 1 and Model 2 for R2 values. According to these results, the GWR analysis shows that the GWR model's performance is stronger because the AIC values are lower and the R2 values are higher (Table 5). Analyses of both models established to measure the impact of international capital and population mobility on SEGE indicate that the model matches the observed data better.

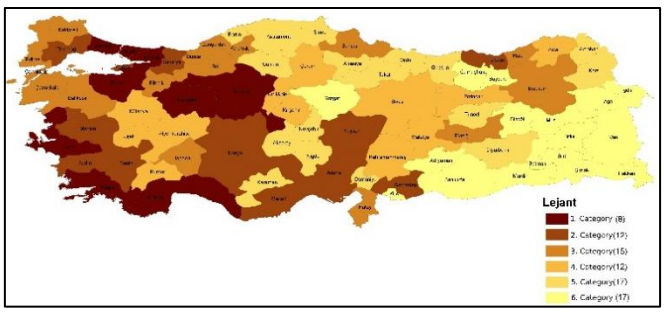

Figure 5. The level of socio-economic development of cities

The socio-economic development levels of the cities are classified into six categories. In comparison, the cities in the first category consist of the most developed countries, the cities in the sixth category are the least developed ones. While the cities first, second and third categories are clustered in Marmara, Aegean, Mediterranean, and Western Anatolia regions, cities in the fourth, fifth, and sixth categories are located in Eastern and Southeastern Anatolia, Eastern Black Sea, and Central Anatolia regions. First category includes the cities of İstanbul, Ankara, İzmir, Antalya, Kocaeli, Bursa, Eskişehir and Muğla. Siirt, Şırnak, Hakkari, Mus, and Agri are the cities with the lowest socio-economic development rate (Figure 5).

Although the local R2 values are a test that measures the model's performance, the higher this value is, the stronger the model's explanation rate. Figure 6 shows R2 values found through the GWR analysis. Together with Marmara and Western Black Sea regions where the socio-economic development level is relatively higher, Ankara, Eskişehir, and the Eastern Anatolia Region are in the sixth category socio-economic development index, R2 values are higher and vary between 0.45-0.47. On the other hand, local R2 values in Hatay, Mersin, Adana, Niğde, Amasya, Samsun, Yozgat, Kayseri, Nevşehir and Osmaniye have lower explanation rates varying between 34% and 37%.

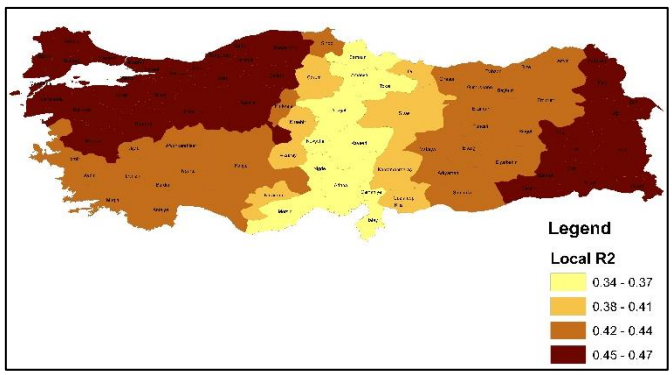

Figure 6. The local R2 values of international capital mobility

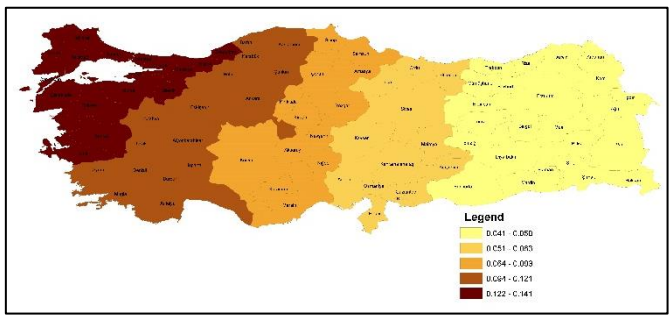

Figure 7. The spatial distribution of the foreign companies per 1000 population

The effect of the OLS analysis findings on the number of foreign companies' coefficient on SEGE is found to be 0.08. However, in the GWR analysis findings, this coefficient's value varies between 0.04 and 0.14 (Figure 7). The impact of the coefficient of the number of foreign companies on SEGE decreases gradually from west to east. In İstanbul, İzmir, İstanbul, Bursa (the cities in the first category), the impact of the coefficient of the number of foreign companies on SEGE

has higher values ranging between 0.12 and 0.14. In Eastern and Southeastern Anatolia regions where fifth and sixth category cities are concentrated, the impact of the coefficient of foreign companies on SEGE has lower values. This means that even though an increase in the number of foreign companies would positively impact these locations' SEGE, the ratio would still be comparatively lower. Therefore, other investments should be necessary.

