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DIFFERENCES IN REGIONAL MIGRATIONS IN THE EUROPEAN UNION

RAZLIKE U REGIONALNIM MIGRACIJAMA U EUROPSKOJ UNIJI

ABSTRACT: This study aims to investigate the differences in regional migrations in the European Union and to determine the regional socio-economic factors that may influence these differences. After providing an insight into the theoretical background through a review of previous studies, a discriminant analysis conducted on a sample of 240 European NUTS 2 regions is presented. The study confirms that the share of population with tertiary education, the perceived level of corruption, the regional EU Social Progress Index and the unemployment rate of young people are the factors that discriminate between groups of regions in the EU based on their rate of net migration. The paper contributes to studies about the differences in regional migrations and the driving factors of migrations. The results can be of interest in future investigations about policy measures aimed at solving the problems of regional migrations, which should include a broader framework (with significant determinants of regional development) in managing migrations.

KEY WORDS: regional migration, regional differences, European Union, NUTS 2 regions

SAŽETAK: Cilj ovog rada jest istražiti razlike u regionalnim migracijama u Europskoj uniji i utvrditi socioekonomske odrednice regionalnog razvoja koje mogu utjecati na navedene razlike. Nakon prikaza teorijske pozadine koja sadrži osvrt na prethodna istraživanja, provedena je diskriminacijska analiza na uzorku od 240 europskih regija NUTS 2. Rezultati potvrđuju da udio stanovništva s tercijarnim obrazovanjem, percipirana razina korupcije, regionalni indeks društvenog napretka i stopa nezaposlenosti mladih predstavljaju odrednice koje odvajaju skupine regija u EU-u na temelju njihove stope neto migracije. Rad nastoji pridonijeti dosadašnjim istraživanjima koja obrađuju razlike u regionalnim migracijama i analiziraju čimbenike koji pokreću migracije. Rezultati mogu biti od interesa za

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buduća istraživanja o mjerama različitih politika koje su povezane s problemima regionalnih migracija i koje bi trebale uključivati širi okvir (sa značajnim odrednicama regionalnog razvoja) u upravljanju migracijama.

KLJUČNE RIJEČI: regionalne migracije, regionalne razlike, Europska unija, regije NUTS 2

JEL CLASSIFICATION: F22, O10, O15, O18, O52, R20

1. INTRODUCTION

The free movement of people and significant migration flows in the European Union (EU), leading to different effects in both emigrant and immigrant countries and regions, motivate the researchers to investigate migration trends, the regional distribution of migrations, destination choices and the reasons for moving. Permanent emigration can create transmission channels with consequences such as losing population and labour force potential or degradation of resources and can result in isolated regional areas, polarisation, and wider development gaps both between and within countries and regions. Immigration can contribute to economic development, reduction of skill gaps, and efficient allocation of workers, but it can also lead to negative effects, such as agglomerations, congestion, and socio-economic disparities. Furthermore, some countries have a lot of potentials, including favourable environmental conditions and resources, but still record significant emigration trends in specific regions. In some cases, the population stays in its home country even though the socio-economic conditions are unfavourable. All of this indicates that there are differences in regional migrations and that various factors stimulate individuals to stay in or leave their countries and/or regions. The determinants of regional socio-economic development have an important role in research about regional migrations, but, as discussed below, these influences differ, show ambiguous results, and deserve further attention in studies about the differences in regional migrations in the EU.

This study aims to investigate the differences in regional migration in the EU and to determine if the selected regional socio-economic factors, that were less investigated on the sample of all EU regions in previous studies, significantly contribute to these differences. The literature review presented in the next section provides an overview of studies about the differences in regional migrations and potential contributing factors. This section helps to define the theoretical background and confirms the importance of the analysis of differences in regional migration in the EU. The third section presents and discusses the results of the discriminant analysis of the sample of 240 European NUTS 2[1] regions. A comment is also given for the case of Croatia, a new EU member state, which is facing significant external and internal migrations. The final section provides a conclusion and recommendations for future research.

[1] NUTS = Nomenclature of territorial units for statistics, a hierarchical system used to divide the economic territory of the EU and the UK (Eurostat, 2022b).

