Göç Sonrası Uyum Sürecinde İş Rolünün Coğrafi Ağırlıklı Poisson Regresyon İle İncelenmesi: Van Örneği

Examining The Role of Job by Geographically Weighted Poisson Regression in The Post-Migration Adaptation Process: The Case of Van

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Abstract

Migration is a process of social change that involves the geographical relocation of people from one settlement to another, either permanently or temporarily, to spend all or part of their future lives. Van province is among the provinces receiving migration due to its geopolitical location and level of development. Migrant individuals must adapt to that society to normalize their relations with the resident population over time. Individuals are in constant contact with society due to the work done after migration, so it is thought that the work done has an essential effect on the adaptation process. In this study, the effect of work on the post-migration adjustment process of individuals migrating from the first and second-degree border neighboring provinces of Van province was analyzed using Poisson and Geographically Weighted Poisson Regression methods. The study aims to determine the relationship between the contribution of work in the post-migration adjustment process and independent variables and to analyze which of the models used for the analysis gives more significant results. In the study, a face-to-face survey was conducted with 440 individuals, and it was observed that the Geographically Weighted Poisson Regression method gave more significant results according to AIC, AICc, and R^2 values. In addition, the effect and significance of the relationship between the dependent variable and independent variables according to provinces and districts are visualized and given with maps.

Keywords: Economy, Geographically Weighted Poisson Regression, Migration

Öz

Göç, insanların gelecekteki yaşamlarının tamamını ya da bir kısmını geçirmek üzere, kalıcı ya da geçici olarak, bir yerleşim biriminden diğerine coğrafi olarak yer değiştirmelerini içeren bir toplumsal değişim sürecidir. Van ili jeopolitik konumu ve gelişmişlik düzeyi nedeniyle göç alan iller arasında yer almaktadır. Göç eden bireylerin yerleşik nüfusla ilişkilerinin zaman içinde normalleşmesi için o topluma uyum sağlaması gerekmektedir. Bireyler göç sonrası yapılan iş nedeniyle toplumla sürekli temas halindedir, bu nedenle yapılan işin uyum sürecinde önemli bir etkiye sahip olduğu düşünülmektedir. Bu çalışmada Van ilinin birinci ve ikinci derece sınır komşusu illerden göç eden bireylerde göç sonrası uyum sürecinde çalışmanın etkisi Poisson ve Coğrafi Ağırlıklı Poisson Regresyon yöntemleri kullanılarak analiz edilmiştir. Çalışmanın amacı, göç sonrası uyum sürecinde işin katkısı ile bağımsız değişkenler arasındaki ilişkiyi belirlemek ve analiz için kullanılan modellerden hangisinin daha güçlü sonuçlar verdiğini analiz etmektir. Çalışmada 440 birey ile yüz yüze anket yapılmış ve AIC, AICc ve R^2 değerlerine göre Coğrafi Ağırlıklı Poisson Regresyon yönteminin daha güçlü sonuçlar verdiği gözlemlenmiştir. Ayrıca illere ve ilçelere göre bağımlı değişken ile bağımsız değişkenler arasındaki ilişkinin etkisi ve anlamlılığı görselleştirilerek haritalarla verilmiştir.

Anahtar Kelimeler: Ekonomi, Göç, Coğrafi Ağırlıklı Poisson Regresyon

Introduction

Migration has been a part of human history for as long as there have been humans. People have migrated from one place to another in search of better resources, for security, or to escape political, social, or economic turmoil. In modern times, migration has become a hot-button issue, with debates raging about the benefits and drawbacks of immigration. People migrate for many reasons, and these reasons can vary depending on the individual or group. According to the International Organization for Migration (IOM, 2022), some of the most common causes of migration include economic, environmental, and political factors. Economic factors can include seeking better job opportunities, higher wages, or improved living standards. Environmental factors can include natural disasters, climate change, and ecological degradation. Political factors can include persecution, war, and human rights violations. Migration can have both positive and negative effects on individuals, communities, and countries. On the positive side, migration can help to alleviate poverty, reduce unemployment, and provide new opportunities for individuals and their families. For example, remittances sent by migrants to their families back home can help to boost local economies (Rapoport and Docquier, 2005). Migration can also bring diversity and new perspectives to communities and countries, leading to cultural enrichment. On the negative side, migration can lead to brain drain, where skilled and educated individuals leave their home country, causing a loss of talent and expertise. Migration can also lead to social and economic tensions in both the host country and the country of origin. Additionally, migrants may face discrimination, exploitation, and abuse, particularly if they are undocumented or have limited legal rights (Genç et al. 2019).According to the United Nations, there were 281 million international migrants in 2020, which equates to 3.6 per cent of the global population (IOM, 2022). The majority of international migrants move to high-income countries, with the top destination countries being the United States, Germany, and Saudi Arabia. However, low- and middle-income countries also host significant numbers of migrants, particularly those from neighboring countries. In recent years, there has been an increase in anti-immigrant sentiment and policies in some countries, with governments tightening border controls and restricting legal immigration. This has led to an increase in irregular or undocumented migration and an increase in human trafficking and smuggling. The COVID-19 pandemic has also had a significant impact on migration, with travel restrictions and border closures causing disruptions to regular migration patterns (IOM, 2022). Migration is a complex issue with many different factors at play. While it can bring benefits to individuals and communities, it can also lead to tensions and difficulties. The variability in the content of the concept of cohesion is not limited to country policies and practices. The fact that different meanings are attributed to the concept of integration by the host society and migrants draws attention as another factor that prevents consensus on the meaning of this concept. It should also be noted that the meaning attributed to the concept has changed in different periods and by different thinkers. The confusion caused by concepts such as integration, adaptation, harmonisation and cohesion, which are often used interchangeably and are closely related to cohesion, deepens this debate (Yılmaz, 2023). Governments and policymakers must balance the benefits and drawbacks of migration and work to create policies that protect the rights and well-being of migrants while addressing the concerns of host communities.

Türkiye has a long history of migration, both as a source and a destination country. Today, Türkiye is home to over 4 million refugees and asylum seekers, making it the largest host country for refugees in the world. But Türkiye's relationship with migration is complex, shaped by a range of political, economic, and social factors. One of the main reasons Türkiye has become such an important destination for refugees and asylum seekers is its geographic location. Türkiye is situated at the crossroads of Europe and Asia, and shares borders with Syria, Iraq, and Iran, among other countries. As a result, it has become a key transit country for refugees and migrants seeking to reach Europe.

