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# MIGRATION INCENTIVES AND FLOWS BETWEEN BELARUS, MOLDOVA, UKRAINE AND THE EUROPEAN UNION: A FORECASTING MODEL

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**ABSTRACT.** The main objective of this paper is to elaborate econometric model forecasting the stocks of migrants from the Eastern European states (EES) in the Visegrad group (V4) countries and the European Union Member States (EU MS) in case of visa abolition.
We use the data span of 2008-2012 and the econometric techniques known as Seemingly Unrelated Regression (SUR), Panel data Least Squares (PLS) and General method of moments (GMM) to build three types of possible scenarios for migration from the Eastern European countries (Belarus, Moldova and Ukraine) to the V4 and to the EU as a whole in the next 35 years, i.e. until the year of 2050 with a simulated shock of visa abolition set at the year of 2015.
Our results show that hypothetical visa abolition is not going to dramatically increase migration from the Eastern European countries in the EU Member States. Even though the immediate effect of visa abolition would probably result in the slight increase of migration stocks in the V4 and EU countries, the annual migration stocks comprised of residents of Belarus, Moldova and Ukraine in the EU MS in a long term might be around from one and a half to just above three – three and a half million people.
Furthermore, a successful accession period with high growth and implementation of the reforms is actually leading to elimination of the migration pressures. More precisely, the citizens of Belarus, Moldova and Ukraine that had the strongest incentives to migrate have already done so long before the visas are eventually abolished.

***JEL Classification:*** C33, F15, F22, J11, J61

***Keywords***: international migration, transition economies, Belarus, Moldova, Ukraine, panel data, seemingly unrelated regressions.

## Introduction

This paper outlines and predicts the determinants of migration from the Eastern European countries (hereinafter denoted as EEC and represented by Belarus, Moldova and Ukraine – see *Figure 1*) to the Visegrad four countries (denoted as V4 and) the EU Member States. The paper's main objective is in identifying the determinants of labor force flows and,

based on these determinants and using their extrapolations, conducing the forecasting of migration flows from Belarus, Moldova and Ukraine to the V4 and to the EU as a whole in the next 35 years, i.e. until the year of 2050 with a simulated shock of visa abolition set at the year of 2015.

Abolition of tourist visas to the EU countries for the citizens of Belarus, Moldova and Ukraine, as well as opening the EU labour market for the citizens of these Eastern European countries, might lead to the higher numbers of migrants. Therefore, it seems useful to conduct some econometric analysis and run extrapolations that would attempt to predict migration flows in case of such events.


Figure 1. Geopolitical location of Belarus, Moldova and Ukraine
*Source*: Own drawing.

To our best knowledge, there has never been any similar analysis and extrapolations of migration flows originating at EEC and heading towards the EU that were conducted in the migration research literature. Our elaboration is based on several studies that predict Eastern migrations to the EU after 2004, but unlike those studies, it works with the more recent data, takes into consideration the outcomes of recent world economic crisis, and utilizes more advanced econometric techniques. Hence, our article represents an interesting and timely contribution to the plethora of the research literature. Generally, there is a plethora of theories about migration potential and migration decisions that can be found in research literature. It appears that potential migrants are not simply lured by the vision of economic profit and the reality might be much more complicated.

The research literature (see e.g. Lee, 1966; Bauer and Zimmermann, 1999; Wang, 2010; or Lapshyna, 2012) implies that it might be possible to arch the existing theories within the concept of so-called "push" and "pull" factors coined by the founder of the neoclassical migration theories George Ravenstein (1885). "Push factors" are represented by unfavourable domestic conditions that influence individuals to seek work abroad, whilst "pull factors" can be described as favourable conditions in the target countries of migration that make them more attractive in the eyes of potential migrants. One again, one should not think of the push factors in purely economic way, e.g. is in terms of low wages or high unemployment, but also

in the terms of unfavourable political situation, police oppression, and corrupt institutions. The same rationale holds for the pull factors, e.g. higher wages, higher living standards, better healthcare and other related issues. Moreover, Krieger and Maître (2006) show that incentives to migrate decrease with age because the older a person is the lower are the expected gains obtained from moving abroad. Propensity to migrate of persons in family phase of life (25-39) seems to be negatively correlated with age (Krieger and Maître, 2006).

Typically, there is a pattern of East-West migration from the Eastern European countries to the EU which Leon-Ledesma and Piracha (2001) describe as temporary and short-term migration. There was also a change in the type of migration – people did not migrate due to ethical and political reasons, but mainly due to economic ones (Jelínková *et al.*, 2011).

Migrants from Belarus, Moldova and Ukraine are moving to work in the EU Member States as seasonal workers and do not intend to live in the EU MS. Their main motivation for working abroad is the wage gap (a pull, not a push factor). Therefore, even the worsening of the political situation at home (similar to the events the world witnessed during the recent protests in Kiev) would not considerably increase the long-term emigration from the Eastern European countries to the V4 countries and EU MS, although there might be an increase in the numbers of migrants in the short run. Leon-Ledesma and Piracha (2001) describe the two characteristics determining this type of migration: remittances or saved earnings and skills acquired by migrants during their stay can be quickly used in their source economy upon their return.

Currently, Moldova and Ukraine are the most advanced in the negotiation process on visa abolition with the EU. However, they do not have too many supporters (Jaroszewicz, 2012). On the other side of the spectrum is Belarus which is quite reluctant to strike any deals with the EU.

Regarding the migration in the three EEC, the situation can be described as follows: Belarus experienced economic turmoil 2011 which resulted in drastic devaluation of the Belarusian currency with regard to the US dollar and EURO. As a result, mostly blue-collar specialists and industry workers started migration to Russia which represents the favorite destination for Belarusian migrants who do not require visas or residence permits to stay and work in this country.