2. LITERATURE REVIEW

"The decision to migrate is complex, involving cost-benefit analyses between origin and destination regions… these analyses are influenced differently by economic, social, cultural, and political factors" (Mihai & Novo Corti, 2022, pp. 163-164). Scientific literature and various expert reports have identified numerous drivers of migrations, include different approaches to grouping factors that may influence migrations, on the international, macro, regional, micro and individual levels, with different context-dependent factors. The classic and contemporary migration theories focus on reasons for moving as well as the effects of migration. The modern migration theory also takes into account new challenges, such as integration aspects and other global trends, shocks, and issues that can direct migrations.

Czaika & Reinprecht (2021) give a synthesized overview of the key migration drivers on the macro (with the following driver dimensions: demographics, economic, environmental, human development, security, supranational, politico-institutional), meso (socio-cultural), and micro levels (individual driver dimensions), with driving factors. For example, they explain that on the macro level, demographics as a driver dimension is connected with population dynamics (changes in population size and composition) as one of the possible driving factors; the economic dimension is related to economic and business conditions, labour markets and employment (unemployment and employment, wages, employment opportunities), to urban/rural development and living standards, poverty and inequality; human development drivers include education services and training opportunities, health services and situation; whereas on the micro level, individual drivers include migrant aspirations and attitudes, etc. Some similar underlying factors can be found in other papers as can be seen below.

Kwilinski et al. (2022) discuss the core economic, ecological, and socio-political determinants of international migration such as wages, unemployment rate, income inequality, corruption, political stability, CO_2 emissions and material footprint per capita. Concerning international migrations to the EU, the decline of the working-age population, lack of labour and specialised skilled workers is seen as a pull factor (Grieveson, Landesmann, Kovačević & Mara, 2021). Focusing on immigration to EU member states, Winter (2020) investigates the determinants such as better living conditions and income differential and confirms once again the importance of economic determinants (compared to political factors). Draženović, Kunovac & Pripužić (2018) have found significant economic and noneconomic (EU accession status, corruption levels, and demographic characteristics) drivers of emigration from the new EU member states to the core EU countries. The differences in the economic development of the EU member states were determined as an important migration factor in a study by Franc, Čeh Časni & Barišić (2020). They show the relationship between the emigration rates, the changes in GDP per capita, and the unemployment rate of the youth population in the immigration countries. In addition to economic conditions, factors such as life expectancy, education spending, population density and existing social networks in the destination countries represent a pull factor for migrations from certain EU member states (e.g. Romania in Davidescu, Strat, Grosu & Zgură, 2017). Moral-Pajares & Jiménez-Jiménez (2014) have found that income per capita and networks increase immigrant inflows in the EU-15. The effect of networks (e.g. families and work-related migrant groups) has been confirmed by Migali & Natale (2017) as well. Mihai & Novo-Corti (2022)

also discuss the importance of including other dimensions (not only economic) when investigating migration determinants. They observe migration from Romania to 21 EU member states and conclude that social and technological developments have a significant effect on migration flows from Romania to the EU. Their analysis of the social dimension includes the elements developed as part of the social progress index, e.g. the satisfaction of basic human needs, the foundations of well-being, and opportunity. In another study of the determinants of migrations in the EU, Prada, Silvestru, Silvestru (Bere) & Lupescu (2017) confirm the significance of socio-economic risks of exclusion, where young people not in education, employment, or training and people at risk of poverty or social exclusion tend to migrate.

In investigating the differences in migrations and socio-economic conditions which can influence them, it is also interesting to highlight that some researchers focus on attitudes toward (im)migrants and their connections with socio-economic indicators (e.g. Naveed & Wang, 2021; Botrić, 2016; Heath & Richards, 2019; Vogt Isaksen, 2019). Halapuu, Paas & Tammaru (2013) have studied the role of institutional trust that can shape attitudes towards immigrants in Europe. The authors conclude that the type of area where one lives, human capital, and economic factors play a role in determining the attitudes towards immigrants in European countries.