When the statistics published by the Directorate of Migration Management are analysed, three different characteristics of irregular mobility towards Türkiye stand out in the top ten nationalities. The first group is the countries neighbouring Türkiye's borders. Syrian nationals take the second place in irregular migration movements in Türkiye. Along with Syrians, Iraqi and Iranian nationals also constitute the largest group of temporary protection and international protection status holders and applicants in Türkiye. The second group is the countries of the remote region, which, although not bordering Türkiye, see Türkiye as a transit or destination country for transit to third countries. Afghanistan, Pakistan, Somalia, Somalia, Palestine and Bangladesh are among the top ten nationalities of these countries. This picture, which extends mainly to Far Asia and South Africa, can be considered as an important evidence that Türkiye is also exposed to irregular movements from distant countries. It is thought that a significant number of irregular migrants from these countries who are heading to Türkiye are trying to cross to European countries through Türkiye. Thirdly, there are foreign nationals from Central Asian countries in Türkiye. Among these, Uzbekistan and Turkmenistan are among the top ten nationalities. Irregular mobility of this group is not observed at border entries or exits, but it is considered to be related to their stay and work status in Türkiye. It is estimated that visa duration and visa type violations are among the primary reasons (Sağıroğlu et al., 2022). The Syrian

refugee crisis, which began in 2011, has had a particularly significant impact on Türkiye. Today, there are over 3.6 million Syrian refugees in Türkiye, making up the majority of the country's refugee population (World Bank, 2021). Türkiye has made significant efforts to provide assistance to Syrian refugees, including offering them temporary protection, providing education and healthcare, and helping them find work. Türkiye's migration policies have also been shaped by its relationship with the European Union. In 2016, Türkiye signed an agreement with the EU to limit the number of refugees and migrants crossing into Europe (European Parliament, 2023).

Van is a province located in eastern Türkiye, near the border with Iran. The region has a rich history, with evidence of human settlement dating back thousands of years. The economy of the border neighborhood of Van province with Iran is largely based on cross-border trade, agriculture, and tourism. The area has historically been an important hub for trade between Türkiye and Iran, with goods such as textiles, spices, and foodstuffs passing through the region. Due to its neighborhood with Iran, the province of Van is economically more developed than the neighboring provinces. Van, which is more developed than neighboring provinces in areas such as social life, economy, education and health, receives immigrants from neighboring provinces due to these reasons. Van is a fascinating and complex province that has undergone significant changes in recent years due to migration and other factors. Despite these challenges, the region remains a vital and important part of Türkiye, with a unique culture and history that continues to evolve and adapt to changing circumstances. Migration from the rural areas of the region to the city centre of Van is generally due to security, economic and socio-cultural reasons. In recent years, while security has fallen to the second place among the reasons for migration, economic reasons have come to the forefront (Deniz and Etlan, 2009). In this study, the factors affecting the job of individuals who migrated to Van from the provinces with first and second degree borders and settled in the city after migration were discussed. The aims of this study; It can be listed as determining the relationship between the work effect and independent variables in the post-migration adaptation process, which of the Geographically Weighted Poisson Regression (GWPR) and Poisson Regression (PR) methods used for the analysis gave better results, and visualizing the relationship between GWPR and the dependent variable and independent variables according to provinces and districts through figures. Individuals adapt and adapt to the socio-cultural structure they are in from the moment they are born. With migration, this socio-cultural structure changes; immigrants encounter people with different identities, cultures, religions and lifestyles. Therefore, all the gains that immigrants have acquired in their home countries can be changed in an instant and immigrants may experience problems of adaptation to the dominant society (Dirimeşe and Emre, 2022). In order to ensure and accelerate integration, many public works and minimising the differences between migrants and local people are important interventions (Demirkıran, 2020). Şimşek (2018) explains refugee integration in the context of migration policies and social class through the example of Syrian refugees in Türkiye, within the framework of the data obtained as a result of semi-structured face-to-face in-depth interviews conducted with 80 Syrian refugees in Istanbul, Izmir, Gaziantep and Hatay between January and December 2016. In their study, Korkmaz and Öztürk (2017) examine the assimilation policies applied to minorities from the beginning of the communist period in Bulgaria until the end of the Near Relative Migration and the process of integration based on settlement and labour force during the migration of Turks to the homeland. In this study, we believe that the method used in this study differs from the literature by addressing the effects of the work on the adaptation process in Van.

1. Literature Review

The impact of immigrants on the host country's labor market is a matter of long-term interest for economists and an important topic of public debate in countries receiving large volumes of immigrants. In addition to the international research of migrations, it is observed that it is also included in the literature nationally or regionally. Therefore, there is a large literature focused on understanding and interpreting these effects.

Angrist and Kugler (2003) examine the relationship between migration and employment in EU countries over the period 1983-1999 using panel data analysis, focusing on the extent to which the displacement effects of migration are mitigated or amplified by cross-country differences in institutions, and in particular in a fixed-effects way. Wang and Luo (2005) analysed the factors affecting access to health services with the GWPR method. The researchers analysed the distribution of health professionals and accessibility of health services together with geographical factors. In his 2008 study, Deniz aimed to investigate migration to the city of Van due to terrorist incidents in the region after 1980, the indirect effects of terrorism, and the impact of migration on urban development. For this reason, surveys and interviews were conducted to determine the problems faced by the migrants before and after migration, and an attempt was made to interpret the results using analytical methods. Gürbüz and Karabulut, in their 2008 study entitled Analysis of the Relationship between Rural Migration and Socio-Economic Characteristics, analysed real data and socio-economic factors affecting rural migration using statistical techniques such as hierarchical clustering, correlation and regression. The study found that rural migration is largely influenced by socio-