Moldova's labour migration is probably one of the highest in the world. The data from the Moldovan Labour Force Survey that captures mostly temporary migrants who still possess a household the country shows that about 300,000 persons, or approximately 25% of the economically active population, recently returned from, worked or intended to work abroad with an annual average of 311,000 in 2010. According to Vremiș *et al.* (2012), the majority of Moldavian labour migrants choose Russia (over 60%).

Ukraine is a special case among all three countries in question: in 2008, State Statistics Committee of Ukraine conducted a survey that revealed that 1.5 million of Ukrainian residents (5.1% of its population at productive age) were working abroad between 2005 and mid-2008. However, the trend is going down: in 2007–2008 there were about 15% less people than in the two previous years (IDSD, 2010). According to Markov *et al.* (2009), the number of immigrants in Ukraine reached 5,257,500 people, or 11.6% of the population, which is now at 11th place in the overall number of immigrants in the world (Markov *et al.*, 2009; or Borshchevska, 2012). This finding may seem surprising, considering that this is a country struggling with extensive economic problems and slow growth. A large exodus of workers from the country is usually an indicator of poor living conditions and high unemployment, one would expect that such a country will not be a popular place for other migrants. Net migration rate (net migration rate, defined as the difference between the number of immigrants and emigrants in the country to 1,000 people in one year) in Ukraine was in 2010

at -0.1 and 2012 dropped down at -0.08. A recent study by the World Bank suggests that migration between Ukraine and Russia catch up with the Mexican migration to the U.S. and represent the second-largest migration corridor in the world (World Bank, 2010; or Stanek and Hosnedlova, 2012).

## 1. The methodology and the model specifications

In order to conduct a comprehensive forecasting of the dynamics and the stocks of migrants from EEC in the V4 and EU Member States in case of hypothetical cancellation of visas we had to create the econometric model that would fulfil the criteria of both scientific integrity and practical usefulness. Our model is built on various data (economic and demographic), current research literature, and our own previous findings.

The first part of our model is in accord with the models centered around the concept of human capital approach (see e.g. Sjaastad, 1962, Harris and Todaro, 1970, or Hatton, 1995). It is dealing with investments into human capital and the expected income in the next iteration (therefore, it represents a form of an intertemporal model). The model exploits the econometric techniques described by Boeri and Brücker (2000), as well as Alvarez-Plata, Brücker and Siliverstovs (2003) who determined migration from the CEECs into the EU15. It also draws from the works of Glazar and Strielkowski (2010), and Glazar and Strielkowski (2012).

Our main assumption is that people are rational economic agents who make their decisions based on the expected income in the host country and their home country. This difference in incomes in both countries observed at the moment the decision is taken, impacts on the expectations about the same difference in the nearest or distant future. Here, a country's GDP per capita becomes a proxy for the income of an individual in source and target countries (our selection of GDP per capita variable can be supported by the data limitations and shortages). In addition, we take the average employment rate target and source countries as a proxy for the labor market conditions in each country. In other words, the probability of finding a job increases when employment opportunities become more abundant and vice versa (see Glazar and Strielkowski, 2010). Our lagged migration stocks variable becomes a proxy for the so-called "network effect" (the phenomenon when migrants segregate in order to facilitate each other to find work, food and shelter, and to ease the costs of moving to and adapting to the new environment – see e.g. Strielkowski, 2011). When the values of migration stocks are based on expectations about the past values of the same variables, one can state that the present values are pre-determined by the past values (see e.g. Hatton 1995). Therefore, in this case we are dealing with the first-order autoregressive process (AR (1)) and a simple error-correction model that can help us to deal with it, can be outlined as follows (see Alogoskoufis and Smith, 1991):

$$\begin{aligned} \Delta m_{fh,t} &= \beta_1 * \Delta ln\,(w_{f,t} / w_{h,t}) + \beta_2 * \Delta ln\,(w_{h,t}) + \beta_3 * \Delta ln\,(e_{h,t}) + \\ &+ \beta_4 * \Delta ln\,(e_{f,t}) + + \beta_5 * ln\,(w_{f,t-1} / w_{h,t-1}) + \beta_6 * ln\,(w_{h,t-1}) + \\ &+ \beta_7 * ln\,(e_{h,t-1}) + \beta_8 * ln\,(e_{f,t-1}) + \beta_9 * (m_{fh,t-1}) + \beta_{10} * DummyF + \varepsilon_t \end{aligned} \quad (1)$$

where:

$m_{fh,t}$ – dependent variable that represents the stocks of migrants from EEC *f* in the V4 and EU countries (we run the simulations across groups, between groups, a separate analysis for V4, and the EU-28 countries) as a % of home population *h*,

$w_{f,t}/w_{h,t}$ – foreign country/ home country difference in incomes,

$w_{h,t}$ – income in the home (source) country,

$e_{f,t}$ – employment rate in country *f*,

$e_{h,t}$ – employment rate in the country of origin,
$m_{fh,t-1}$ – lagged migrants stock in the country *h* and foreign country *f*,
DummyF – dummy variable for coding the free movement of labor,
t, t-1 – a time period (either present, or past).

The variables described above are placed into the equation specified in (1) above as steady-state levels and as the differences (deltas) of the variables. Variables' deltas yield the reaction of migration to these fluctuations in the short-run. On the other hand, the levels of these variables signify the relationships between migration stocks and other variables in the long-run. Thence, one can deduct the equilibrium stock of migrants from equation (1) using all changes, putting them equal to zero, and getting steady-state situation for the stocks of migrants:

$$\bar{m}_{fh} = (\beta_5 / -\beta_9) * ln\,(w_f / w_h) + (\beta_6 / -\beta_9) * ln\,(w_h) + \\ + (\beta_7 / -\beta_9) * ln\,(e_h) + (\beta_8 / -\beta_9) * ln\,(e_f) + \\ + (\beta_{10} / -\beta_9) * DummyF + \varepsilon \quad (2)$$

where $\bar{m}_{fh}$ represents the equilibrium rate of the foreign migrants to the whole body of source country's population. All β's are shown in brackets are they represents semi-elasticities in the long-run equilibrium which can be interpreted as the relation between stocks of migrants and our right-hand variables in the equation. We expect the coefficient $\beta_9$ to be negative so that the signs of the original coefficients are going to remain the same. We expect the negative sign of the coefficient due to the fact that migration follows AR(1) process (our output variable depends linearly on its own previous values). Therefore, $m_t$ equals to$\eta m_{t-1}$, where η has to be smaller than 1 (the whole population of the source country is going to migrate, should this be otherwise). Thence, one part of equation (1) can be re-written to read as follows:

$$\Delta m_t = m_t - m_{t-1} = \beta_9 * (m_{t-1}) \quad (3)$$
$$m_t = (1 + \beta_9) * (m_{t-1})$$

