INTERNATIONAL MIGRATION AND LABOUR MARKET IMPACTS[1]
- Evidence from panel data

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Abstract

The research aims to identify and analyse the impact of labour emigration on labour markets within the European Union. The analysis is based on developing double-log macroeconometric models that combine cross-section and time series in a panel structure, by using a set of indicators specific for the emigration process and labour market, as main explanatory variables. The results show that an intense emigration process has extremely negative effects on the size and structure of the labour force, generating its significant reduction, especially regarding the highly skilled labour. At the same time, we identified a relaxation of the labour market pressures generated by high unemployment, through a downsize of this rate and a slight increase in employment, mainly due to a general improvement of the local employment opportunities.

Key words: international migration, labour market, unemployment, education, macroeconometric modelling

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Macroeconomic changes from the past 30 years, induced by globalisation, production rationalisation or increased sector differentiation, have shaped a different scenario for the European labour market, compared to the existing one in the 1960s and 1970s in Europe [1]. International labour migration is seen as a challenge in Europe, especially concerning the unskilled labour [2]. At the same time, human capital, especially the highly skilled labour, represents one of the main resources, developed countries facing a surplus of demand for skilled workers that can't be covered by the local labour force trained within the national education system. Thus, developing countries become extremely competitive in providing skilled labour to cover this gap.

Nevertheless, unlike North America, Australia or New Zeeland, Europe does not hold a certain specific place in the international labour market for tertiary educated workers.

EU-15 net migration registered about 600,000 persons by year in the last five years of the twenty century, representing only half of the migrant flows registered in the US. Still, in the next five years, the amount doubled and, for the first time, the European migrant flows have become larger than those registered in the US [1]. In 2003, the net migration in Europe reached the stepping stone of two million people (European Commission, 2008). This increase in the migrant flows was accelerated by the European Union enlargements in 2004 and 2007. On average, between 2004 and 2008, net increase of immigrants in the EU-15 reached 250,000 people from the eight New Member States (NMS) in 2004, especially from Poland, and approximately 300,000 persons from the two New Member States in 2007, mainly from Romania [3]. Thus, we can observe that the population increase from Central and Eastern Europe towards the EU-15 during the first eight years of the XXI century was robust and constant, taking into consideration that the Romanian emigrants were seven times larger in 2007 than in 2000, while the migrants from Lithuania and Slovak Republic were five times bigger than in 2000.

The evolution of emigrant stocks for the EU New Member States analysed within the panel, 2000-2012
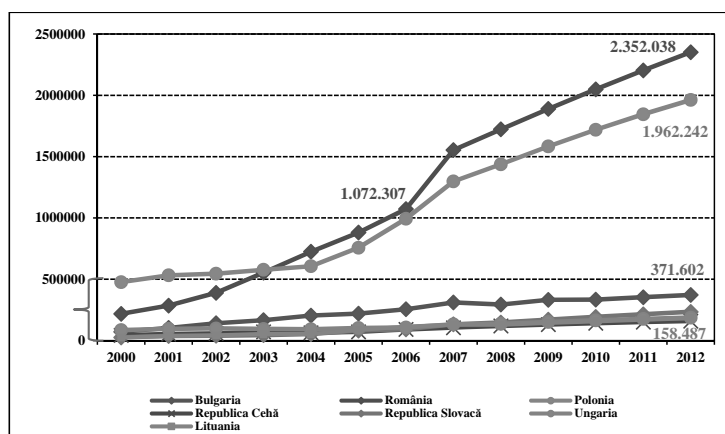
Source: Data from paper [3]

Overall, in 2007 the European Union (EU-27) hosted about 29.1 millions of foreign citizens, of which 10.6 million were intra-EU migrants

(European Commission, 2008). Approximately 40% of those migrants were citizens of the EU New Member States, mostly coming from Romania (1.6 million), Poland (1.3 million) and Bulgaria (310,000). These statistics point out that about 7.2% persons of the Romania's population, 4.1% of Bulgaria's population and 3.4% of Poland's population benefits from the free movement right to live in a different country than the origin one, as citizens of the European Union [1]. Emigration was also high in Lithuania and Cyprus due to the fact that more than 3% of the working age population moved from the origin country to the other EU Member States. These statistics undermine the real number of migrants, because they don't include temporarily and seasonal migration or the migrants that frequently move from one country to another within the European Union, respectively from the origin to destination country. At the same time, these statistics don't include return migration or the persons that benefited previously from their legal rights as citizens of the European Union.

The estimations concerning the emigration of citizens from the New Member States are being influenced by several factors, such as economic requirements (low wages, high unemployment rates, the decline of specific industrial sectors, labour market deregulation), as well as the migrants' general desire of improving life conditions and ensuring a better future for their family. The importance of motivations for improving the social or professional status varies largely among most of the workers from the New Member States that migrated in EU-15, while the economic reasons remain essential for most of them [1].

