Prof. Vesna Bucevska, Ph.D.*

DETERMINANTS OF MIGRATION FROM EU CANDIDATE COUNTRIES TO GERMANY: A GRAVITY MODEL APPROACH

Abstract: *The objective of this paper is to investigate the determinants of migration from the EU candidate countries (Macedonia, Croatia and Turkey) to Germany during the period 1997-2007 using the extended gravity model. The estimation of the model of migration flows is made on pool data using EViews 6. The results of estimation show that the ratio between unemployment rate in the country of origin and the country of destination turned out to be the main economic determinant of migration flow, showing a strong effect. The results from the model show also presence of strong social network effects.*

Key words*: Migration flows, EU candidate countries, gravity model.*

1. Introduction

The last EU enlargement which took place on 1st January 2007 extended the European Union (EU) to 27 members. Currently three countries (Croatia, Macedonia and Turkey) have the status of EU candidate countries.

In the realm of the European Union (EU) accession process, the EU candidate countries, on one hand and the EU-27 on the other hand are facing a number of economic, social and political challenges raised by the potential migration from these countries to EU. The huge differences in the income level between the EU candidate countries and the EU members states, higher than at any time before in the history of the EU enlargement, the high and persistent unemployment rates in these countries, the low relative wages, along with the insufficient social protection in the EU candidate countries are reasons for fear of massive migration flows from EU candidate countries to EU. The fear is additionally enhanced with perception of these countries as a crossroad of organized crime and source of cheap labour force and illegal migrants who would immigrate to the EU countries in search of better life.

This fear is mostly expressed by Austria and Germany which have installed 'transitional arrangements' with newcomers, thus diminishing the economic potential of freedom of labour and producing substantial economic

* University „Ss. Cyril and Methodius", Faculty of Economics-Skopje, Macedonia

costs. [2] But, is the fear of large migration pressure from EU candidate countries to current EU-27, when these countries become full members of EU, justified? We will try to answer this question by estimating the main determinants of migration from the present three EU candidate countries countries to Germany in the period 1997-2007 using the extended gravity model. An understanding of the determinants of migration is the first and most important precondition for the assessment of possible migration pressures from these countries to Germany.

2. Review of present empirical studies on migration

From a methodological point of view there are two groups of empirical studies which try to identify the migration determinants and estimate migration potential from Central and Eastern European Countries to EU: econometric studies and surveys. We will focus below on the econometric studies.

All econometric studies are based on a similar set of explanatory variables (income differential, unemployment rates in the source and host country, and some institutional variables) and as such provide strong empirical evidence that decision migration is significantly determined by the search for better economic conditions.

Although econometric studies use similar explanatory variables, the estimates of the migration potentials differ significantly. For example, there are econometric studies according to which 4 percent of the CEECs-10 population will move to EU-15 member states [3, p.12]. Other forecasts are substantially higher or lower [1, p. 45]. The main reason for the differences in the estimates of migration potential lies in the fact that these models employ different econometric estimators which use different sources of variation of the data and impose different restrictions on the intercept, the slope parameters and the error terms.

4. Recent migration flows to EU with a spotlight on Germany

Before presenting the migration flows from the three EU candidate countries to Germany in the period from 1997 to 2007, we will discuss some of the problems regarding the measurement of migration.

First of all, there are differences in the definition of migration among the EU member states. As a result of the differences in the definition of migrants, the data supplied by Member States as well as the estimates produced by Eurostat may include systematic coverage errors such as

exclusion of some categories of immigrants (temporary migrants for longer than one year, students, asylum seekers, etc.) or inclusion of migrants who settle in the country for less than one year. According to Eurostat [6, p.1] total immigration in the EU increased over the last five years. In 2006 the number of immigrants was nearly a quarter higher than in 2002. However, in the last three years this increase has slowed, even turning into a decline in 2005 [6, p.1].

