

MIGRATION MOTIVATION IN EU – A STATISTICAL APPROACH

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Abstract

Due to the fact that the migration is a complex and multidimensional phenomenon, the modeling and the statistical analysis implies the co-integration of a large variety of disciplines: statistics, demographics, geography, economy and others. The migration process can be also seen as a result of the globalization. The migration should represent a clear and well defined phenomenon, in reality this thing is happening very rare due to the fact that the migration process has a lot of forms, the way in which the migration is seen is different from each person's perspective.

One of the goals of the economic activity is represented by the increase of the quality of life and also the poverty reduction. Due to the fact that one of the most important factors, which contribute to migration, has economic implications, we may assume that the common way to achieve the above is to migrate.

In this paper we will briefly discuss the opportunities and constrains that people have to handle when they decide to migrate. We will also describe the advantages and the disadvantages for both home and destination countries. In the second part of this paper, we will develop an econometric model which will help us to strengthen the theoretical approach and also to show the evolution of this complex phenomenon. Based on the data from Eurostat, World Bank, IOM and other specific sites, we will try to classify some EU countries from the migration perspective.

Keywords: migration, labour market, discriminant analysis

JEL Classification: A12, C01, F22, J61, J62

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1. Introduction

The migrant will face a series of difficulties, but also a number of opportunities, benefits from the decision to migrate. The migrant expects that the amount of advantages to exceed the hardships encountered. Each individual is different, hence the decision of an individual or family to migrate can be taken into account based on various factors. Individuals may have different demands, react differently to change, adapt differently. Therefore, migration incentives depend on a number of factors such as the level of preparation, religion, social values.

The decision to migrate is based on multiple factors, and not only on the poor conditions from the country of origin or on the favourable conditions from the host country.

Beside the determinant factor – the economical one, the decision to migrate is influenced by other factors - social, political and ethical - as well.

The age plays an important role in the migration process, the younger the persons, the bigger is the migration rate. The older people are less open to changes, they adopt the “new” harder and are less flexible.

The family is also a factor that influences the migration process. If the person is single, not married, they are more willing to leave the country, they are more willing to risk. It is proved that the men migrate in a higher number compared with women. With regards to the families (with or without children) it has been shown that in most of the cases, the women follow the men – the latter migrate first and are followed lately by the women.

If the families that migrate have children and they leave them in the care of the grandparents or other relatives, they may develop problems of social nature: school dropout, social exclusion, juvenile delinquency, lack of adequate development due to the absence of both parents in the period of the child development.

The friends represent another factor that may influence the decision to migrate and/ or the decision of electing the destination country. If the persons that decide to migrate have friends or relatives in a specific country, they will choose more easily the destination country and will adapt easier as well.

The language represents another factor that contributes in the decision of choosing the destination country. The persons choose the destination country, the country that has as official language the English language (or the country in which English language is enough to be able to cope) – it is well known that English language is the most known language by the EU persons; or a country that has a easy to learn language or a country with a language close to the native language. Knowing the language from the host country helps the persons to adapt easier and to have more chances to enter to the labour market – in most of the cases, not

knowing the official language from the host country may be a major disadvantage, greatly reducing the chance to be considered equal to those already established in the host country or to the ones that speak the language of the host country.

The migration cost represents another important factor in the decision process of the migration. The cost of the migration is not based only on the cost of travel from the country of origin to the destination country, but on all the living costs – the public transport, the cost of renting or buying a home, the cost of the alimentary products, the cost of the services, the cost of the health insurance - as well.

Although it is said that the migration process has a positive impact on the country of origin, but as much as the duration of the migration process increases, the positive effects turn into negative effects (Vasile V, 2014).

The decision to migrate is based also on the push and pull factors. The push factors are the ones that determine the people to migrate from the country of origin perspective, while the pull factors are the ones that attract the people to migrate from the host country perspective.

The interpersonal relationship (the relatives, family or friends) can act as a push factor and pull factor as well. For a person whose family lives in another country, the decision to migrate can act like a pull factor, while for a person whose family is based in the country of origin is neither a pull or push factor, but rather acts like a discouragement to migrate (Kelo M. et. al., 2004).