Therefore, it seems that $\beta_9$ should be negative because it is the only way how it might assure the sustainability of migration. If the $\beta_9$ was positive, the coefficient would have to be larger than 1 which would have led to the massive wave of migration.

To begin with, we are testing whether the long-run equilibrium between migration stocks and explanatory variables truly exists. Thence, we are testing for the cointegration that might yield whether our variables form the cointegration set (by passing the two-stage process). In order to do this, one can start with estimating the long-run equilibrium parameters at the equation (1). We out the changes of variables for steady stage to be equal to zero which, allows us to estimate the equation defined in (3). Being a part of cointegration, the cross-section pooling of data can involve further restrictions that may cause problems to the regression results. In order to deal with this, the literature suggests using a plethora of estimators for the panel data. Based on the data and the model assumptions described in the similar studies, we decided that in this framework the most efficient estimator should be the Seemingly Unrelated Regression (SUR). However, we are also computing the classical panel data Least Squares (PLS) and the General method of moments (GMM) in order to try to confirm the hypothesis that the SUR is the best estimator in our case.

Therefore, one can take out the employment rate in country of origin (domestic income) that has shown insignificant in all estimations. It seems that the null hypothesis of insignificancy of beta cannot be rejected and our variable can be removed.

Moreover, our variable for the employment rate in the country of origin also had to be removed from the equation (2) because it came through as insignificant in all estimation attempts (the null hypothesis of insignificancy of beta was not rejected). Our resulting final model can be then presented as follows:

$$\Delta m_{fht} = \alpha_h + \beta_1 ln\,(w_{ft}/w_{ht}) + \beta_2 ln\,(w_{ht}) + \beta_3 ln\,(e_{ft}) + \\ + \beta_4\,(m_{fh,t-1}) + \beta_5\,(m_{fh,t-2}) + \beta_6 * DummyF + Z_{fh}\gamma + \varepsilon_t \quad (4)$$

where:
$m_{fht}$ – dependent variable denoting the stocks of migrants from source country *h* in target country *f* as a % of source country population *h*,
$w_{ht}$ – income level in the country of origin,
$w_{ft}/w_{ht}$ – foreign /home country income difference,
$e_{ft}$ – employment rate in country *f*,
$m_{fh,t-1}$ – lagged migrants stocks of migrants from from home country h in country *f*,
$m_{fh,t-2}$ – lagged migrants stocks of migrants from home country h in country *f*,
$Z_{fh}$ – vector of time-invariant variables which affect the migration between two countries such as geographical proximity and language,
DummyF – Free mobility of people (abolishment of tourist visas).

Our empirical model utilizes the following econometric techniques: Seemingly Unrelated Regression (SUR), Panel data Least Squares (PLS), as well as the General method of moments (GMM). We run the three types of possible scenarios: optimistic, realistic and pessimistic and present them for each of the 3 countries. We model migration from the EECs (Belarus, Moldova and Ukraine) to the V4 and to the EU as a whole for the next 35 years to come, i.e. until 2050 (with a simulated shock of tourist visa abolition in 2015).

## 2. Main results and discussions

The main outcomes of our estimations (depicting the resident stocks of migrants for 2008-2050 and including 3 scenarios, 27 EU countries and Norway with an impact of visa abolition in 2015 for each separate country in question) are presented in *Figures 2*, *3* and *4*. We draw three scenarios using the results of our model presented in (1) to (4) above, and the specifications for each of the scenarios presented in *Table 1* that follows. The detailed modelling of each scenario (low, medium and high) for Belarus, Moldova and Ukraine is presented in the Appendices.

Our optimistic scenario supposes that the employment is at the average of 2008-2011 observations and that the proxy of economic growth and well-being can be yielded by the 1% GDP growth in the EEC and the 4% GDP growth in the EU. The realistic (medium) scenario works assumes that there is 0% GDP growth in the EECs and that there is a 2% GDP growth in the EU. Finally, the pessimistic (worst-case) scenario works with the -2% decline in GDP in the EEECs and the 0% GDP growth in the EU (see *Table 1*).

We employ the panel data on resident permits issued in respective countries to the nationals of Eastern European states (sum of short and long term) in all 27 EU countries and Norway. We were able to locate observations from 2008 to 2012 in the majority of cases. In the model, we explain migrant stocks using the number of issued resident permits and analyzing the so-called "push factors" of migration – the explanatory variables are unemployment and GDP per capita in EES.

Table 1. Specification of main scenarios

| Optimistic | Realistic | Pessimistic |
|---|---|---|
| Employment = average of 2008-2012 observations | Unemployment = average of 2008-2012 observations + 0.5% | Unemployment = average of 2008-2012 observations + 2% |
| 1% GDP growth EES, 4% GDP growth EU MS | 0% GDP growth EES, 2% GDP growth EU MS | -2% GDP decline EES, 0% GDP growth EU MS |

*Source*: Own results.

The shock which simulates the visa abolition is has been set on the year 2015 and the size and duration of the shock is derived from the situation in Poland, Bulgaria and Romania after their accession to the EU. The results of the shock are recorded in the model one year after the visas were abolished (there is a lag before the data are collected and analyzed).