The largest absolute numbers of immigrants to the EU in 2006 were recorded in Spain, Germany and United Kingdom (841 000 in Spain, 662 000 in Germany and 591.000 in Germany) [6, p.2]. The number of immigrants in Germany in 2006 was the lowest recorded number of immigrants in Germany since 1987. However, in 2007 this number has modestly increased (680.766 immigrants) which represents a growth of 2,9% compared to 2006 [8, p. 16].

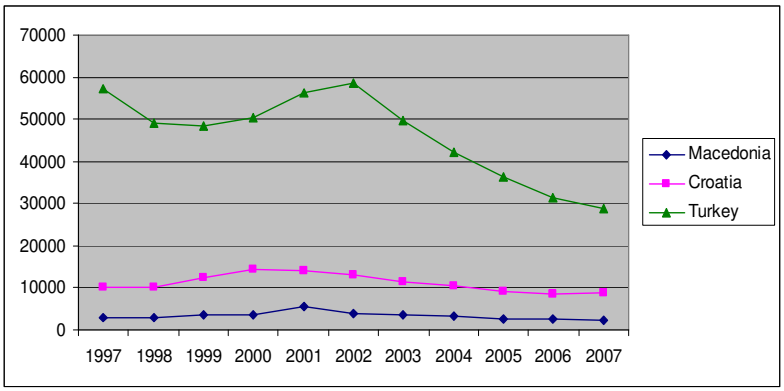
If we analyse the number of immigrants to these three EU member states in relation to their population size, we will see that among these countries only Spain had high immigration relative to its population size, while for Germany and the United Kingdom, immigration per 1000 inhabitants was close to the EU-27 average [8, p. 149].

It is worth mentioning that **in the period 1997-2007 Germany was the most dominant EU receiving country of immigrants (almost 8 million immigrants came into Germany),** followed by United Kingdom with 4,8 million immigrants, Spain and Italy with 4,2 and 2,7 million immigrants, respectively. [8, p. 153].

If we compare the total absolute number of immigrants from the EU candidate countries (Macedonia, Turkey and Croatia) in Germany in 2007 compared to that number in 1997 we will see that it has declined for 56,7 %. Among these countries the biggest fall was recorded by Croatia (84,98 %) followed by a decline of 76,12% by the Macedonian immigrants and 50,62% by the Turkish immigrants. This decline is due to the political stabilization and economic stabilization of Croatia and Macedonia and the successfully implemented reforms in Turkey.

In spite of the decline in the absolute and relative number of immigrants coming from the EU candidate countries, the participation of the immigrants from these countries in the total number of immigrants in Germany remained significant in 2007. Immigrants from Turkey were the third biggest group of immigrants by countries of origin with a share of 4,2% in the total number of immigrants in Germany. In the same year 30.168 immigrants from the former Yugoslav republics (without Slovenia) were registered, which is equal to 4,4 % of total number of immigrants in that year [8, p. 19].

Figure 1: Annual immigration flows from the EU candidate countries to Germany in the period 1997-2007



Source: Migrationsbericht des Bundesamt fuer Migration und Fluechtlinge im Auftrag der Bundesregierung, Migrationsbericht 2007, p. 208-211

5. Data, methodology and empirical results

The analysis of the determinants of migration from the EU candidate countries to Germany is based on historical data on migration flows from these three countries to Germany collected for the period 1997-2007. Reliable data on migration has been largely missing in South-Eastern Europe. Therefore, the data on the immigration flows are taken from one source-Migrationsbericht des Bundesamt fuer Migration und Fluechtlinge im Auftrag der Bundesregierung, Migrationsbericht 2007, which makes the data comparable. A migrant in this paper is someone outside his or her country of birth or citizenship for 12 months or more including refugees and asylum seekers, foreign students and other long-term visitors, unauthorized foreigners, and naturalized foreign-born citizens of the European Union.