The economic approach of international migration theories highlights three guidelines for the analysis of the labour emigration/ immigration, respectively the identification and assessment of the factors that shape the size and structure of migrant flows, of the way in which migrants adapt to the host country, as well as the migration impact of origin and host economies [4].

The migration model represents a relationship that links international labour migration and the variables identified by the economic theory. The most important migration models found in the literature can be grouped into two main categories: *(i)* models used for the analysis of the determinants and shaping factors of international migration and *(ii)* models which assess its impact on the labour market, as well as on the origin and host economies.

Regarding the impact on sending countries' labour markets, the literature highlights negative effects through changes in the size and structure of the labour force, according to the educational level, as well as positive effects through lowering the increasing pressures generated by high unemployment rates, respectively low employment levels. Thus, in order to point out these

effects for the considered panel sending countries, within our developed models we used several endogenous variables, such as unemployment rate (total and by educational level), employment rate, labour force (total and by educational level), employment participation rates for males and females, working conditions expressed through the average number of hours worked (total, male, female).

Tthe main objective of the performed research was described by the macroeconometric analysis of the labour market impacts of emigration within the main sending countries from Central and Eastern Europe, members of the European Union. In order to accomplish this objective, the research is based on developing macroeconometric models that highlight, through the explanatory variables used within the analysis, the main labour market consequences of labour emigration within a panel of seven countries from Central and Eastern Europe.

Labour emigration from the New Member States of the European Union in Central and Eastern Europe towards the South-West Europe was emphasised by the enlargements in 2004 and 2007, free movement of persons, respectively of workers, being one of the four freedoms granted by the European Union through its essential treaties.

In order to analyse the determinants and shaping factors of labour emigration from the New Member States of the European Union we developed and tested specific models, using panel data during 2000-2010 for a group of seven Central-European countries, members of the European Union since 2004 (Poland, Czech Republic, Hungary, Slovak Republic and Lithuania) and 2007 (Romania and Bulgaria).

The main reasons for choosing the seven specific emigration countries from Central and Eastern Europe consist of significant evolutions of the process during the last decade, studies such as the one performed by Brucker [3] pointing out that by the end of 2007, the data on international migration captured from the host countries statistics reveal a stock of 3.8 million emigrants from the New Member States of the European Union that live in EU-15. The main sending countries are Romania (1.6 millions) and Poland (1.3 millions).

Thus, in order to analyse the labour market impacts of the emigration process for the seven origin countries form Central and Eastern Countries, we developed five econometric models based on panel data, which combines cross-sections with time-series, through a set of specific indicators. The emigration data are taken from a relatively new and complex set of indicators developed by Brucker [3], while for the other indicators regarding the economic activity and the labour market we used data series from Eurostat and the World Bank.

The model is developed as *a simple regression model*, respectively a *double-log* and a *semi-log* regression model, focusing on *random* and *fixed effects* within the panel.

The model developed for the analysis of the labour market impact of emigration has the general form of a simple regression model with panel data. Thus, for panel data, the general linear representation of the model is described as follows [5]:

$$y_{it} = \sum_{k=1}^{k} x_{kit} \beta_{kit} + \varepsilon_{it}$$

$$i = 1,..., N$$

$$t = 1,..., T \tag{1}$$

where: N represents the number of panel units (countries), while T signifies the number of periods (time).

The general form of the developed model used for analysis of the labour market impact of emigration process is expressed as a simple regression model for considered panel countries:

$$Y_{it} = \beta_1 + \beta_2 X_{it} + \varepsilon_{it}, i = 1,......,N, t = 1,........T \tag{2}$$

This simple linear regression model is extremely useful for *(i)* the analysis of the dependence between two variables, the labour market specific endogenous variable, respectively the exogenous variable specific for the emigration process, and *(ii)* for characterizing the dependence between the two variables in a certain time horizon (2000-2010).

The proposed model uses the logarithm of the variables in order to capture a precise estimation of parameters, respectively of the labour market influence of the emigration process, thus taking the general form of a *double-log model*, with the following configuration:

$$\log(Y_{it}) = \beta_1 + \beta_2 \log(X_{it}) + \varepsilon_{it}, i = 1,......,N, t = 1,........T \tag{3}$$

The model comprises the labour market impact of emigration through its dependent and explanatory variables, according to the economic literature. Thus, within the empirical analysis, we focus on the specific elements of migrant sending countries, through assessing the labour market emigration effects (unemployment, employment, size and structure of the labour force, working conditions, educational level).