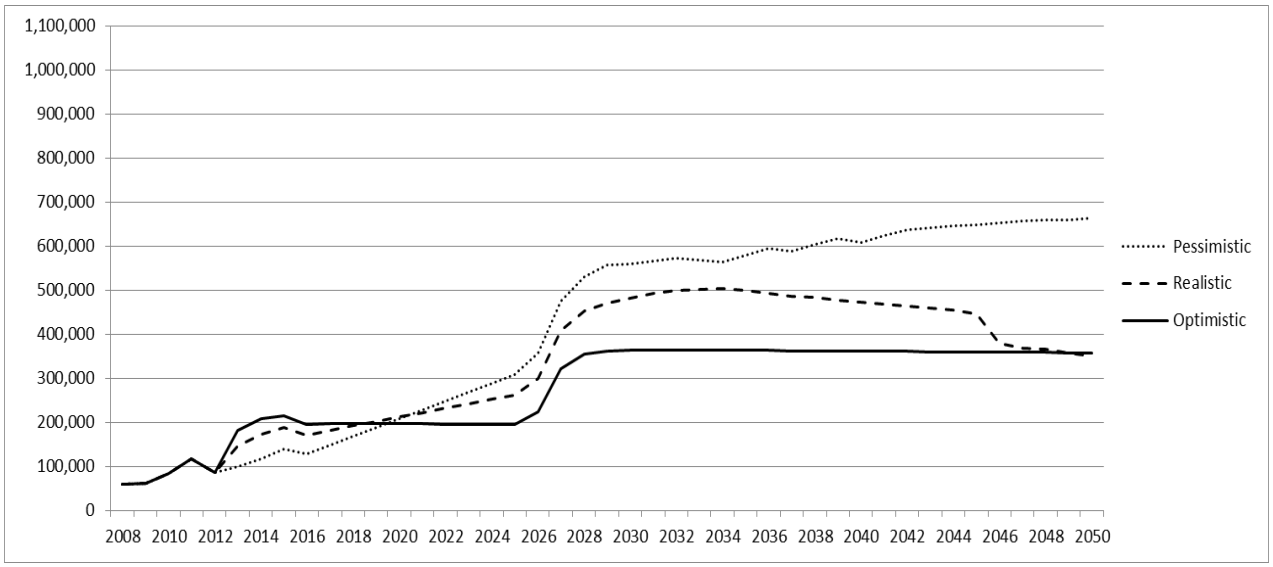


Figure 2. Belarusian migrants stocks 2008-2050 – 3 scenarios, 27 EU countries and Norway, impact of visa abolition in 2015
*Source*: Own results.

Judging by our results, one can notice that in case of Belarus the optimistic scenario oscillates to the 200,000 migrants by 2050. In case of realistic (or medium) scenario, the migrant stocks fall below 200,000. When the pessimistic (the worst-case scenario) is concerned, the stock of Belarusian nationals in the EU might rise up above 500,000 people. The result of visa abolition in 2015 would be that in the optimistic case scenario, the stock of Belarusian migrants in EU MS would be around 350,000, while in pessimistic scenario case the stock would reach 550,000 people by 2050. The abolition of visas is probably not going to cause any immediate effect.

In case of Moldova, the results for all three scenarios represent an oscillation around 200,000 people (below, at the 200,000 migrant stock level, or above that for the optimistic, realistic and pessimistic scenarios). The abolition of EU visas for the Moldavian nationals appears to result in the increase of migration stocks in the EU to the level ranging from 350,000 to 500,000 Moldavians. It has to be noted that the EU has already abolished visas for the Moldavian nationals and this has not resulted in the dramatic increase of migration flows to the EU, same as our scenarios and models are showing (see *Figure 3*).

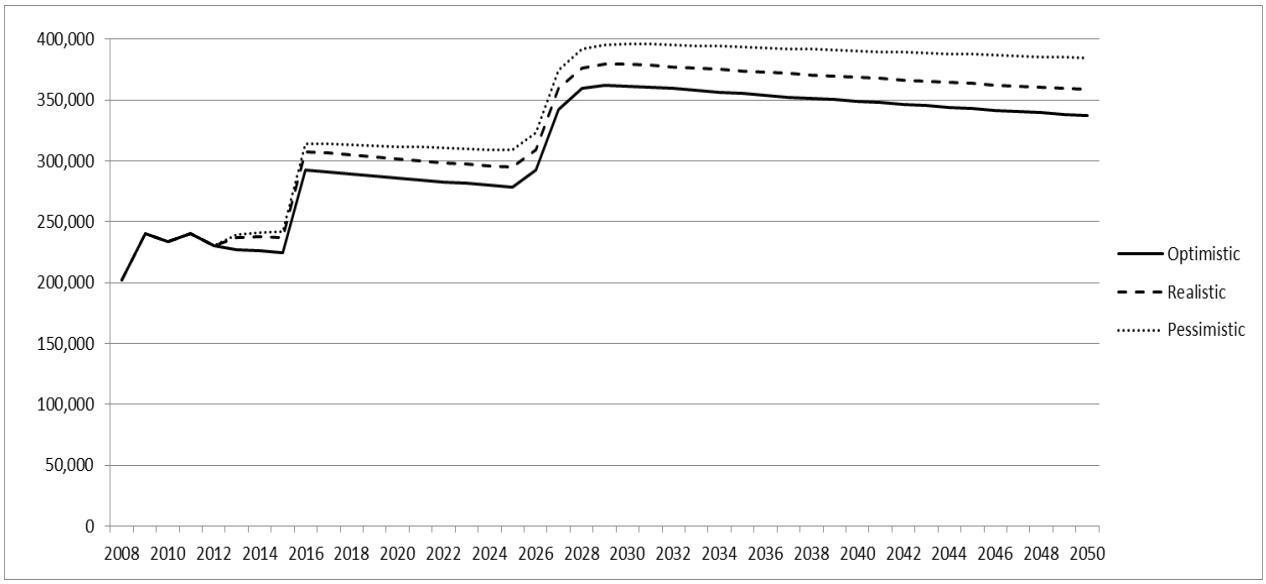


Figure 3. Moldavian migrant stocks 2008-2050 – 3 scenarios, 27 EU countries and Norway, impact of visa abolition in 2015
*Source*: Own results.