Data on GDP per capita in US Dollars at prices and PPS of 2005 were collected from the statistical division of the United Nations Economic Commission for Europe. The unemployment rates were obtained from the Transition Report of the European Bank for Reconstruction and Development (various issues) and from the database on labour statistics operated by International Labour Office Bureau of Statistics. The figures on the total population were collected from the statistical division of the United Nations Economic Commission for Europe and the information on the distance in kilo-meters between the capital cities of the EU candidate candidate countries and Berlin were obtained from the web site www.indo.com. It is worth mentioning that the dataset represents a huge

progress over the datasets used in the earlier studies on this topic. The data is balanced i.e. there are no missing observations. The relative differences in GDP per capita and unemployment should be lagged in order to account for the information on which the potential immigrants base their decisions to move. There might be a reverse causality with respect to the effect of migration flows on earnings and employment. To avoid the problem of endogeniety we include the variables GDP per capita and unemployment with their lags.

The aim of this paper is to estimate the main determinants of migration from EU candidate countries to Germany in the period 1997-2007 as a first and most important step for assessing the migration potential in the years following the accession. Almost all econometric models discussed in the empirical literature explain migration by income and employment opportunities in the respective countries and a set of institutional variables which should capture different migration restriction.

The specification of the empirical model used in this paper is based on the extended gravity model which has been widely applied in the empirical studies of the determinants of migration flows [9, p. 5].

For the purpose of this paper, I have slightly modified the above mentioned models as follows:

$$\ln M_{ij} = \beta_0 + \beta_1 \ln P_i + \beta_2 \ln P_j + \beta_3 \ln(UNEMPL_i / UNEMPL_j)_{t-1} + \beta_4 \ln(GDP_i / GDP_j)_{t-1} + \beta_5 \ln DIST_{ij} + \beta_6 \ln STOCK_{ijt-1} + \beta_7 EU + u_{ijt}$$

where:

M_{ij} = the gross flows of immigrants from country *i* to country *j* divided by the population of the country of origin *i* in a particular year *t* (t=1,2,...11);

i =1,...3 is the country of origin (3 EU candidate countries)

j= 1 denotes the host (destination) country

P_i =population of the country of origin

P_j =opulation of the host (destination) country

$URRATIO_{t-1}$ =the ratio between unemployment rate in the country of origin and unemployment rate in the destination country, in year *t*-1

GDP_i / GDP_j = the ratio between GDP per capita in the country of origin *i* and GDP per capita in the destination country *j*

$DIST_{ij}$ =aerial distance between the capital cities of the country of origin *i* and the country of destination *j*

$STOCK_{ij}$ = share of stock of immigrants from the country of origin *i* living in the destination country *j* in the total population of the country of origin in percent

EU_i=dummy variable if the country has started the accession negotiations

u_{ijt} = the error term.

To keep the model simple and comparable to the results of the most empirical studies, we have used a static model. The model has a log-log specification. Therefore the estimated parameters are actually elasticises. All variables are in logarithms and the explanatory variables: *URRATIO*, *GDP* ratio and *STOCKS* are lagged one year to avoid simultaneity with the dependent variable.

Migration theory divides the causes for migration into pull factors (conditions in destination countries) and push factors (conditions in countries of origin). The **"pull" (attracting) factors have the positive impact on migration. The main pull factors are the size of the economy (population in country of destination) and the social network. The "push" ("repelling") affect the migration negatively.** The main push factors in gravity models are the geographical distance, the unemployment ratio, the income relation and the population in country of origin.

Population and distance are called gravity variables. According to Orlowski [9, p. 5] population also serves as a measure of the size of the labour market. The more the country of origin is populated, the higher will be the probability that more people decide to emigrate from that country.

Labour market situation in the country of destination *j* and the country of origin *i* and the probability of employment are measured by the ratio between unemployment rate in the country of origin $UNEMPL_i$ and the one in destination country $UNEMPL_j$, respectively. The lower the ratio, the more difficult it should be to emigrate to the country of destination-Germany.

The difference in income is measured by GDP per capita in US Dollars at current prices and enters the model as a ratio between the GDP per capita of the country of origin *i* to the GDP per capita of destination country *j* (GDP_i / GDP_j). The difference in income per capita usually is taken as a proxy for differences in real wages.

The focus of the gravity model is on the geographical distance as a key determinant. It is usually measured by the aerial distance between the capital cities of two countries and serves as a proxy for the direct costs of migration (transportation costs).