economic data, but also by some socio-psychological factors that are not available or cannot be measured, city attractiveness and transmitter factors. Bohra and Massey (2009) used GWPR to analyse internal and international migration processes in Nepal. The researchers examined the impact of geographical factors on migration flows and how they interact with other socioeconomic factors. Rey and Anselin (2009) defined a Python library called PySAL and made it ready to use various geographical analytical methods such as GWPR analysis. The researchers gave detailed information on how these methods can be used in migration studies and how they can be applied on various examples. Mayda (2010) analysed the determinants of bilateral flows of international migration by using spatial panel data analysis method to examine the factors behind migration flows. Kalogirou (2012) analysed the factors affecting migration using the Geographically Weighted Regression (GWR) Method with Swedish internal migration data. When the data are locally calibrated with the GWR method, it is found that both explanatory variables have a significantly varying effect. In their 2013 study, Altay and Çılgın examined the population structure of the district centres of Ödemiş and Söke districts in İzmir and Aydın provinces, which are geographical neighbours in the Aegean region and have positive net migration. Beine et al. (2013) analysed the impact of international migration on fertility with GWPR. The researchers assessed the impact of migration on fertility rates in the source country together with geographical factors as well as social norm transmissions. Yakar (2013) determined a model that shows the relationship between net migration between provinces and socio-economic development levels of provinces with real data using GWR analysis. According to the GWR analysis, it was obtained as a result of the existence of a strong positive relationship between meat migration and the socio-economic development level of the provinces. Boubtane et al. (2013) used the panel data method for 22 OECD countries to examine the causal relationships between migration, unemployment and GDP. In their 2014 study, Tümtaş and Ergün conducted assessments of migration and poverty in Van, one of the cities where the effects of poverty caused by both forced and voluntary migration are felt most. Castles et al. (2014) analysed the social, political and spatial aspects of global migration. Bell et al. (2015) used the GWPR method to explain the level and pattern of international internal migration. The researchers assessed the impact of economic and demographic factors as well as geographical factors on internal migration. In their study conducted by Elmastaş and Yılmaz in 2015, the factors affecting migration in the province, the migrations given and received by the province were analysed. In addition, the migration given and received by the province according to the reasons for migration are also discussed. Çakı analysed Türkiye's migration history in his 2018 study. He also examined Türkiye's policy in the Syrian migrant crisis in recent years. In their study, Dumancı and Gür (2022) aimed to make an evaluation of the migration policies developed by Türkiye on the integration of migrants and their access to rights and, in this context, to the right to education. In their study, Demirağ and Kakışım (2018) comparatively examine the acculturation, integration and assimilation processes of Turkish immigrants who went to Germany as workers and settled there permanently from the position of "guest workers". In their book, Sağıroğlu and Yılmaz (2021) provide an opportunity to evaluate the challenges and opportunities for coexistence between indigenous and foreign groups from a multidimensional perspective.Yüzbaşı and Görür (2021) investigated the effects of socio-economic factors on crime using Multiple Linear Regression and GWR methods. As a result, it was observed that the GWR method gave stronger results. In their study, Ekhtiari and Aysan (2022) examined the migration experiences of Iranian immigrants living in Türkiye and Iranians who have applied for international protection, and the difficulties they face in their integration into Türkiye, taking into account social, economic and cultural factors.

When the studies on migration in Van were examined, it was observed that the studies were generally in the form of evaluation and there were no statistical or survey studies. In addition, it has been observed in the national literature that migration is generally handled on the basis of countries and similar methods are used. In the international literature, it has been observed that different methods are used and analyzes are generally made with real data. It is thought that the study will contribute to the literature due to the fact that it has not been discussed in the national area and the methods used are different.

2. Material and Method

Analyzes of migration flows and their influence factors are usually conducted at the total country level, thus ignoring the existence of large regional disparities. Because regions are so diverse, the main drivers of migration are likely to vary in space and act with varying intensity, creating different regional patterns. In the study, the migration of Van province from neighboring provinces was handled with PR and GWPR methods. In this study, a face-to-face survey was conducted with 440 individuals residing in Van, who migrated to Van from the provinces bordering Van in the first and second degree, and Snowball Method was preferred as the survey collection method.

The variables discussed in this study are;

Dependent variable: My job had a positive impact on the post-migration adjustment process. Independent variables: Inadequacy in social life, Van is a city with good economic conditions, Economic (unemployment, poverty, etc.) inadequacy, To reach a better life, and I am satisfied with Van in general. The effect of the considered independent variables on the dependent variable was analyzed by PR and GWPR methods, and which model gave stronger results was examined according to AIC, AICc and R^2 values. The intensity of the independent variables according to the provinces and districts is shown on the figures. At the same time, the significant effects of the independent variables on the dependent variable were investigated and these effects were visualized on the figures according to the selected provinces and districts. Analyzes were made using the R program.

1.1.   Poisson Regression

The standard model for discrete data is the PR model, which is a non-linear regression model. This regression model is derived from the Poisson distribution, allowing the density parameter μ to depend on the explanatory variables (Cameron and Trivedi, 1998).

When given the variable x, the probability of counting the number of events y_i (dependent variable for the ith observation) can be defined as follows:

$$Pr\, Pr\,(x_i) = \frac{exp^{-\mu_i}\mu_i^{y_i}}{y_i!}, \tag{1}$$

where, , y_i: 0,1,2,..., i: 1, 2, ..., n, μ_i: $E(x_i) = exp(x_i^T\beta)$, x_i^T: $[1, x_{i1}, ..., x_{ik}]$, k:number of explanatory variables, exp: Euler number (2.71828...) and 'T' is defined as the transpose of a matrix (Long, 1997). The PR model defined by Fleiss et al. (2003);

$$ln\mu_i = \beta_0 + \beta_1 x_{i1} + \beta_2 x_{i2} + ... + \beta_{(p-1)} x_{i(k)}(x_i^T\beta), \tag{2}$$

where k is the number of parameter regressions. μ_i is the expected value of the Poisson distribution for the ith observation and $\beta = [\beta_0, \beta_1, ..., \beta_k]$.

1.2.   Geographically Weighted Poisson Regression

GWPR is a spatial modeling technique that combines a Poisson regression model with geographic weighting functions. It is a powerful tool for analyzing spatially-varying relationships between variables, particularly in cases where the relationship between variables varies across space. GWPR allows for the exploration of spatial heterogeneity in the relationships between the dependent variable and the explanatory variables. It can identify regions where the relationship is stronger or weaker, as well as regions where the relationship is positive or negative. It is particularly useful in analyzing spatial data on public health, crime, and environmental issues, among others. The GWPR model is an advanced GWR model that transforms the framework of a simple regression model into a weighted regression. A special form of the spatial count model, the Spatial Poisson model, allows parameter evaluation with spatial units u_i, a vector describing location i (Li et al., 2013; Nakaya et al., 2005). A spatial Poisson model can be written as follows;

$$Y_i \sim Poisson\left[exp\left(\sum_k \beta_k(u_i)x_{ik}\right)\right], \tag{3}$$

where x_{ik} is the kth explanatory variable at location i, β_k is the parameter for the kth explanatory variable and $u_i = (u_{xi}, u_{yi})$ is the vector defining the latitude and longitude at location i. The model is characterised by a geographically varying coefficient $\beta_k(u_i)$, known as GWPR, which is a function of the location u_i. i represents locations 1 to n. The covariate form of the GWPR model with a set of estimators where the parameters are allowed to vary in space can be written as follows;

$$ln\, ln\,(Y) = ln\, ln\,(\beta_0(u_i)) + \beta_1(u_i)X_1 + ... + \beta_k(u_i)X_k + \varepsilon_i, \tag{4}$$

where β_k is a function of position. The parameters in the model $\beta = (\beta_0, \beta_1, ..., \beta_k)$ are allowed to differ between locations. Thus, the GWPR modelling framework addresses spatial heterogeneity.