According to the OLS analysis findings, its impact on SEGE is 0.08, but the GWR analysis findings show that this value changes between 0.03 and 0.11. Antalya, İstanbul, Bursa, Yalova, Muğla, where the development rates are also very high, have the highest rates in the number of houses sold to foreigners (Figure 8). In these cities, the impact of the coefficient of the number of houses sold to foreigners on SEGE has high values varying between 0.08 and 0.11. The impact of the coefficient of the number of houses sold to foreigners on SEGE is lowest in the cities in East and Southeast Anatolia regions. These results are similar to the number of foreign companies' coefficient. In the east of Turkey, house sales to foreigners are very low. GWR results also show that both the sales and their impact on SEGE are comparatively low in these regions.

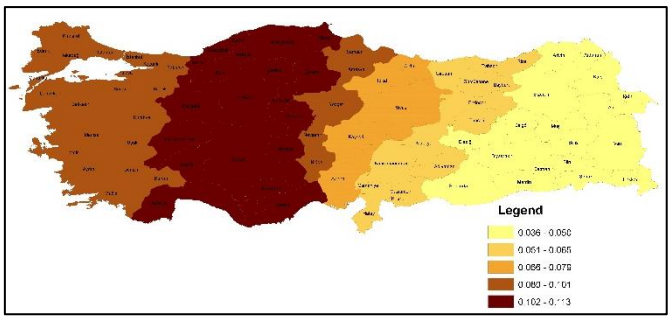

Figure 8. The spatial distribution of the houses sold to foreigners' ratio coefficient

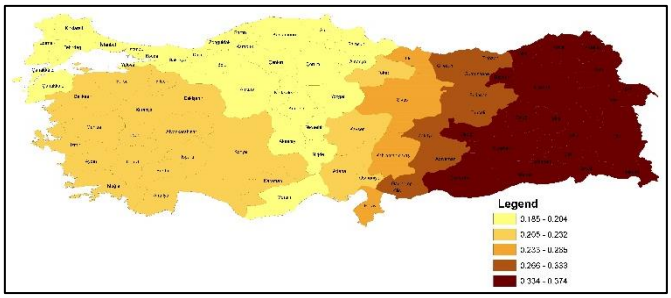

Figure 9. The spatial distribution of the incentive certificate issued to foreigners' ratio coefficient

The impact of the coefficient of the incentive certificates issued to foreigners on SEGE varies between 0.18 and 0.37. These values are higher than the other two variables used in international capital mobility. It is noteworthy that the spatial distribution of the coefficient of the incentive certificates issued to foreigners differs from the other two variables. Besides the general incentives given to the cities in the Eastern and South-eastern Anatolia regions, where cities in the fifth and sixth category cluster, additional incentives were provided for some specific businesses to promote economic development. However, Hakkari, Şırnak, Bitlis, Batman, Siirt, and Tunceli have the lowest rates of benefiting from incentives. The GWR findings show that the effect of the number of incentive certificates issued to foreigners on SEGE has high values ranging from 0.33 to 0.37 in cities in the Eastern Anatolia region. Although İstanbul, İzmir, Bursa, Antalya, Ankara, and Manisa are the most developed cities in terms of industry and service sectors and also have the highest number of incentive certificates issued to foreigners, this coefficient's impact on SEGE is lower than Eastern and South-eastern Anatolia regions (Figure 9).

In Turkey, the coefficients of the number of foreign companies, the number of houses sold to foreigners, and incentive certificates issued to foreigners variables positively impact SEGE. However, the spatial distributions vary. International foreign capital mobility affects the socio-economic development level of the cities. The spatial distribution of international population mobility local R2 values differ from the international capital mobility's. According to Figure 10, Figure 11 shows that Eskişehir and Ankara, together with the Marmara and Western Black Sea regions, the regions that are the first two categories of the development index, have higher local R2 values varying between 0.53 and 0.55. On the other hand, Hatay, Osmaniye, and Kilis, together with the cities in the Southeastern Anatolia region where the least developed cities are concentrated, have lower values ranging between 0.34-0.38 (Figure 10). These values show that the model's rate of explaining the relationship between socio-economic development and international population mobility is comparatively lower.