In order to capture not only the economic factors, but also the "micro foundation" of migration decisions, such as the existence of social network links between the country of origin and Germany, we include the explanatory variable $STOCK_{ij}$, representing the share of stock of immigrants from the country of origin *i* living in the destination country *j* in the total population of the country of origin in percent. The importance of social networks is that although migration is in fact initiated by economic motives, it often becomes a rather complex self-sustaining social process over the years.

Finally, we add the dummy variable EU which takes value 1 if the country has stared accession negotiations and 0 otherwise.

Our study of the main determinants of migration from EU candidate countries to Germany in the period 1997-2007 has two dimensions: it involves different countries and it has a temporal dimension. Therefore the most appropriate would be to use pool data.

Table 1. Estimation results

EViews - [Table: TABLE01 Workfile: NIS::Untitled\]

File Edit Object View Proc Quick Options Window Help

View Proc Object Print Name Edit+/- CellFmt Grid+/- Title Comments+/-

1	Dependent Variable: LOG(M?)				
2	Method: Pooled Least Squares				
3	Date: 04/28/09 Time: 15:09				
4	Sample (adjusted): 2 10				
5	Included observations: 9 after adjustments				
6	Cross-sections included: 3				
7	Total pool (balanced) observations: 27				
8					
9	Variable	Coefficient	Std. Error	t-Statistic	Prob.
10					
11	C	541.4665	304.4866	1.778293	0.0914
12	LOG(PI?)	0.246062	0.130562	1.884635	0.0749
13	LOG(PJ)	-47.45905	27.09482	-1.751591	0.0960
14	LOG(URRATIO?(-1))	0.686705	0.300277	2.286904	0.0338
15	LOG(GDPPCRATIO?(-1))	-0.539496	0.454849	-1.186101	0.2502
16	LOG(STOCKS?(-1))	0.892800	0.413402	2.159639	0.0438
17	LOG(DISTANCE?)	-1.545782	0.586279	-2.636596	0.0163
18	EU?(-1)	-0.044496	0.168868	-0.263495	0.7950
19					
20	R-squared	0.947910	Mean dependent var		-1.956052
21	Adjusted R-squared	0.928718	S.D. dependent var		0.614615
22	S.E. of regression	0.164094	Akaike info criterion		-0.535564
23	Sum squared resid	0.511608	Schwarz criterion		-0.151612
24	Log likelihood	15.23011	Hannan-Quinn criter.		-0.421395
25	F-statistic	49.39298	Durbin-Watson stat		1.353874
26	Prob(F-statistic)	0.000000			
27					

If we look at results, they show that the coefficients estimated have the expected sign for all the covariates.

The impact of the situation of the labour market in the country of a potential emigration proved to be statistically significant at level of significance of 5%. One should note that the impact of the difference in GDP per capita at current prices as well as the difference in the living standards (PPS-adjusted GDP per capita) proved to be insignificant. Such an outcome suggests that the emigrants are not looking for a better income, but the main reason for their migration is to find a job.

Thus, all things being equal, during the period 1997-2007 (and for the same country of origin) emigrants increased when the per capita GDP decreased (increased) and when the unemployment rate increased (decreased). Yet, *ceteris paribus,* they moved to regions that were relatively close to the sending region. The other gravity variable, namely population, seems to have affected interregional migration in the same positively way.

The use of gravity models for estimation of the migration pressure after the EU candidate countries become full members of EU is subject to critics. The stock, and not the flow of migrants adjusts to the "pull" and "push" factors. If visa and other legal barriers to migration exist, the stock may remain below a desired level. Consequently, the migration pressure after these three countries join the EU may steam both from the "natural" reaction to the "pull" and "push" factors, as well as from the process of increase of the stock to the desired level. That could lead to higher increase in the number of migrants than projected with the gravity model [9, p. 6].

6. Conclusion

The objective of this paper was to investigate the determinants of migration from the EU candidate countries to Germany during the period 1997-2007 using the extended gravity model.