2. Literature review and general framework

The migration process can be seen as an opportunity, that can have positive effects for the people that don't have enough opportunities in their own country, finding a job, accessing better conditions and an increased level of living in the destination country, country that could benefit from the emigrants, if they resemble to the socioeconomic and demographic characteristics of the host country (Mihi-Ramirez A. et. al, 2013).

The international migration attracts a series of advantages and disadvantages for both home and destination country.

One of the most noticeable disadvantages for the home country is the loss of people – here we are referring to the investment made in education (no matter the level of the education achieved, investments are made anyhow), the bigger the level of education, the bigger the loss. On the other hand this can be seen as an advantage as well, if we take into consideration the fact that on short and medium term the unemployment rate can decrease due to the increase of the migration rate.

Regarding the advantages for the destination country, one of the biggest advantages is the gain of “needed” people without making any effort in order to have qualified people for the sectors being in difficulty. The migration process can have disadvantages for the destination country if we think that the people that emigrate can take the work place of a resident. The bigger the emigration rate, the bigger the unemployment rate in the destination country.

If we are facing with temporary migration we can say that both home and destination countries can benefit from this phenomenon. The home country will benefit from the remittances sent by the people that work in other countries. Also, when people will get back in their home country, they will share their knowledge and experience accumulated in the destination country – this is also an advantage because the home country would benefit without making any investment. If we are thinking at the benefits for the destination country (temporary migration) we can say that the destination country will have qualified people for the needed domains without taking each individual from scratch and invest in each of them.

The dual theory of the labor market highlights very well the flow on this market referring to migration. The local population migrates to more attractive professions, while the immigrants take the 3D jobs (the dirty, dangerous and difficult jobs). This division is enhanced by the occupation varied nature – the attractive jobs are the ones in which the capital is predominant, while the 3D jobs are the ones in which the “hard” job is predominant (Bijak J., 2006).

3. Research goal, methodology and data issues

The statistical method used for the present paper is the Discriminant analysis. Discriminant function analysis is used to determine which variables discriminate between two or more naturally occurring groups (<https://documents.software.dell.com/statistics/textbook/discriminant-function-analysis>).

The Discriminant Analysis is a method that is part of the explicative methods of the data analysis. It utilizes a dependent variable (Y) and some explanatory variables (X1, X2, ..., Xp) quantitative or binary. This method is applied to a population characterized by continuous or categorical variables which components are divided in groups. The scope of this analysis is to classify one or more new observations in groups already specified (<http://www.creeaza.com/afaceri/economie/finante-banci/Analiza-Discriminanta-Principala111.php>).

In order to perform this analysis we selected some countries from the European Union and some indices related to the migration process (factors that can contribute to the decision to migrate or not). The countries included in the analysis are: Belgium, Bulgaria, Denmark, Germany, Spain, France, Croatia, Italy, Latvia, Lithuania, Luxembourg, Hungary, Poland,

Portugal, Romania, Slovenia, Sweden and Norway. The indices on which we performed the analysis are: Number of emigration, Number of immigration, GDP, Inflation rate, Mean and median income, People at risk of poverty or social exclusion (noted in the analysis: PRPSE), Population by educational attainment level - tertiary education (noted in the analysis: Population_tertiary). Without the first two indices, the others are *predicted variables*.

The data was collected from Eurostat for year 2013 (due to the absence of data for more recent years) and the tool used for this analysis is SPSS.

4. Empirical results

In order to obtain a categorical variable, we calculated the Net migration rate (the number of immigrants – the number of emigrants, divided by 1000). After we obtained this variable, we divided the countries into two groups: leaving country (Net migration rate<0) and receiving country (Net migration rate>0). Before we conducted the “Discriminant analysis”, we standardized the indices – in order to have an accurate analysis. In the below table we have the number of countries included in the first category of the “category” variable. We have 8 “leaving countries”: Bulgaria, Spain, Croatia, Latvia, Lithuania, Poland, Portugal and Romania, and 10 “receiving countries”: Belgium, Denmark, Germany, France, Italy, Luxembourg, Hungary, Slovenia, Sweden and Norway.