To estimate the parameters of a GWPR model, a form of the maximum likelihood principle is considered (Li et al., 2013; Nakaya et al., 2005). The method is locally similar to the maximum likelihood principle and can be called the geographically weighted likelihood method. The geographically weighted log-likelihood at location u_i can be given by

$$L(u_i) = \sum_{j=1}^{N} \left(-\hat{Y}_j(\beta(u_i)) + Y_j log\hat{Y}_j(\beta(u_i))\right) \cdot w_{ij}(\|u_i - u_j\|), \tag{5}$$

where $\hat{Y}_j(\beta(u_i)) = exp(\sum_k \hat{\beta}_k(u_i)x_{jk})$, is the number of events estimated at location u_i with the estimated parameter vector $\hat{\beta}$ at regression point i, w_{ij} is the geographical weight of observation j at regression point i. The weights of observations w_{ij} gradually decrease as the distance between regression point i and the observation at location j increases (Al-Hasani et al., 2021).

There are various kernel functions used for weighting in GWPR model such as box-car, bi-square, tri-cube, exponential and Gaussian (Gollini et al., 2013; Bidanset and Lombard, 2016; Lu et al., 2016; Wang and Chen, 2017). In this study, Gaussian is used for the weighting function. A classical choice for the weighting function is the Gaussian function and is shown as follows (Brundson et al., 1996).

$$w_{ij} = exp\, exp\left(-\frac{1}{2}\frac{\|u_i - u_j\|}{G}\right), \tag{6}$$

where the parameter G (called bandwidth) regulates the kernel size. It is worth emphasising here the spatial nature of the weighting scheme. Data recorded at locations close to the regression point i are given higher weights than data recorded at more distant locations. As the focal point of the regression moves to a different location, all weights change. The bandwidth controls the rate at which the weight of a data decreases as the distance from the location where it was recorded to the regression point increases. When the bandwidth is large, the weights decrease slowly; when the bandwidth is small, the weights decrease rapidly (Nakaya et al., 2005).

3. Analysis and Findings

Information on the variables used in the study and the results of the analysis are given in detail below.

Table 1.

Information on the variables used in the analysis

Variables	Explanation
JIP	My job had a positive impact on the post-migration integration process (Dependent variable).
ISL	Inadequacy in social life.
GEC	Van is a city with good economic conditions.
EI	Economic (unemployment, poverty, etc.) inadequacy.
RBL	Reaching a better life.
ISV	In general, I am satisfied with Van.

Table 1. presents the explanations of the abbreviations of the variables. JIP (My job had a positive impact on the post-migration integration process) was taken as the dependent variable, while other variables were considered as independent variables.

Table 2.

Descriptive statistic of variables

Variables	Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
JIP	1.000	3.000	4.000	4.368	5.000	10.000
ISL	1.500	3.171	5.038	5.438	7.286	10.000
GEC	3.300	4.500	5.000	5.459	6.361	10.000
EI	1.667	4.000	5.533	5.497	7.000	10.000
RBL	1.000	1.589	3.000	3.403	4.467	10.000
ISV	2.000	3.000	3.523	3.694	4.208	9.000

Table 2. presents descriptive statistics for the variables used. In this study, 1 is considered as the option of completely agree while 10 is considered as the option of strongly disagree. When Table 2 is examined; The highest value was observed as 10, while the lowest value was observed as 1. While the highest mean value belongs to the EI variable, the lowest mean value belongs to the RBL variable.

Figure 1.

Distribution of My education contributed positively to the post-migration adaptation process
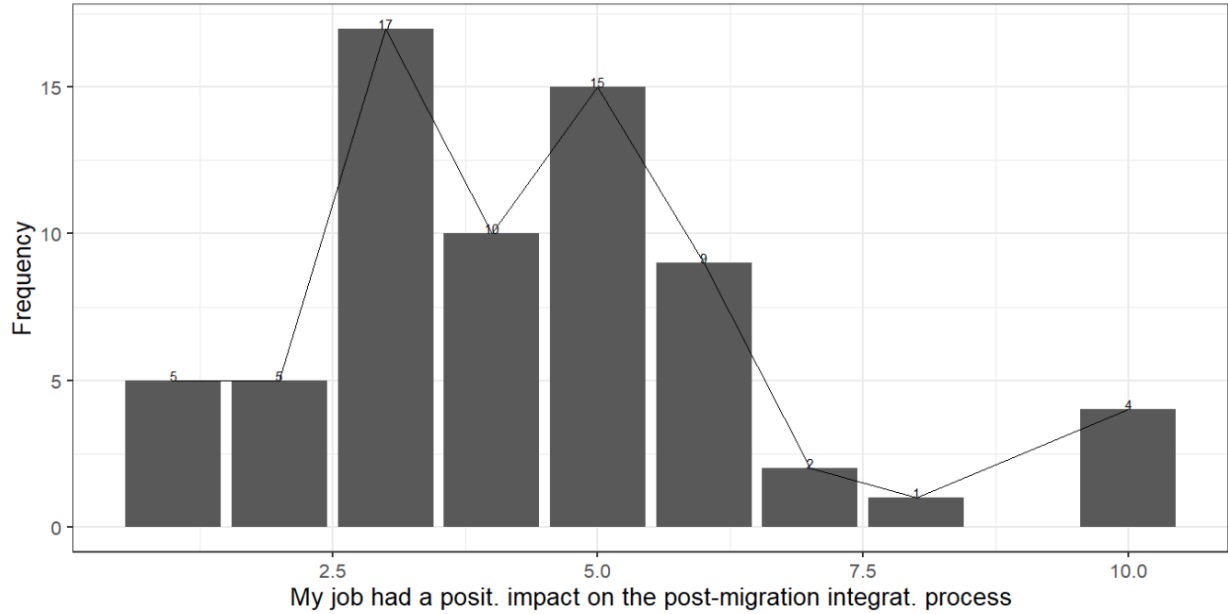

Figure 1. shows the distribution of the dependent variable My job had a positive impact on the post-migration integration process. According to Graph 1, it can be said that the variable adapts to the Poisson distribution. In order to support this situation, the Poisson distribution data of the variable are given in Table 3.