As for Ukraine, the optimistic scenario yields that by 2050 there is going to be just little less than 1,000,000 migrants. In case of realistic (or medium) scenario, the migrant stocks oscillate around 1,000,000. When the pessimistic (the worst-case scenario) is concerned, the stock of Ukrainian nationals in the EU might reach 2,000,000 people (*Figure 4*).

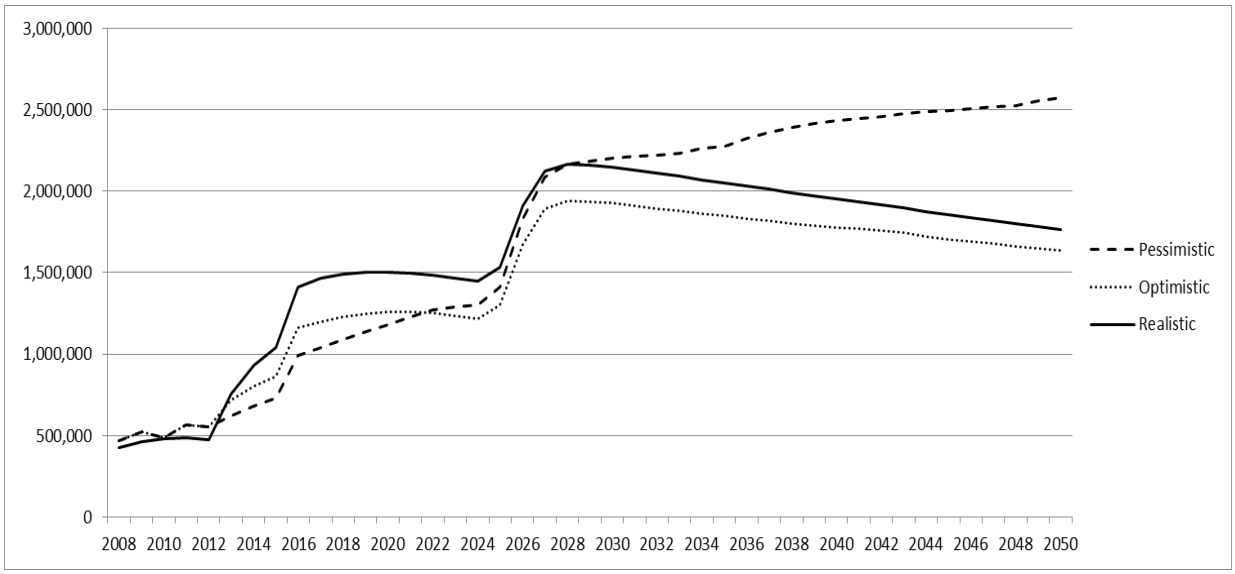


Figure 4. Ukrainian migrant stocks 2008-2050 – 3 scenarios, 27 EU countries and Norway, impact of visa abolition in 2015
*Source*: Own results.

The result of visa abolition in 2015 would be that in the optimistic case scenario, the stock of Ukrainian migrants in EU MS would be around 1,500,000 people, while in pessimistic scenario case the stock would reach about 2,500,000 people by 2050.

Overall, we can state this within this very model and this very econometric approach our results are robust and significant which, in turn, might lead us to the conclusions that migration from EEC to the EU MS would considerable but manageable representing from one and a half to three and a half million migrants depending on the scenario we use.

## 3. Main conclusions and policy implications

To sum it up, one can see that the hypothetical visa abolition for the Eastern European countries represented by Belarus, Moldova and Ukraine is not going to increase the stocks of migrants from the CEEs countries in the EU Member States. This is not surprising, since the same results were obtained before and after the EU 2004 Eastern Enlargement, when the 8 former Communist countries, Cyprus and Malta joined the EU. Similar (moderate) results are often reported from the analysis and predictions of possible Turkish migration to the EU in a hypothetical case Turkey joins the Union, or the Single Market would be opened for the workers with Turkish passports.

Our results yield that the annual rise of migrants stocks comprised on the EEC nationals in the EU MS in a long term is expected to be manageable. The scenarios created in order to simulate the stock of migrants before and after the visas abolition predict that the stock of migrants is likely to be around 180 thousands by 2050.

The experience of former EU enlargements fully supports our results. Furthermore, a successful accession period with high growth and implementation of the reforms is actually leading to elimination of the migration pressures. More precisely, the Belarusians, Moldavians and Ukrainians who had strongest incentives to migrate had already migrated and settled down in the EU long time ago. The forthcoming visa abolition for the citizens of EEC would most probably keep migration at the manageable level.