The analysis revealed that the ratio between unemployment rate in the country of origin and the country of destination turned out to be the main economic determinant of migration flow, showing a strong effect. The results from the model show also presence of strong social network effects.

Despite the willingness of European Commission, there is a real risk that the accession perspectives for the EU candidate countries, with exception of Croatia, have become even more distant, after Angela Merkel's statement given in March this year.

Although the trend of economic performance of EU candidate countries is positive and there are some signals that convergence is on the way, these economies are still far from catching up to Germany. Income level in all three observed countries is still lower than in Germany and unemployment rates are high (double digit with exception of Turkey) and persistent. A pause in the EU enlargement process will slow-down the economic growth of these countries and increase unemployment rates. A result of that will be higher number of potential migrants who will immigrate to Germany in spite of the legal and administrative restrictions. As these countries catch-up economically, they will provide conditions for a broad based economic growth and job creation and thus reduce and gradually eliminate the migration pressures. In this interval of accession uncertainty, Germany can assist the faster economic development of these countries and decrease the migration pressure by lifting the visa regime for short term migrants and seasonal workers coming from Turkey and Macedonia, as it did for Croatian citizens in 2001.

References

1. Alvarez-Plata, P., H. Bruecker and B. Siliverstovs, *Potential migration from central and eastern Europe into EU-15-An update*, Report for the European Commission, DG Employment and Social Affairs, Berlin, German Institute for Economic research (DIW Berlin), 2003.
2. Boeri, T. and H. Brücker, Migration, co-ordination failures and EU enlargement, *Discussion Paper No. 1600*. Bonn: Institute for the Study of Labor, May 2005.
3. Boeri, T. and H. Bruecker, Eastern enlargement and EU labour markets: Perceptions, Challenges and Opportunities, *World Economics,* Vol. 2, No. 1, Jan/Mar 2001.
4. Boeri, T, H. Bruecker, *The impact of eastern enlargement on employment and wages in the EU member states*, Report of DIW, CEPR, FIEF, IAS and IGIER for the European Commission, Berlin and Milano, 2000.
5. Buddelmeyer, H., Jensen, P. H., Oguzoglu, U. and Webster, E. M., Fixed effects bias in panel data estimators, IZA Working Paper No. 3487, IZA, Bonn, 2008
6. Eurostat, Statistics in Focus, 98/2008.
7. Haug, S., *Klassische und neuere Theorien der Migration*, Arbeitspapiere - Mannheimer Zentrum für Europäische Sozialforschung / No 30. Mannheim 2000.
8. Migrationsbericht des Bundesamt fuer Migration und Fluechtlinge im Auftrag der Bundesregierung, *Migrationsbericht 2007,* Berlin, 2007.

9. Orlowski, W., Migration from central and eastern European countries after the accession: Effects for regions, labour markets, and social security systems, *Research Bulletin*, 2(9), Central Statistical Office, Warsaw: 7-21, 2000.
10. Pippidi, A.M., Seeking the virtuous circle: Migration and development in the Balkans, *Romanian Journal of Political Science,* Issue 01/2006.
11. Wooldridge, J, *Econometric Analysis of Cross Section and Panel Data,* MIT press, Cambridge, 2001.

DETERMINANTE MIGRACIJA IZ ZEMALJA KANDIDATA ZA ČLANSTVO U EU U NEMACKU- MODEL GRAVITACIJE

Rezime: Cilj ovog rada je da istraži determinante migracija iz zemalja kandidata za članstvo u EU (Makedonija, Hrvatska i Turska) u Nemačku u periodu od 1997-2007. godine koristeći prošireni model gravitacije. Ocena modela migraciskih tokova je urađena na udruženim podacima primenom softverskog paketa EViews 6. Rezultati ocene pokazuju da je odnos stope nezaposlenosti u zemlji porekla prema stopi nezaposelnosti u zemlji odredišta najznačajniji ekonomski faktor migraciskih tokova. Takođe rezultati ukazuju na veliki uticaj društvene mreže.

Ključne reči: migraciski tokovi, zemlje kandidate za članstvo u EU, model gravitacije.