Another important aspect is the research of region-specific drivers of migration. Studies that include various countries and their regions confirm the differences in migration patterns and regional development factors that influence migrations. In regional analyses, the issue of limited data often makes it difficult to conduct more detailed investigations about migrations. Several significant contributions can be found in previous studies. Causa, Abendschein & Cavalleri (2021), as well as Dijkstra (2022, p. 188), analyse regional differences in migration within the EU and conclude that "since 1992, migration has contributed more than natural change to the population growth in the EU", but the share of migrants varied across regions between and within individual countries. Hermansons, Daly, Gauk & Raugze (2019) describe the differences in labour migration trends across European regions and countries, where eastern and southern European countries have a negative net migration rate, northern and western European countries have a positive net migration rate, and differences are also confirmed at individual country level. The differences between southern and eastern European regions are discussed in the research by Incaltarau & Simionov (2017) on the role of migration transition drivers in explaining the net migration balance at the regional NUTS 2 level in the EU.

Some of the aforementioned factors in the context of investigations at a national level are also significant on a regional level. Etzo (2008) concludes that GDP per capita represents an important economic determinant of interregional migrations in Italy, the unemployment rate in the sending region is a significant push factor, while network effects are also significant. The determinants of regional mobility in Italy were investigated in Adda (n.d.), where the author highlights the importance of taking geographical inequality into account in the context of quality of life when investigating individual migrations. Aggregate relative poverty is recognized as a relevant determinant of migration in the context of Polish regions in Stark, Micevska & Mycielski (2009). Bover & Arellano (2002) study intra-regional migrations in Spain and highlight the significant influence of employment in the service industry, unemployment, housing prices and education on the likelihood of individual migrations. In

an analysis of Austrian bilateral movements at the NUTS 3 level, Fischer (2018) discusses the slow adjustment of the labour market to economic disparities in terms of migration. The author also notes that the economic determinants may play a secondary role in the decision to migrate, which can depend on a specific country. Causa et al. (2021, p. 12) state that in the OECD countries "inter-regional migration does not seem to systematically respond to inter-regional differences in economic performance". Furthermore, on the sample of 133 European (NUTS 1, NUTS 2) regions of the EU-15, Rodríguez-Pose, Ketterer & Castells-Quintana (2015) conclude that money does not have an essential role in migrations across the EU's regions and that other factors (e.g. the likelihood of finding a job, network effects, social security-related and human capital-related regional characteristics…) are more significant with regard to migration flows at the EU regional level. Samek Lodovici et al. (2021) affirm that migration patterns are connected with the spatial distribution of knowledge regions across Europe, including the share of highly educated individuals.

This review shows the importance of the topic and confirms that migration is not a result of a single factor. The analysis that follows focuses on selected characteristics of regional development that potentially contribute to differences in regional migrations in the EU NUTS 2 regions.

3. DISCRIMINANT ANALYSIS OF THE DIFFERENCES IN REGIONAL MIGRATIONS IN THE EU

3.1. Methodological approach and data

A two-group discriminant analysis method was used to perform a more detailed analysis of differences in regional migrations in the EU and the potential contributing factors. According to Hair, Black, Babin & Anderson (2010), discriminant analysis is a statistical technique that can be applied when the dependent variable is categorical and the independent variables are metric. It can help in understanding group differences and in determining which of the independent variables most account for the differences in the groups' score profiles, which fits the aim of our analysis, as explained below.

A crude rate of net migration by EU NUTS 2 regions was used as an indicator to describe the differences in regional migrations. NUTS 2 regions are often included as units of observation in regional analyses performed in the EU due to data availability and the importance of these regions in the implementation and evaluation of regional policies in the EU. As this study analyses the differences in regional migrations in the EU, two groups of regions were defined, with the EU average as a point of division. The data were extracted from the Eurostat database (Eurostat, 2022a), and regions with crude rates of net migration higher than the EU average were included in one group, and those with crude rates of net migration lower than the EU average were included in the other. In total, data for 240 NUTS 2 regions were analysed and two groups of 120 regions were formed based on the given explanations. In line with this, VAR 1 indicates a two-group single categorical dependent variable, where each case belongs to only one group. Before explaining independent variables, it should be highlighted that a more detailed analysis of data on the crude rate of net

migration by EU NUTS 2 regions confirms significant variations both across and within EU member states. Regional variations in the EU countries indicate that there are significant differences between regions of the same country and that in most of the countries, there are regions with positive and negative crude net migration rates.