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## Appendices

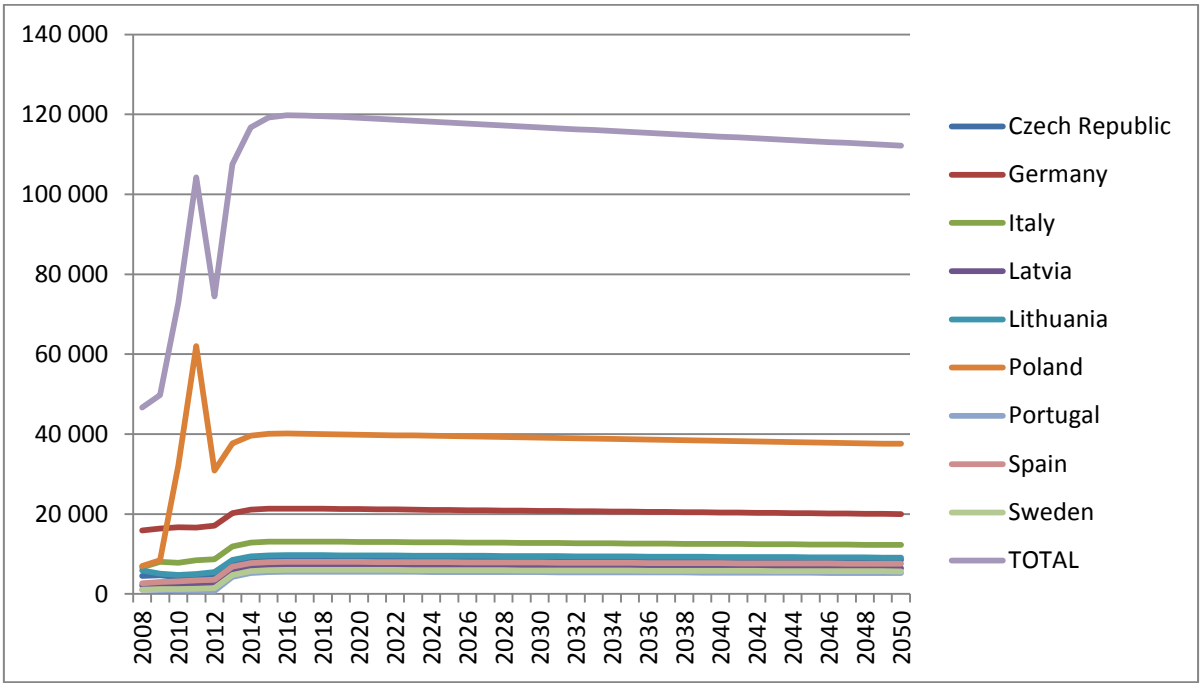


Figure A1. Belarusian migrant stocks – optimistic scenario
*Source*: Own results.

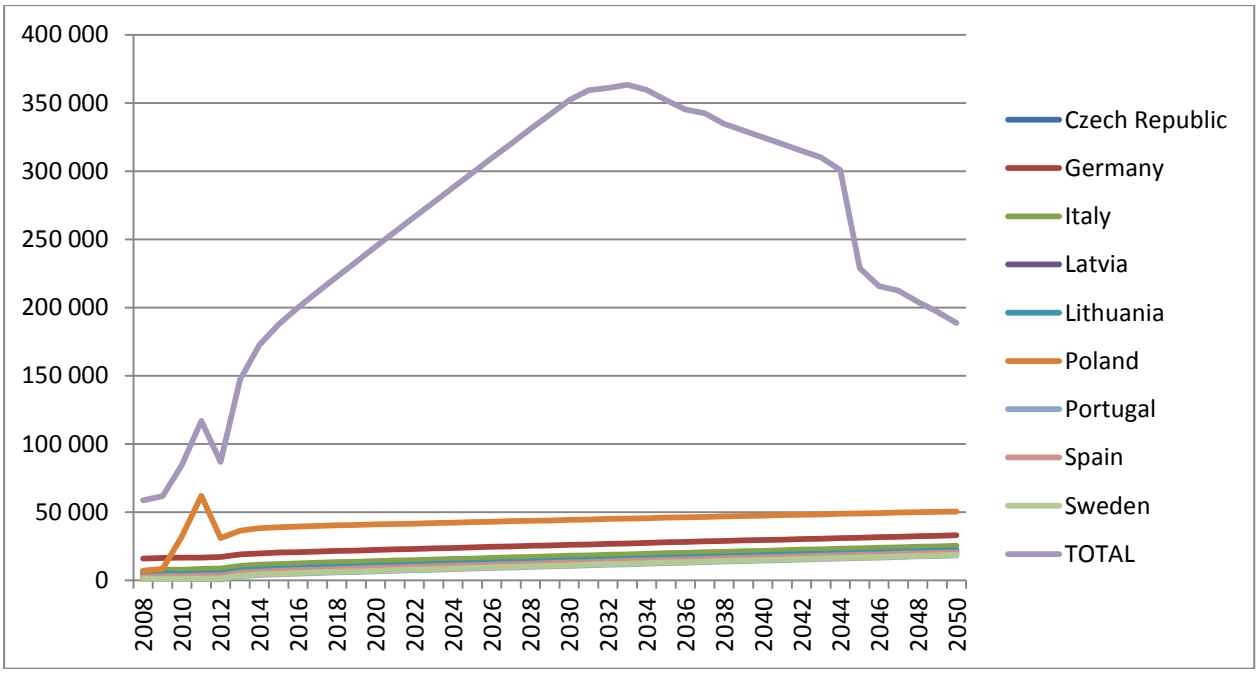


Figure A2. Belarusian migrants stocks – realistic (medium) scenario
*Source*: Own results.