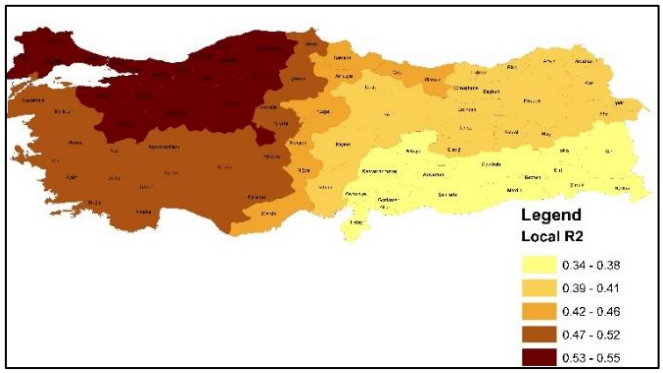

Figure 10. The local R2 values of international population mobility/movement

The spatial distribution of the coefficient of the residence permit granted to foreigners differs from the other variables used in the study. All of the Marmara Region and İzmir, Aydın, and Manisa are the places where this variable's positive impact on SEGE is at its lowest. Interestingly, the positive impact is this low, even though the number of foreigners residing in these cities is much higher than the cities in other regions. The highest level of impact of the coefficient of the residence permit granted to foreigners on SEGE is spatially concentrated in two different areas. The first of these areas covers Mersin, Konya, Karaman, Kırşehir and Kırıkkale, while the other cluster includes Trabzon, Rize, Giresun, Gümüşhane, Bayburt and Erzurum and some of the cities in the south. The impact of the residence permit issued to foreigners on SEGE is higher in Eastern Anatolia, Eastern Black Sea, Southeast, and in the Mediterranean region than in the cities located in the country's western parts (Figure 11). In recent years, the number of residence permits granted to foreigners in Turkey increased as the number of foreigners who prefer to settle in the Mediterranean and Southeast Anatolia witnessed a surge. This

surge could have had a high and positive impact on the socio-economic development level of the cities.

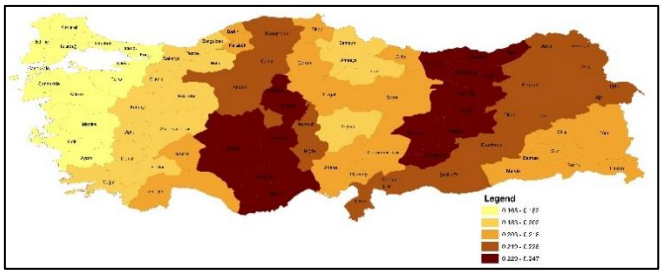

Figure 11. The spatial distribution of the residence permit granted to foreigners' coefficient

Figure 12 shows the spatial distribution of the effect of the coefficient of the number of work permits issued to foreigners on SEGE. This coefficient's effect is at the lowest level in Hatay, Gaziantep, Kilis, Sivas, Osmaniye, Adıyaman, Kahramanmaraş and highest in Marmara and Western Black Sea regions and İzmir, where the number of foreign employees is relatively higher. While the high number of foreign workers in cities in developed regions has a more significant impact on SEGE; it is noteworthy that the impact of this variable is lower in Hatay and Kahramanmaraş, the relatively less developed cities, even though the number of foreign workers saw an increase in the recent years. Although the percentage of foreign workers in cities in the Eastern Anatolia region is below 2%, its effect on SEGE has average values varying between 0.10 and 0.14.

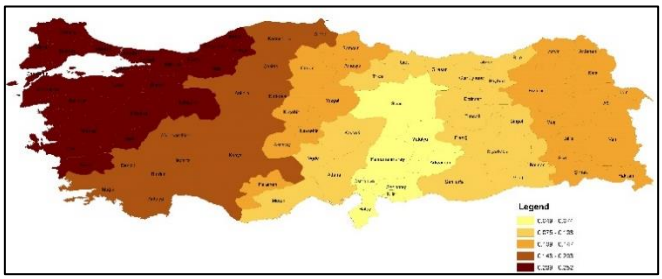

Figure 12. The spatial distribution of the coefficient of the number of work permits for foreigners

Three variables were used in the first stage to reveal the relationship between international population mobility and SEGE. While the variables of the ratio of the number of foreigners granted, a residence permit, and the ratio of the number of foreign workers have a significant relationship with SEGE, the ratio of the number of international students does not have a significant effect on the SEGE. Hence, this variable is not included in GWR models. The relationship between the other two variables used to measure the effects of international population mobility on SEGE is positive. In Turkey's cities, the spatial distribution of the level of the impact of these two variables on SEGE varies significantly (Figure 12).