The main hypotheses of the simple regression models deveoped

within the paper are based on general hypotheses of the regression models [6], expressed as: *(i)* correct model specification; *(ii)* data series are not affected by measurement errors; *(iii)* the residuals are random variables with zero mean: $E[\varepsilon_i | X = x_i] = 0$, for every *i*; this property reveals the fact that other unregistered factors, except for the exogenous characteristic, have no systematic influence on the mean of endogenous characteristic; *(iv)* the variance of residual variables is time invariant or constant, defining the property of *homoscedasticity*. This hypothesis is extremely restrictive for the developed model, due to the fact that the panel data are gathered for a group of countries; *(v)* there is no first order autocorrelation or serial correlation of residuals: $\text{cov}(\varepsilon_i, \varepsilon_j) = 0, i \neq j$.

A high level of precision is ensured for the developed models through validating these hypotheses, as well as the robustness of parameters estimated through least squares and maximum likelihood methods, both being used for random (*RE – random effects*) and fixed (*FE – fixed effects*) effects models. We performed a complex set of tests in order to verify the statistical significance of the coefficients and to validate the hypotheses of the model, thus: the differentiation of the coefficients estimated through both types of models with random and fixed effects was performed by implementing the *Hausman* test; the hypothesis of no serial correlation of the residuals was performed through the *Wooldridge – Lagram Multiplier* test; the *homoscedasticity* hypothesis was validated through *Breusch-Pagan Lagrangian Multiplier* test for random effects models, respectively through the modified *Wald* test for group-wise heteroscedasticity in the fixed effects models; the assumption of *no multicollinearity* was tested with the help of the explanatory variables *correlation matrix* and by performing the auxiliary regressions, while the validation of individual and jointly influence of exogenous variables on the dependent variable was accomplished through *Wald, Fisher* and *t-statistic* testes, as well as through the analysis of variance (ANOVA).

The model and associated data were processed with the Stata 11 econometric package, using variables with panel data for the seven emigration countries and a time dummy variable (from 1 to 77) for the 2000-2010 period. In order to estimate the parameters of the random effects model we used the GLS method (*GLS - Generalized Least Squares*) and for the fixed effects we used *OLS – Ordinary Least Squares*. The main objective of the empirical regression analysis is to explain as much as possible from the variation of the dependent variable (a specific emigration indicator) through the variation of the explanatory variables used within associated models.

We developed five double-log multiple regression models (described based on the general specification), in order to highlight the labour emigration effects on the sending countries' labour markets. Each model comprises,

through the endogenous variable, the emigration impact on: unemployment rate (*model 1*), employment rate (*model 2*), size and structure of the labour force (*model 3*) and female (*model 4*) and male (*model 5*) labour force participation rates.

These five double-log models were processed both through random (RE) and fixed (FE) effects, their coefficients being estimated through least squares method (*GLS – Generalised Least Squares* for RE models and *OLS – Ordinary Least Squares* for FE models). In order to distinguish between the two categories of parameters we used the Hausman test which validated all the results, the differences between coefficients being insignificant. These are the main results.

Results of the models developed based on the logarithm of immigrant flows for the analysis of labour emigration impact on the labour market, random and fixed effects, GLS and OLS Methods

Table 1

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Random effects (RE)
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                        Model 1      Model 2      Model 3      Model 4      Model 5
                        b/se         b/se         b/se         b/se         b/se
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Log Imigranţi - total   -0.278***    0.027**      -0.035***    -0.057***    -0.031***
                        (0.06)       (0.01)       (0.01)       (0.01)       (0.01)
Constant                5.199***     3.787***     15.753***    4.490***     4.473***
                        (0.69)       (0.11)       (0.19)       (0.09)       (0.08)
--------------------------------------------------------------------------------------------
R-squared               0.022        0.305        0.830        0.036        0.034
Wald                    18.540       6.910        14.800       49.990       21.240
N observations          77.000       77.000       77.000       77.000       77.000
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Fixed effects (FE)
--------------------------------------------------------------------------------------------
                        Model 1      Model 2      Model 3      Model 4      Model 5
                        b/se         b/se         b/se         b/se         b/se
--------------------------------------------------------------------------------------------
Log Imigranţi - total   -0.357***    0.044***     -0.037***    -0.060***    -0.032***
                        (0.07)       (0.01)       (0.01)       (0.01)       (0.01)
Constant                6.029***     3.609***     15.777***    4.522***     4.486***
                        (0.75)       (0.12)       (0.08)       (0.09)       (0.07)
--------------------------------------------------------------------------------------------
R-squared               0.268        0.186        0.247        0.433        0.237
Fisher                  25.285       15.802       22.607       52.625       21.422
N observations          77.000       77.000       77.000       77.000       77.000
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* p<0.05, ** p<0.01, *** p<0.001
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Note: The standard errors are presented in brackets; the models are estimates through random and fixed effects for each country within the panel and comprise a time dummy variable.

Source: own process of panel data with Stata 11 econometric package.