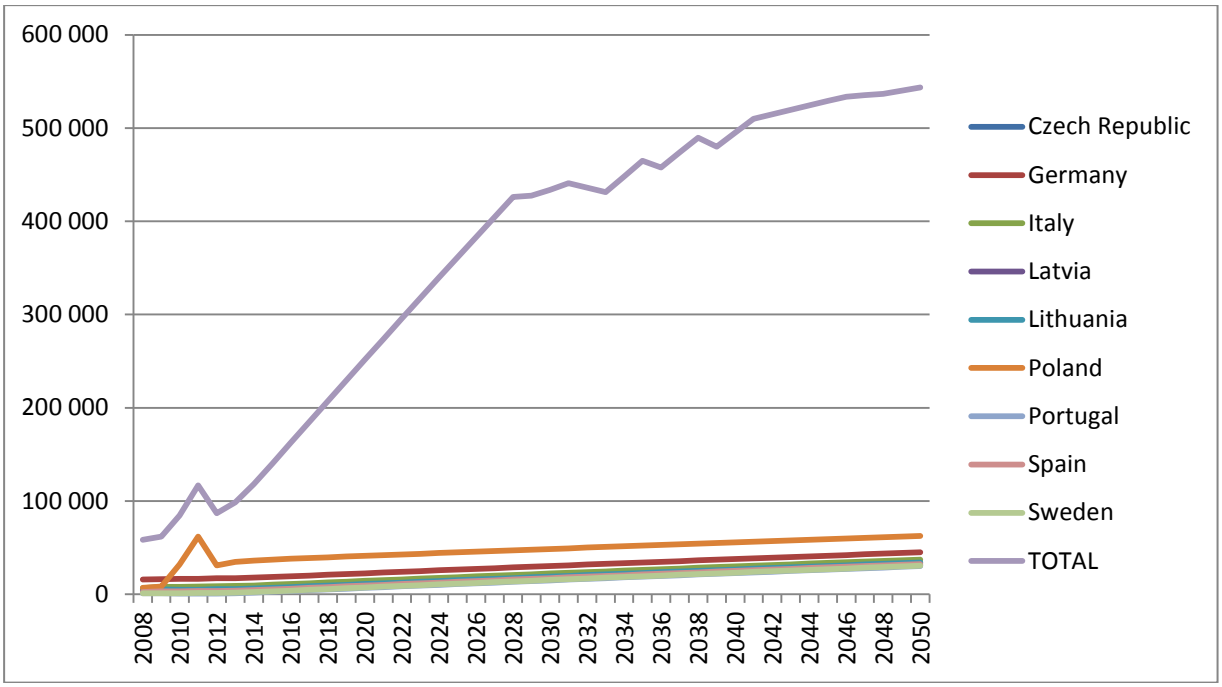


Figure A3. Belarusian migrants stocks – pessimistic (worst-case) scenario
*Source*: Own results.

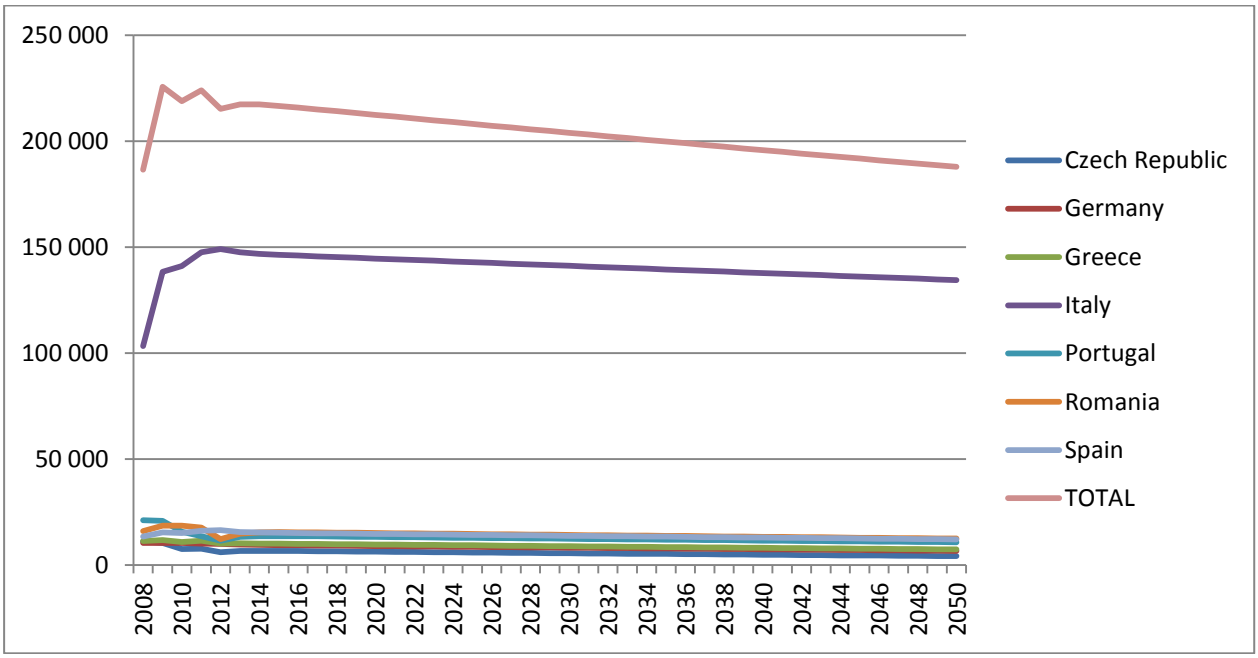


Figure B1. Moldavian migrant stocks – optimistic scenario
*Source*: Own results.