Independent variables included in this analysis are based on the examination of the papers presented in the theoretical background section, a research gap that is seen in previous works regarding the selected regional development factors that influence migrations (that were less investigated on the sample of all NUTS 2 EU regions) and data availability. It can be expected that the characteristics which differ between regions with net migration rates higher than the EU average and those with net migration rates lower than the EU average are as follows: population density (higher population density implies concentrations of population and economic activities, possibly better access to services and opportunities for employment, but it can also produce some unfavourable effects of high concentrations of population in regional areas (especially in regions that include large cities); old-age dependency ratio (which can have unfavourable effects on numerous macroeconomic and social aspects, but if these effects are not seen and there are adequate living conditions for the working-age population in these regions, it will not lead to emigration); the share of people with tertiary education (a factor that can attract highly skilled workers, but in regions with lower levels of development and social progress it can motivate highly educated people to leave these regions); the unemployment rate of young people (a significant factor that may induce emigrations of young people who are looking for (better) job opportunities); labour market slack (subgroups with unmet needs in terms of employment; this can also be a motivating factor for migration with the aim of finding better working conditions, but not all unmet needs (e.g. part-time employment where the employee wants to work more) will be a significant enough factor for emigrating. Sometimes they can motivate the person to change their job in the same region, so it is possible that this variable will not contribute to the differences observed); the EU regional Social Progress Index (EU-SPI, according to Annoni & Bolsi (2020), measures social progress for each EU region and is used as a complement to measures such as GDP; it can be expected that the lower results may lead to regional emigrations); the perception of corruption (reduced economic opportunities, trust, and security due to corruption can be significant drivers of migration). No data regarding network connections at the NUTS 2 level are available. Although some indicators were extracted that refer to the risk of poverty and severe material deprivation as well as households with very low work intensity at the EU NUTS 2 level, the data were lacking for a significant number of regions, so these aspects were excluded from the analysis. At the time of performing the analysis, the average data for the 2017-2019 period were used for the dependent variable and most of the independent variables. The period after 2020 can be observed in future analyses that will estimate the impact of the COVID-19 crisis. The EU-SPI and its components were based on data published in 2020 (the most recent data available at the time of performing the analysis). The index comprises different dimensions that measure social progress (indicators that refer to basic human needs, the foundations of well-being, and opportunity) and due to data availability, it includes the period 2016-2018, along with some data as recent as 2020 (Annoni & Bolsi, 2020).

The table below presents variables with the corresponding data sources.

Table 1. Variables included in the discriminant analysis

Variable	Explanation	Data source
VAR 1	Crude rate of net migration plus statistical adjustment (the ratio of net migration (including statistical adjustment) during a year to the average population in that year; expressed per 1000 persons).	Eurostat (2022a)
VAR 2	Population density, persons per square kilometre	Eurostat (2022a)
VAR 3	Old-age dependency ratio 3rd variant (population 65 years or over to population 20-64), %	Eurostat (2022a)
VAR 4	Population by educational attainment level (25-64 years), tertiary education, %	Eurostat (2022a)
VAR 5	Unemployment rates of young people aged 15-29, %	Eurostat (2022a)
VAR 6	Labour market slack (15-64 years); 1000 persons	Eurostat (2022a)
VAR 7	European Social Progress Index (difference between national and regional values)	European Commission (2021)
VAR 8	Institutions corruption index (perceived level of corruption)	EU-SPI database: European Commission (2020) Note: The indicator of the perceived level of corruption used in this database is based on the source: European Quality of Government Index (University of Gothenburg).

Group sizes of the dependent variable are significantly greater than the number of independent variables, which is one of the assumptions of the discriminant analysis. Other assumptions of the discriminant analysis were checked, and the data were prepared for analysis (which included normalisation, exclusion of outliers, which the discriminant analysis is sensitive to, and correlation control[2]). A stepwise discriminant analysis was performed. The most important results for the aim of the research are presented below.