Table 3.

Dispersion of My job had a positive impact on the post-migration integration process

Mean	Variance
4.367	4.404

Table 3 shows the fit of the dependent variable to the Poisson distribution. According to Cameron and Trivedi (1998), the most important feature of the Poisson distribution is that the mean and variance of the distribution are equal or very close to each other. When Table 3 is examined, it is observed that the mean and variance of the dependent variable have very close values (4.367, 4.404). Therefore, it can be said that the dependent variable is suitable for the Poisson distribution.

Table 4.

Summary of PR model coefficients

Variables	Estimate	Std.Error	t-statistic	p-value
Intercept	1.119	0.316	3.537	0.000***
ISL	-0.019	0.037	-0.530	0.596
GEC	0.074	0.050	1.467	0.142
EI	0.061	0.036	1.672	0.044*
RBL	-0.063	0.047	-1.357	0.174
ISV	-0.020	0.069	-0.297	0.766

Signif. codes: : 0.001 '***' 0.05 '**' 0.1 '*'

Table 4. shows the relationship between the dependent variable and the independent variables according to the PR results. According to Table 4; There is a significant relationship between the constant and EI variables and the dependent variable JIB ($p \leq 0.05$). According to these results; It has been observed that the JIB value is 1.119 if the independent variables are zero. It can be said that there is a positive relationship between EI and JIB and the change in the EI variable causes an increase in the JIB variable.

Table 5.

GWPR parameter summary results

Variables	Min.	1st Qu.	Median	3rd Qu.	Max.
Intercept	-0.063	0.621	0.873	1.288	1.834
ISL	-0.135	-0.080	-0.067	-0.034	0.089
GEC	-0.175	-0.068	-0.035	0.037	0.224
EI	-0.011	0.034	0.060	0.106	0.178
RBL	-0.165	-0.095	-0.071	-0.041	-0.006
ISV	-0.194	0.022	0.205	0.354	0.603

Table 5. gives the results of the GWPR analysis. When Table 5 is examined; The lowest value belongs to the ISV (-0.194) variable, while the highest value belongs to the constant variable (1.834). While the lowest median value belongs to the RBL variable (-0.041), the highest median value belongs to the constant variable (1.288).

Table 6.

Estimated diagnostics of PR and GWPR models

Variables	PR	GWPR
R^2	0.134	0.600
AIC	80.942	70.866
AICc	118.363	72.243

R^2 (Coefficient of Determination) is a statistical measure that shows the degree of variation in the dependent variable depending on the independent variables. A high R^2 value means that the explanatory power of the model is high. AIC (Akaike information criterion) and AICc (Adjusted Akaike information criterion) are selection criteria used to compare different possible models and determine which one is the most appropriate for the data. Low AIC and AICc values are preferred in the selection of the appropriate model (Akaike, 1974; Hurvich and Tsai, 1989).Table 6. gives the model selection criteria for the PR and GWPR models. When Table 6 is examined; It was observed that the R^2 value of GWPR (0.600) was higher than the R^2 value

of PR (0.134). It was also observed that the AIC (70.866) and AICc (72.243) values of the GWPR were lower than the AIC (80.942) and AICc (118.363) values of the PR. Therefore, it can be said that the GWPR model gives stronger results than the PR model and it is healthier to prefer the GWPR model. According to the results of the GWPR analysis, the distribution of the relationships between the dependent variable and the independent variable and the significance of these relationships according to the provinces and districts are given below in the form of figures. In the figures indicating the coefficient of variation of the variables (figure on the left), Van province is represented in grey, while in the figure showing the significance of the relationship between the variables (figure on the right), it is indicated as turquoise.

When interpreting the beta coefficients obtained in Poisson regression analysis, we need to take the exponential (exp) value of the coefficients, starting from the inverse of the logarithmic link function. As in classical regression analysis, we cannot directly interpret the coefficients. Therefore, when we take the exponential value when interpreting the beta coefficients, we say that if the beta coefficient is below 1, there is an inverse relationship, and if it is above 1, there is a positive relationship. According to the GWPR analysis results, the distribution of the relationships between the dependent variable and the independent variable and the significance of these relationships according to provinces and districts are given in detail in the form of figures below and interpreted by taking into account the beta coefficient interpretation mentioned above. In the figures indicating the coefficient of variation of the variables (figure on the left), Van province is represented in gray color and the significance of the relationship between the variables is shown in gray color.

Figure 2.

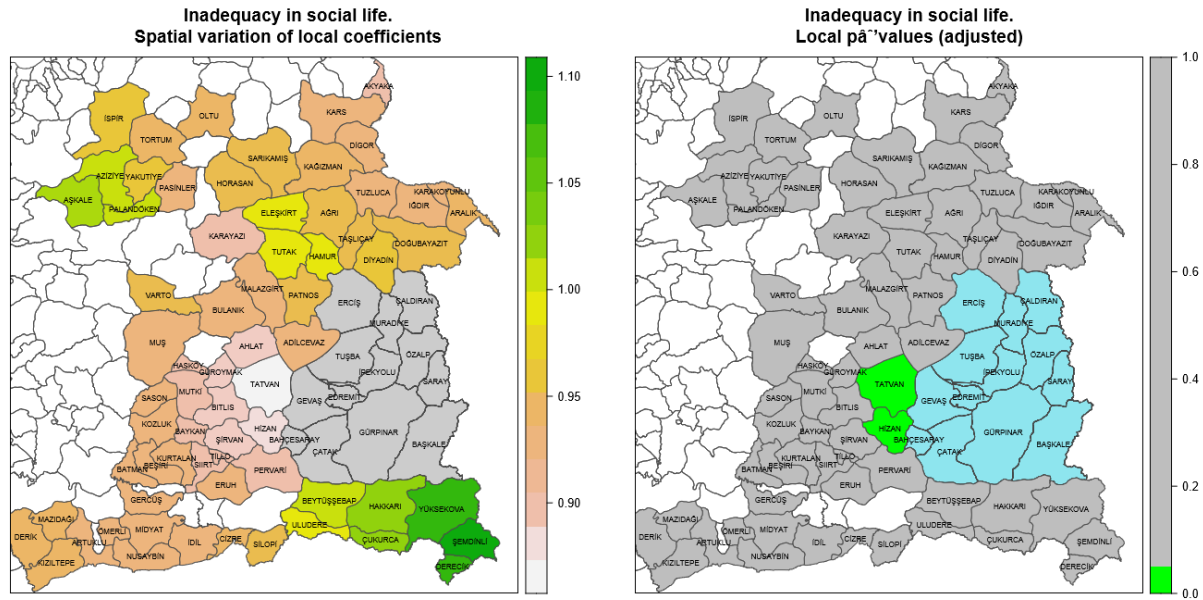Distribution and significance of the relationship between ISL and JIB by province and district