Table 1 – Frequencies for “Category” variable

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid leaving country	8	44.4	44.4	44.4
receiving country	10	55.6	55.6	100.0
Total	18	100.0	100.0	

Source: Author’s work

In the first output we have “Group Statistics” table – here we have the mean and the standard deviation values for the two types of category (leaving country or destination country). For the first group we have the highest mean value for “People at risk of poverty or social exclusion”=0.7515267, while for the second group the highest mean value is registered for “Mean and median income”=0.6234160.

Moving forward with the analysis, we have the table ”Tests of Equality of Group Means”. Here we have the Sig. Value for each indices included in the analysis as follows: ”GDP”, ”Inflation rate” and ”Population by educational attainment level - tertiary education” as non-significant (Sig.>0.05) and “Mean and median income” and “People at risk of poverty or

social exclusion” significant (Sig. <0.05). The conclusion we may draw is that the last two indices mentioned before will be included in the next steps of the analysis.

Table 2 – Group Statistics

category		Mean	Std. Deviation	Valid N (listwise)	
				Unweighted	Weighted
leaving country	Zscore(GDP)	-.3999413	.42412696	8	8.000
	Zscore(Inflation_rate)	-.3838614	1.19553679	8	8.000
	Zscore(Mean_and_median_income)	-.7792700	.30503542	8	8.000
	Zscore(PRPSE)	.7515267	.85814733	8	8.000
	Zscore(Population_tertiary)	-.3947432	.93252688	8	8.000
receiving country	Zscore(GDP)	.3199531	1.22190607	10	10.000
	Zscore(Inflation_rate)	.3070891	.73582974	10	10.000
	Zscore(Mean_and_median_income)	.6234160	.91918468	10	10.000
	Zscore(PRPSE)	-.6012213	.64222464	10	10.000
	Zscore(Population_tertiary)	.3157946	.98143408	10	10.000
Total	Zscore(GDP)	.0000000	1.00000000	18	18.000
	Zscore(Inflation_rate)	0.0000000	1.00000000	18	18.000
	Zscore(Mean_and_median_income)	0.0000000	1.00000000	18	18.000
	Zscore(PRPSE)	.0000000	1.00000000	18	18.000
	Zscore(Population_tertiary)	.0000000	1.00000000	18	18.000

Source: Author’s work

Table 3 – Tests of Equality of Group Means

	Wilks' Lambda	F	df1	df2	Sig.
Zscore(GDP)	.865	2.508	1	16	.133
Zscore(Inflation_rate)	.875	2.282	1	16	.150
Zscore(Mean_and_median_income)	.486	16.948	1	16	.001
Zscore(PRPSE)	.522	14.676	1	16	.001
Zscore(Population_tertiary)	.868	2.433	1	16	.138

Source: Author’s work

Table 4 – Log Determinants

category	Rank	Log Determinant
leaving country	5	-6.665
receiving country	5	-5.022
Pooled within-groups	5	-2.971

Source: Author’s work

Regarding to the "Log determinants" tables – it's important to have appropriate values which is the case in the present analysis.

The next step is the analysis of "Box's M". One important aspect in this analysis is the fact that the critical value is 0.01 and not 0.05 which is common for many tests. For this study, we have the Sig.=0.020 which is not statistically significant, so we will assume we have equal population covariance.

Table 5 – Test Results

Box's M		44.321
F	Approx.	1.900
	df1	15
	df2	906.275
	Sig.	.020

Source: Author's work

In the next table "Eigenvalues" are presented the functions, the one with the highest Eigenvalue being the better. In our case we have only one function which will be the one we choose, with a "Canonical Correlation" of 0.783.

Table 6 – Eigenvalues

Function	Eigenvalue	% of Variance	Cumulative %	Canonical Correlation
1	1.589 ^a	100.0	100.0	.783

Source: Author's work

In the "Wilks' Lambda" output we have the Sig. value as well as in the previous output. If we have had more than one function, the Sig. value is the screening step in order to choose the correct function. In the present analysis we have only one function with the Sig.=0.025<0.05 which is statistically significant.

Table 7 – Wilks' Lambda

Test of Function(s)	Wilks' Lambda	Chi-square	df	Sig.
1	.386	12.840	5	.025

Source: Author's work

The next two outputs have to be analyzed in parallel. The "Standardized Canonical Discriminant Function Coefficients" needs to have closed values to the ones from the "Structure Matrix" output which is the case in our study. For GDP we have the values -0.239 and -0.314, for Mean and Median Income we have -0.048 and -0.817, for People at risk of poverty or social exclusion we have 0.494 and 0.760. For the rest of the indices we have

differences between the values. For Population by educational attainment level - tertiary education we have 0.526 and -0.309, for Inflation rate we have 0.26 and -0.300.