3.2. Results and discussion

Tests of equality of group means were performed in order to assess the significance between the means of the independent variables of the two groups of NUTS 2 regions. The results in the table below show that the old-age dependency ratio (VAR 3) and labour

[2] Results are available upon request (they are not presented in the text due to space limitations).

market slack (VAR 6) variables are not significant. Significant differences between the two groups are confirmed for all other independent variables.

Table 2. Tests of equality of group means

Variable	Wilks' Lambda	F	df1	df2	Sig.
VAR 2	0.948	11.933	1	219	<0.001
VAR 3	0.999	0.180	1	219	0.672
VAR 4	0.811	51.025	1	219	<0.001
VAR 5	0.903	23.618	1	219	<0.001
VAR 6	0.992	1.758	1	219	0.186
VAR 7	0.886	28.112	1	219	<0.001
VAR 8	0.845	40.232	1	219	<0.001

Source: Author's calculation

The intercorrelations between the independent variables presented in the following table are not high, which implies that it is possible to include these variables in the analysis.

Table 3. Pooled within-groups matrices

Variable	VAR 2	VAR 3	VAR 4	VAR 5	VAR 6	VAR 7	VAR 8
VAR 2	1.000	-0.312	0.086	-0.224	0.258	0.006	0.043
VAR 3	-0.312	1.000	-0.139	0.229	0.093	0.099	0.048
VAR 4	0.086	-0.139	1.000	-0.011	0.177	0.283	0.443
VAR 5	-0.224	0.229	-0.011	1.000	0.396	-0.174	-0.329
VAR 6	0.258	0.093	0.177	0.396	1.000	0.012	-0.033
VAR 7	0.006	0.099	0.283	-0.174	0.012	1.000	-0.060
VAR 8	0.043	0.048	0.443	-0.329	-0.033	-0.060	1.000

Source: Author's calculation

The stepwise estimation process was used to identify which of the variables best discriminate between two groups of the observed NUTS 2 regions. In stepwise estimation, independent variables enter into the discriminant function based on their discriminating power, and the variables that are not important in discriminating between the groups are eliminated (Hair et al., 2010). Considering the aim of the study and the results of the tests of equality of group means presented above (where the results imply that some variables are not significant), the method is appropriate for the analysis in this paper.

Table 4. Standardized canonical discriminant function coefficients

Variable	Function 1
VAR 4	0.472
VAR 5	-0.315
VAR 7	0.396
VAR 8	0.383

Source: Author's calculation

Based on the results given in the table above, the variables that are the strongest predictors of allocation to one of the groups can be identified. The results given in the following table provide further details for interpretation.

Table 5. Structure matrix

Variable	Function 1
VAR 4	0.757
VAR 8	0.672
VAR 7	0.562
VAR 5	-0.515
VAR 2[a]	0.130
VAR 3[a]	-0.080
VAR 6[a]	-0.049

Pooled within-groups correlations between discriminating variables and standardized canonical discriminant functions. Variables ordered by absolute size of correlation within function.

[a]. This variable not used in the analysis.

Source: Author's calculation

The results in the structure matrix table provide a basis for identifying and describing the variables that discriminate between groups of NUTS 2 regions in the EU. These variables comprise: the share of population with tertiary education, the perceived level of corruption, EU-SPI and the unemployment rate of young people. These factors constitute important socio-economic determinants of (regional) development that can have an influence on differences in regional migration in the EU and contribute to differences between higher and lower results of the regional crude rate of net migration. Supercript [a] indicates the variables that have been removed from the model. This was expected for the variables VAR 3 and VAR 6 regarding the previously presented results of the tests of equality of group means, but the stepwise analysis also removed VAR 4 (population density). Population density can be a push factor in some regions where higher population concentrations produce unfavourable effects (as explained above). Its importance in determining the differences can also diminish in comparison with other significant variables and because the sample includes numerous NUTS 2 regions with various socio-economic drivers of migrations that may be more important.[3]

[3] It should be noted that the analysis results also confirmed that the log determinants are similar and that Wilks' lambda table identifies the significance of the one discriminant function. Stepwise statistics confirmed that the variables entered/removed are the same as the variables presented in the standardized canonical discriminant function coefficients table and the structure matrix table. Wilks' lambda table showed that all the independent variables entered in the model are significant (with $p < 0.001$).