Figure 2 shows the distribution of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to Inadequacy in social life, according to provinces and districts (left Figure) and the distribution of significance of the relationship between these variables according to provinces and districts (right Figure). When Figure 2 is examined according to the relationship between the variables (left Figure); it has been observed that there is a positive relationship between the variable of migration due to inadequacy in social life and the variable of my job had a positive impact on the post-migration integration process in green and greenish areas (1.00, 1.10). It has been observed that the effect is higher especially in the southern region (green area) of Van province. Therefore, it can be said that the participation in the migration variable is high migration due to inadequacy in social life from the south and north-west of Van and in tehese areas the change in this variable causes an increase in the my job had a positive impact on the post-migration integration process variable. In addition, it is observed that this relationship is negative in light coloured regions (0.90-1.00). In these regions, the change in the variable inadequacy in social life causes a decrease in the variable the my job had a positive impact on the post-migration integration process. This effect was observed to be particularly high in the south-western and western regions of Van. When the significance of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to inadequacy in social life, according to provinces and districts, is analyzed (Figure on the right); it was observed that this relationship was significant in Tatvan and Hizan districts located in the western region of Van province (green areas).

Figure 3.

Distribution and significance of the relationship between GEC and JIB by province and district

Van is a city with good economic conditions.
Spatial variation of local coefficients

Van is a city with good economic conditions.
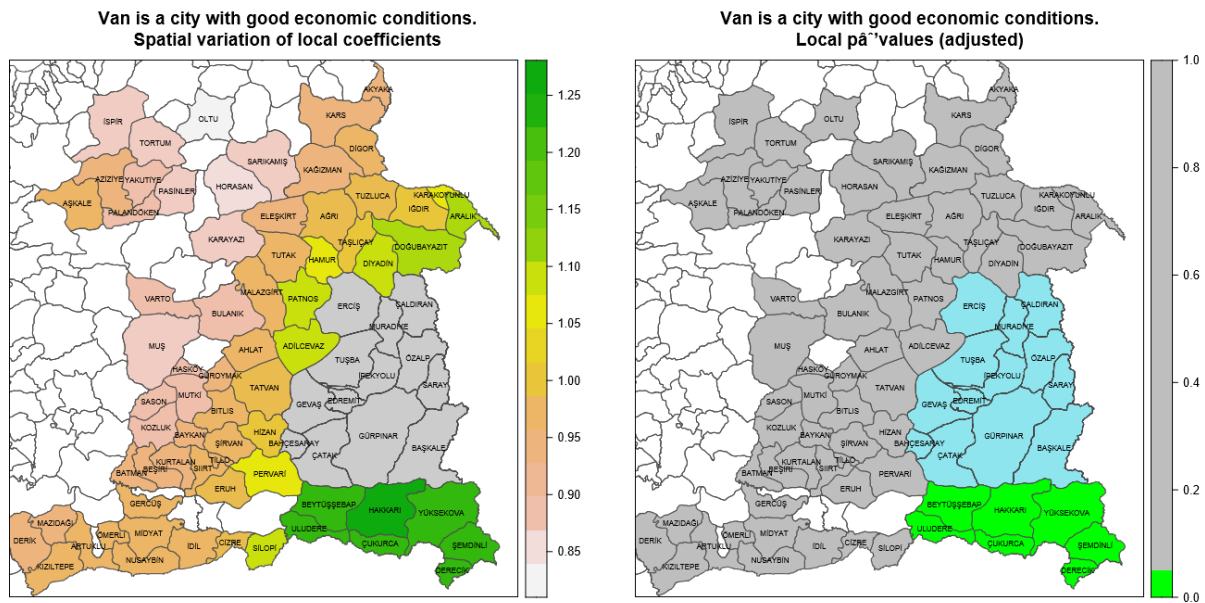Local pâ˜values (adjusted)

Figure 3 shows the distribution of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable Van is a city with good economic conditions, according to provinces and districts (left Figure) and the distribution of significance of the relationship between these variables according to provinces and districts (right Figure). When Figure 3 is examined according to the relationship between the variables (left Figure); it has been observed that there is a positive relationship between the variable of Van is a city with good economic conditions and the variable of my job had a positive impact on the post-migration integration process in green and greenish areas (1.00, 1.25). It has been observed that the effect is higher especially in the southern and northern regions (green area) of Van province. Therefore, it can be said that the participation in the Van is a city with good economic conditions from southern and northern regions and the change in this variable causes an increase in the my job had a positive impact on the post-migration integration process variable. In addition, it is observed that this relationship is negative in light coloured regions (0.85, 1.00). In these regions, the change in the variable Van is a city with good economic conditions causes a decrease in the variable the my job had a positive impact on the post-migration integration process. This effect was observed to be particularly high in the west and north-west regions of Van. When the significance of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable Van is a city with good economic conditions, according to provinces and districts, is analyzed (Figure on the right); it was observed that this relationship was significant in the southern region of Van province (green areas).

Figure 4.

Distribution and significance of the relationship between EI and JIB by province and district
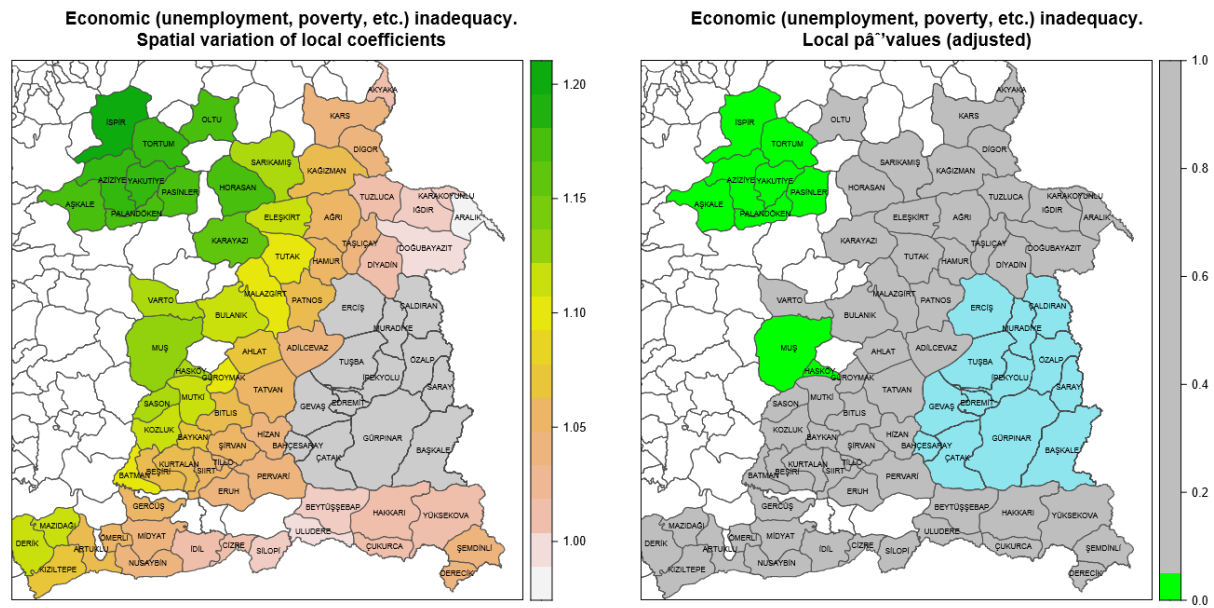