Table 8 – Standardized Canonical Discriminant Function Coefficients

	Function
	1
Zscore(GDP)	-.239
Zscore(Inflation_rate)	.206
Zscore(Mean_and_median_income)	-.948
Zscore(PRPSE)	.494
Zscore(Population_tertiary)	.526

Source: Author’s work

Table 9 – Structure Matrix

	Function
	1
Zscore(Mean_and_median_income)	-.817
Zscore(PRPSE)	.760
Zscore(GDP)	-.314
Zscore(Population_tertiary)	-.309
Zscore(Inflation_rate)	-.300

Source: Author’s work

The below output (“Classification Results”) contains the percent that the model predicts the final result. For “leaving country” we have 87.5% countries with the original category equal with the predicted group and for “receiving country” we have 90% countries with the original category equal with the predicted group. We can conclude that the highest percent of correct classification is for “receiving country”.

Also, we want to look below the output – we have 88.9% of original grouped cases that are correctly classified and 77.8% of cross-validated grouped cases are correctly classified.

If we take a look at the processed database we will see some additional variables generated as follows:

- Dis_1 – the predicted group for analysis 1;
- Dis1_1 – the discriminant score for function 1;
- Dis1_2, Dis2_2 – the probability for each case of group membership in group 0 which is “leaving country” (Dis1_2) and level one which is the “receiving country” (Dis2_2).

Table 10 – Classification Results

category			Predicted Group Membership		Total
			leaving country	receiving country	
Original	Count	leaving country	7	1	8
		receiving country	1	9	10
	%	leaving country	87.5	12.5	100.0
		receiving country	10.0	90.0	100.0
Cross-validated ^b	Count	leaving country	6	2	8
		receiving country	2	8	10
	%	leaving country	75.0	25.0	100.0
		receiving country	20.0	80.0	100.0

a. 88.9% 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. 77.8% of cross-validated grouped cases correctly classified.

Source: Author’s work

Let’s take Romania’s case to analyze based on the above variables. According to the variable “category” created by us at the beginning of this analysis, Romania is classified as a “leaving country”. The predicted group (Dis_1) is the same – “leaving country” with a probability of being part of the “leaving country” group of 98.54% and a probability of being part of the “receiving country” group of only 1.453%.

The only two countries that have opposite group membership after the analysis are Hungary and Portugal. Hungary was initially classified as a “receiving country” and based on the indices included in the analysis (GDP, Inflation rate, Mean and median income, People at risk of poverty or social exclusion, Population by educational attainment level - tertiary education) was classified as a “leaving country”. The value for Dis_1 is 1.26 with the probability of being part of the first category (leaving country) of 92.27% and with the probability of being part of the second group of 7.726%.

The Portugal case is on the opposite part. This country was initially classified as a “leaving country” and after the analysis as a “receiving country” with a values for Dis_1=0.174. The probability of being part of the first category is 46.92% and the probability of being part of the second group is 53.08%.

As a general note we can say that the analysis conducted was accurate due to the fact that for almost all countries we have the initial classification the same as the final classification, except Hungary and Portugal.

5. Conclusions

The migration is a multidimensional process that includes a lot of areas, with the principal aim - life quality increase. The decision to migrate is based on several components: economics, social, demographic. Based on this, the countries are divided in home and destination countries. In the analysis conducted we classified the countries (some EU countries) only by the Net Migration Rate and as an output we obtained a separate classification by taking into consideration some indices that are related to the migration process. We obtained different classifications for only two countries – Hungary and Portugal, the rest of them have the same classification which lead us to affirm that the analysis provided is accurate. The countries included in the analysis which are in the "leaving countries" group are: Bulgaria, Spain, Croatia, Latvia, Lithuania, Poland, Romania; and the countries which are in the "destination countries" group are: Belgium Denmark, Germany, France, Italy, Luxembourg, Slovenia, Sweden, Norway.

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