Table 6. Classification matrix

Classification results[a, c]					
			Predicted group membership		
		group*	0	1	Total
Original	Count	0	87	33	120
		1	21	99	120
	%	0	72.5	27.5	100.0
		1	17.5	82.5	100.0
Cross-validated[b]	Count	0	86	34	120
		1	22	98	120
	%	0	71.7	28.3	100.0
		1	18.3	81.7	100.0

[a.] *77.5% of original grouped cases correctly classified.*

[b.] *Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.*

[c.] *76.7% of cross-validated grouped cases correctly classified.*

** 0 = EU NUTS 2 regions with crude rates of net migration lower that the EU average, 1 = EU NUTS 2 regions with crude rates of net migration higher than the EU average*

Source: Author's calculation

The classification matrix shows that 77.5% of cases in the original group are classified correctly (76.7% in a cross-validated sample). The correct classification is higher in the group of regions that have crude rates of net migration higher than the EU average (82.5% compared to 72.5% in the other group).

The study presents the need to take into account various characteristics of regional development that contribute to a favourable, inclusive, and trustworthy living environment when investigating the differences in migration and the reasons for moving. The significant factors identified herein can also influence attitudes toward migrations that may be connected with the structural socio-economic characteristics.

If the final elaboration includes the example of Croatia, a new EU member state faced with significant external emigrations (further increased after the last EU enlargement) as well as problems related to internal migrations, it can be concluded that the results of this study may be a part of the explanation of the unfavourable trends also in Croatia. Several valuable studies discuss Croatian demographic problems, including migration aspects (e.g. Akrap, 1999; Gelo, Akrap & Čipin, 2005; Lajić, 2007; Akrap & Ivanda, 2019). Their results show that socio-economic conditions and regional development differences affect regional and national migrations, while migrations influence future demographic projections, labour force, the structure of the economy, as well as other aspects of regional and national development. A more detailed analysis of the results presented in this paper indicates that the Croatian NUTS 2 regions included in the analysis belong to the group of regions with

a lower than the EU average net migration rate and that the determinants of regional development, such as the share of population with tertiary education, the perceived level of corruption, the social progress index and the unemployment rate of young people, should be included in broader discussions about the problems and impacts of migrations in Croatia. It should also be noted that this study (due to data availability) only includes the NUTS 2 level, and an analysis at the NUTS 3 level with a focus on specific individual countries would be an additional contribution to the research of this topic due to significant differences between the regions of the same country.

5. CONCLUSION AND IMPLICATIONS

By investigating which socio-economic factors of regional development contribute to differences in regional migrations in the EU, this paper contributes to previous studies about the differences in regional migrations and their driving factors. The analysis confirms that differences in regional migrations in the EU are connected with regional socio-economic factors, such as the population with tertiary education, the perceived level of corruption, EU-SPI and the unemployment rate of young people, which discriminate between groups of NUTS 2 regions in the EU based on their crude rate of net migration.

The results can provide a basis for more specific studies about policy measures aimed at the areas of education, social progress, corruption and (youth) unemployment (labour market) that should contribute to the creation and implementation of the migration and regional development policies.

This study did not focus on causal relationships, but they may be investigated in future studies about the driving factors of emigration, immigration, and re-migration (in groups of EU regions). With higher data availability about migrants' characteristics, their reasons for moving and public opinions at the regional NUTS 2 (or lower) level in the EU, it would be useful to analyse the regional migration patterns in more detail. One of the important constraints of this analysis is its focus on regional statistics instead of the characteristics of migrants. Similar research can extend the analysis period, especially regarding the COVID-19 and post-COVID-19 period, with the aim of shedding light on the contemporary challenges. It is also possible that some variables differed at the time before and after intense emigration, therefore, more complex analyses should include different time dimensions and contexts. As the sample includes EU regions, the instruments of the EU cohesion policy (e.g. EU funds, programmes and initiatives that enable targeted assistance) directed at mitigating migration-related problems can help reduce unfavourable differences by creating an attractive environment on a regional basis.

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