Figure 4 shows the distribution of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to economic (unemployment, poverty, etc.) inadequacy, according to provinces and districts (left Figure) and the distribution of significance of the relationship between these variables according to provinces and districts (right Figure). When Figure 4 is examined according to the relationship between the variables (left Figure); it has been observed that there is a positive relationship between the variable of migration due to economic (unemployment, poverty, etc.) inadequacy and the variable of my job had a positive impact on the post-migration integration process in all provinces and districts (1.00, 1.20). It has been observed that the effect is higher especially in the northwest and west regions (green area) of Van province. Therefore, it can be said that the participation in the migration due to economic (unemployment, poverty, etc.) inadequacy from all provinces and districts and the change in this variable causes an increase in the my job had a positive impact on the post-migration integration process variable. When the significance of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to economic (unemployment, poverty, etc.) inadequacy, according to provinces and districts, is analyzed (Figure on the right); it was observed that this relationship was significant in the Muş province and southern region of Van province (green areas).

Figure 5.

Distribution and significance of the relationship between RBL and JIB by province and district
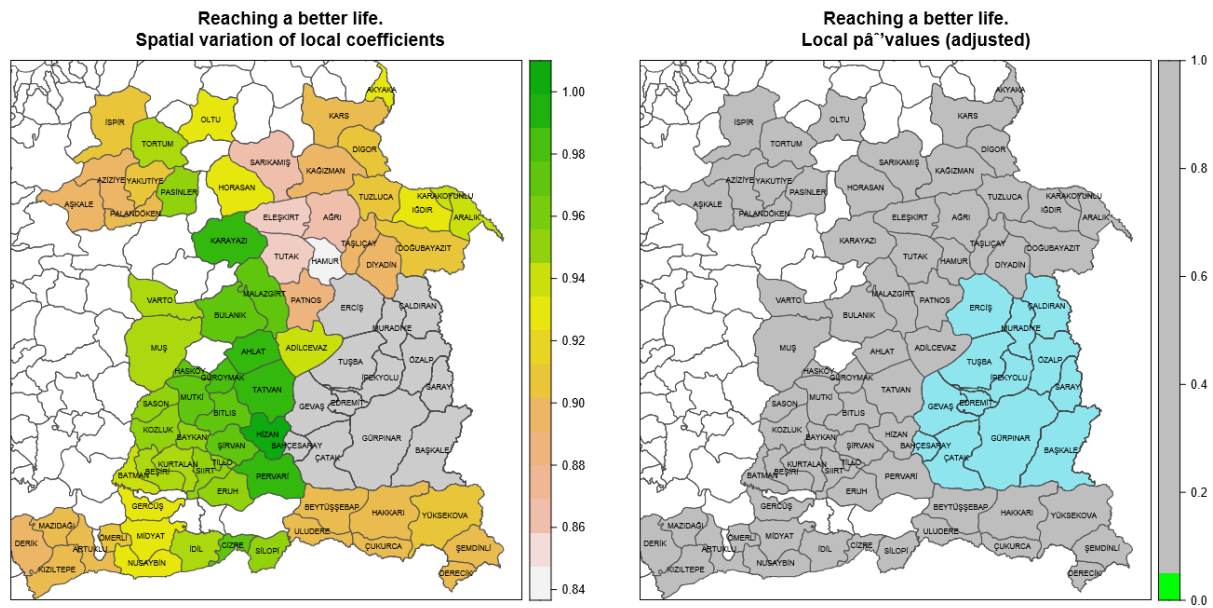

Figure 5 shows the distribution of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to reaching a better life, according to provinces and districts (left Figure) and the distribution of significance of the relationship between these variables according to provinces and districts (right Figure). When Figure 5 is examined according to the relationship between the variables (left Figure); it has been observed that there is a positive relationship between the variable of migration due to reaching a better life and the variable of my job had a positive impact on the post-migration integration process in green areas (1.00). Therefore, it can be said that the participation in the migration due to reaching a better life from west of Van province and the change in this variable causes an increase in the my job had a positive impact on the post-migration integration process variable. In addition, it is observed that this relationship is negative in light coloured regions (0.84, 1.00). In these regions, the change in the variable migration due to reaching a better life causes a decrease in the variable the my job had a positive impact on the post-migration integration process. This effect was observed to be particularly high in the south, south-west, north, north-east and most of the north-west of Van province. When the significance of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable migration due to reaching a better life, according to provinces and districts, is analyzed (Figure on the right); it was observed that no significant relationship was observed in any region.

Figure 6.