5. CONCLUSION

With the globalization process, international mobility of foreign capital, labor force and international students has started to be seen as a part of the economic development process for developed and developing countries. In particular, foreign capital investments in developing countries have been supported by the OECD and this investment has been identified as the "engine of development" for these countries [9]. Foreign direct investments, which are effective in closing the capital deficits needed by developing countries, play an important role in increasing employment, technological development and exports as well as increasing the growth of host countries.

Due to Turkey's geographical location and the recent wars in Middle Eastern countries, both population and capital mobility have become important for the country. International capital investments in Turkey started with the transition to a market economy after 1980. In 2003, with the legal regulation on foreign capital investments, there was a significant increase in the amount of investments in Turkey. According to 2018 CBRT data, foreign capital investment in Turkey reached $15 billion [10].

This study aims to discuss the relationship of international mobility with the cities' socio-economic development level. Two different regression models were established for international capital and population mobility, and their effects on the socio-economic development level were analyzed. The effect of the number of foreign companies and houses sold to foreigners on SEGE is higher in developed regions. Also, higher capital investment in developed regions positively contributes to the level of socio-economic development. Similar studies demonstrate similar results [32, 34, 40, 41, 70, 80, 81]. Foreign capital prefers regions with better infrastructure and high human capital. The number of incentive certificates issued to foreigners has a higher effect on SEGE in the Southeast and East regions where the cities are relatively less developed. However, the number of investors benefiting from incentives in these regions is much lower than in the developed cities. To increase the number of investors benefiting from incentives in less developed regions, it is necessary to solve the existing problems of the regions first.

While international population movements and SEGE have a positive and meaningful correlation, international students' numbers have not. In Istanbul, Bursa, Kocaeli, Izmir, Aydın, where the number of foreign people granted a residence permit is high, its impact on the socio-economic development level is lowest. In recent years Mediterranean and South-eastern regions of the country received more migration. This situation positively impacted SEGE in these and neighboring regions. The regions where the number of foreign workers has the highest positive impact on SEGE are Marmara and Aegean regions containing the cities with the highest socio-economic development levels.

On the other hand, even though Hatay, Gaziantep, Kilis, Sivas, Osmaniye, Adıyaman, Kahramanmaraş saw an increase in the numbers of foreign workers, its positive impact on SEGE is still low. Generally, the higher the international mobility, the more positive its impact on the SEGE of the cities. The case of Turkey demonstrates similar results as well. The mobility in southern and western cities is higher, where the socio-economic development level is also considerably higher than in the rest of the country. Foreign investments also prefer the more developed western regions. The results of the socio-economic research this study conducted are pretty similar to the previous studies: the unequal development pattern between the east and Western regions of Turkey continues.

As Zekarias [36] puts it, regions should improve their conditions for investment, increase the inter-regional integration levels, and develop the human capital and in-

frastructure to attract more foreign investment. However, even though the increase of foreign investment in eastern regions would improve the socio-economic development index, other local investments are also necessary for further advancements.

The earthquake that occurred in the Turkish cities of Adana, Adıyaman, Batman, Diyarbakır, Elazığ, Gaziantep, Hatay, Kahramanmaraş, Kilis, Malatya, Mardin, Osmaniye and Şanlıurfa in February 2023 will further deepen the already existing development inequalities. Except for Adana and Gaziantep, which are in the second level of development, it is difficult to predict how long it will take for the cities, which have lost almost all of their hard and soft infrastructure, to recover. In addition to the negative impact of natural disasters, the fact that the 6th-level provinces, which are geographically located in Turkey, will also be affected by global geopolitical developments should not be ignored and should be included in the projections. For future studies, it would be appropriate to carry out micro-level studies for the development of specific policies, practices and implementation tools that focus on unique values and problems. In particular, it will undoubtedly be necessary to take into account the negative contributions of population mobility in the future.

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