The results obtained after processing our panel data for the five

developed models, with random and fixed effects, highlight an extremely high level of significance of the estimated coefficients (0.1%), both for the specific emigration exogenous variable and the intercept. High values for Wald and Fisher tests enable the fact that the exogenous variables are jointly significant in influencing the endogenous variable of developed models, the variation of specific labour market indicators being largely explained through the variation of the emigrant stock (immigrants by citizenship).

We encountered positive effects of emigration on reducing unemployment and increasing the employment rate after processing the models based on the flows of immigrants by citizenship, according to the mirror data procedure. Thus, a 1% increase in the immigrant flow from the considered sending countries within the panel towards the main destination countries of the European Union significantly reduces the unemployment rate by 0.278% (random effects), respectively by 0.357% (fixed effects), as well as slightly increasing the employment rate by 0.027% (random effects), respectively 0.044% (fixed effects).

The results presented in table 1 point out negative effects of the labour emigration process on the size and structure of the labour force, respectively on labour participation rates for males and females. More precisely, a 1% increase in the flow of immigrants by citizenship reduces the labour force by approximately 0.035%, while the female labour participation rate diminishes by 0.060%, respectively by 0.032% for males. Thus, the negative labour emigration impact, especially on the long run, is reflected through the loss of human capital, being retrieved in the economic growth rates of the migrant sending countries.

Panel evolution of the immigrant flows by citizenship within the European Union - total, men, women, 2000-2010
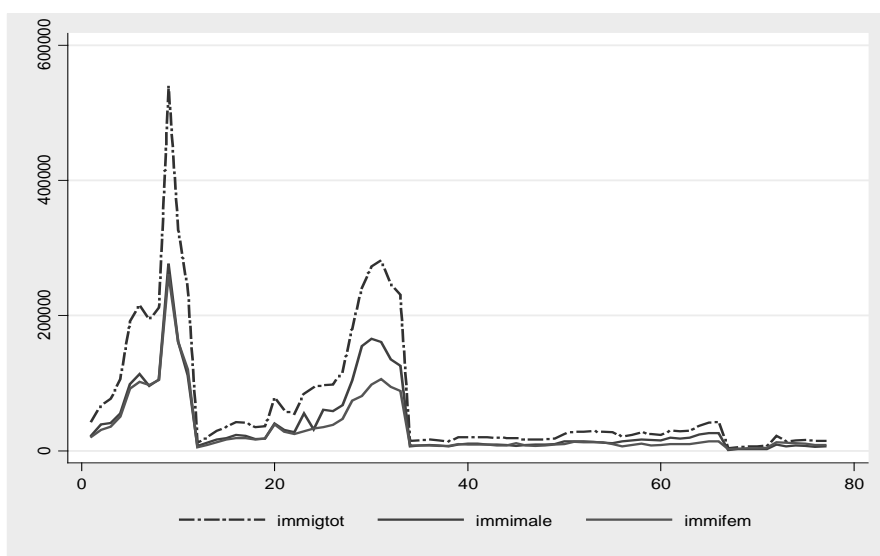
Source: Panel data processed based on Stata 11 econometric package

The results obtained after processing the five developed models based on the logarithm of the female immigrant flows from the seven sending countries of the panel towards the main destinations within the European Union highlight, in general, the same patterns as in the case of male immigrants, these aspects being underlined by the female migration trends within the panel, during 2000-2010. Conclusively, the positive impact of emigration on the labour market, displayed through a slight increase in employment and unemployment reduction, is countered by the significant negative effects on the size and structure of the labour force, respectively on gender labour force participation rates.

Conclusions

In the case of a sending country, the emigration of a part of the total labour force has major (positive and negative) implications, due to the fact that it modifies the size and structure of the labour force, influences the consumption and investment in the source economy, as well as the labour market behaviour of household members. On that background, the obtained results highlight a negative impact of emigration on labour force size for the

considered sending countries analysed within the panel, but this negative impact is soften by the relaxation of persistent high unemployment pressures. A boost on the emigration process reduces the unemployment rate for persons with primary and secondary education within origin countries. A possible reason for this could be represented by additional investments in education performed by remaining individuals in order to improve their employment perspectives, as well as by the loss of a significant part of this type of labour through emigration that is being forced to accept the jobs rejected by host countries natives due to high wage gaps between sending and destination countries (possibility of getting a higher wage at destination).

Regarding the performed analysis of the labour emigration impact on sending countries' labour markets, we can conclude that the positive effects induced by the relaxation of the pressures generated by high unemployment rates are counter-balanced by the negative impact of emigration on the size of the labour force, especially highly skilled labour (tertiary educated).

The main limitation of the performed research is represented by the lack of comparable data concerning international labour migration, at a global level and especially within the European Union. Concurrently, the research results have lead to identifying new opportunities and future research guidelines, through expanding the analysis of the labour emigration determinants and by analysing the economic consequences of the process, for both migrant sending and host countries.

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