Distribution and significance of the relationship between ISV and JIB by province and district
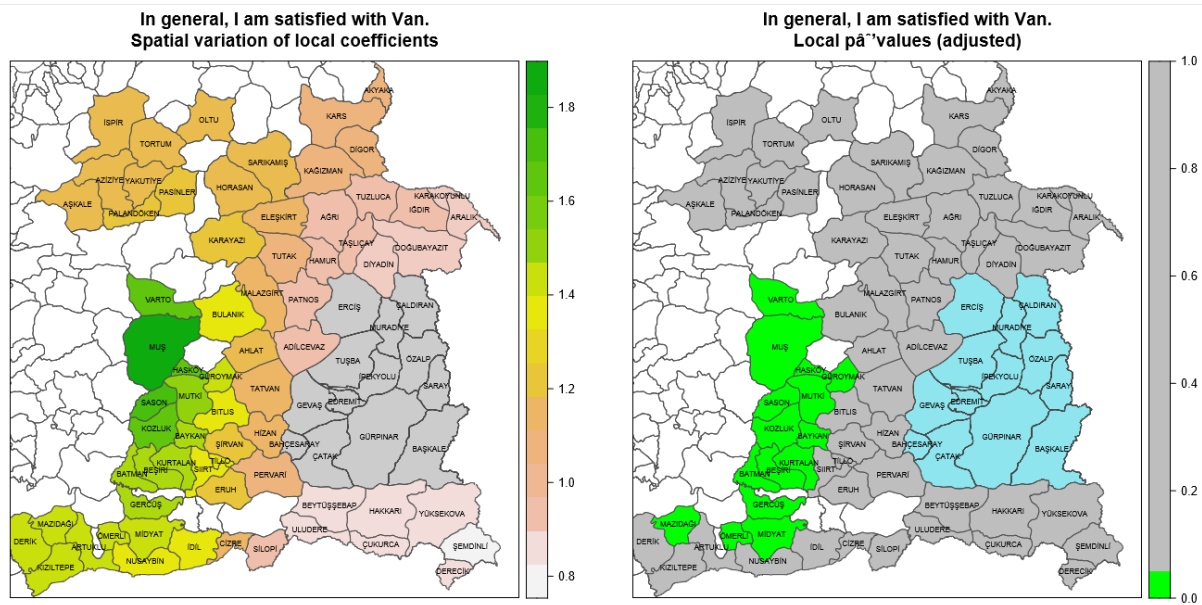

Figure 6 shows the distribution of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable I am satisfied with Van, according to provinces and districts (left Figure) and the distribution of significance of the relationship between these variables according to provinces and districts (right Figure). When Figure 6 is examined according to the relationship between the variables (left Figure); in all provinces and districts of Van province except the southern region, a positive relationship was observed between the independent variable I am satisfied with Van and the dependent variable my job had a positive impact on the post-migration integration process. (0.1, 1.80). It has been observed that the effect is higher especially in the west region (green area) of Van province. Therefore, it can be said that the participation in the I am satisfied with Van from all provinces and districts except the southern region and the change in this variable causes an increase in the my job had a positive impact on the post-migration integration process variable. In addition, it is observed that this relationship is negative in South of Van province (0.8, 1.00). In this region, the change in the variable I am satisfied with Van causes a decrease in the variable the my job had a positive impact on the post-migration integration process. When the significance of the relationship between my job had a positive impact on the post-migration integration process dependent variable and the independent variable I am satisfied with Van, according to provinces and districts, is analyzed (Figure on the right); it was observed that this relationship was significant in the west and southwest regions of Van province (green areas).

Conclusion and Discussion

Immigration has been and continues to be a complex and often controversial issue in many parts of the world. While immigration can bring many benefits, such as cultural diversity, economic growth, and an influx of skilled workers, it can also create social and economic challenges, including job competition, strains on public services, and cultural tensions. Internal migration has been a significant phenomenon in the province of Van, Türkiye, shaping its demographic, economic, and social landscape. Due to various factors, including the lack of economic opportunities, social and political instability, and natural disasters, many people have migrated from rural to urban areas within the province in search of a better life. While internal migration has brought about various benefits, including economic growth and cultural exchange, it has also created challenges, such as urbanization and social inequality. The local authorities and the Turkish government have implemented various policies and programs to manage the effects of internal migration, such as improving access to basic services, promoting regional development, and creating job opportunities. However, more efforts are needed to address the underlying causes of migration and to ensure that all residents have access to equal opportunities and a high standard of living. By adopting a collaborative and inclusive approach, the province of Van can harness the potential of internal migration and build a more prosperous, equitable, and cohesive society for all residents.

This study is important in terms of the fact that migration, which is one of the important problems of today, was made in the province of Van and the model used. When migration studies conducted throughout Türkiye are examined, it has been observed that models such as OLS and Spatial analysis methods are generally used statistically (Öz and Çelebioglu, 2015; Özgür

and Aydın, 2011; Aral and Oğuzlar, 2021). In addition, when the studies conducted in the field of migration and integration in Turkey and Van (Dirimeşe and Emre, 2022; Demirkıran, 2020; Şimşek, 2018; Korkmaz and Öztürk, 2017; Dumancı and Gür, 2022; Demirağ and Kakışım;2018; Sağıroğlu and Yılmaz, 2021) were examined, it was observed that the methods used in this study were not used. With the GWPR method used in this study, these changes are analysed and the reasons for migration are analysed in detail by examining the relationships of demographic data using spatial statistical analyses and figures thanks to the convenience provided by GWPR. The analysis outputs are interpreted by considering cultural, economic and social factors and it is aimed to provide innovative contributions to the literature in these fields. As a result of the literature review; it is estimated that the GWPR method has not been used in the field of migration in national studies. It has been observed that the GWPR method has not been used especially in analysing regional migrations. It is thought that this study is innovative with both the questionnaire and the GWPR method used and will contribute to this field for Türkiye in this respect. In addition, when the studies on migration in Van province were analysed, it was observed that the studies conducted were generally in the form of evaluation and there were no statistical or survey studies. The fact that this field has not been studied in Van province before shows the innovative aspect of this study. At the same time, when international studies are examined, it is thought that real data are mostly used in the field of migration and GWPR literature is limited in this field. It is thought that this study will be innovative with the survey study and GWPR method in the international literature and will contribute to the literature.

Although migration is essentially defined as "movement of relocation", it is closely related to the social, cultural, economic and political structure of the society and has emerged as a social event that deeply affects it. Therefore, necessary measures should be taken to minimise the negative effects of migration. As stated in this study, it is observed that the coefficients of the variables of migration due to inadequacy in social life, migration due to economic impossibilities and migration due to access to a better life are high in all provinces and districts. Therefore, in order to reduce the migration due to these reasons, policies should be organised to increase the opportunities in such areas and it is recommended to increase investments in this regard. In addition, it is inevitable that the coefficients of the variable "Van is an economically good city", which is among the reasons for the province of Van to receive migration, are high in all provinces and districts and this situation will inevitably lead to economic problems in Van over time. For this reason, it is recommended to make investments in Van in order to prevent problems in basic areas such as economic, health, social and education. At the same time, policies should be developed to increase investments in the tourism sector by promoting Van province, which has a rich historical and natural beauty, on international platforms.

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Contribution Rates of Authors to the Article / Yazarların Makaleye Katkı Oranları

The authors contributed equally to the study./Yazarlar çalışmaya eşit oranda katkı sağlamıştır.

Declaration of Interest / Çıkar Beyanı

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