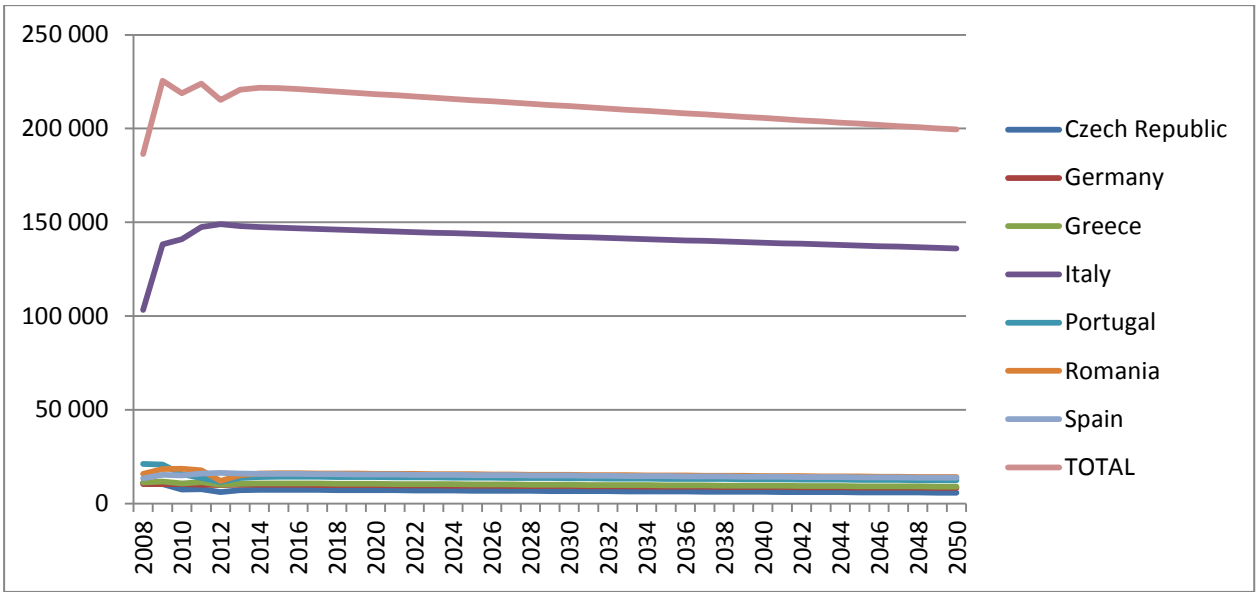


Figure B2. Moldavian migrants stocks – realistic (medium) scenario
*Source*: Own results.

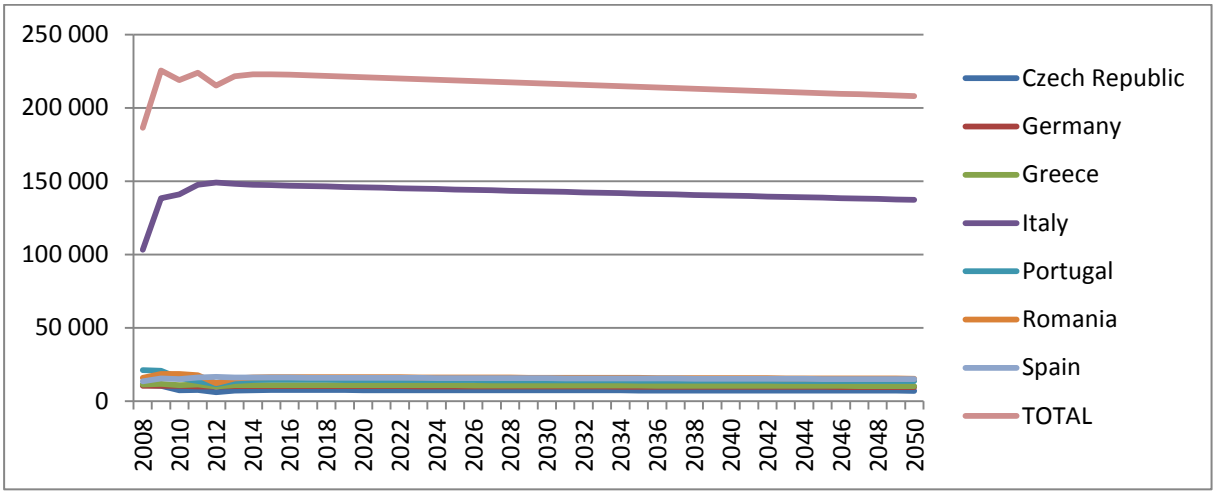


Figure B3. Moldavian migrants stocks – pessimistic (worst-case) scenario
*Source*: Own results.

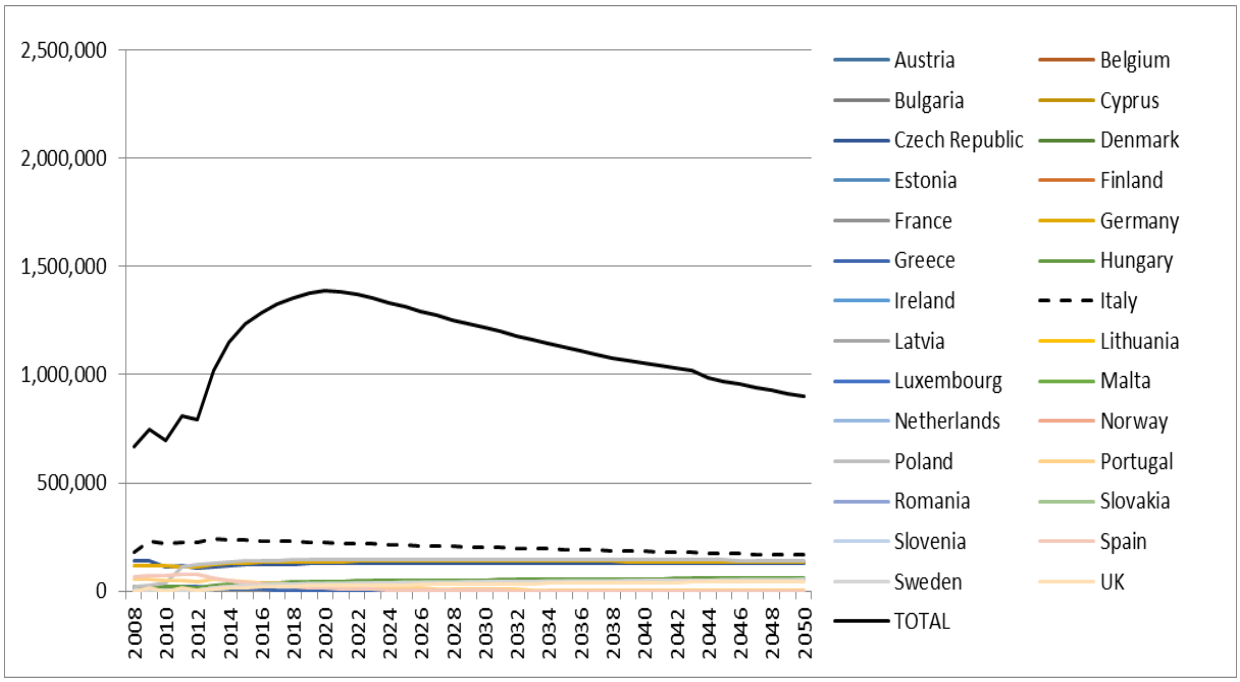


Figure C1. Ukrainian migrant stocks – optimistic scenario
*Source*: Own results.

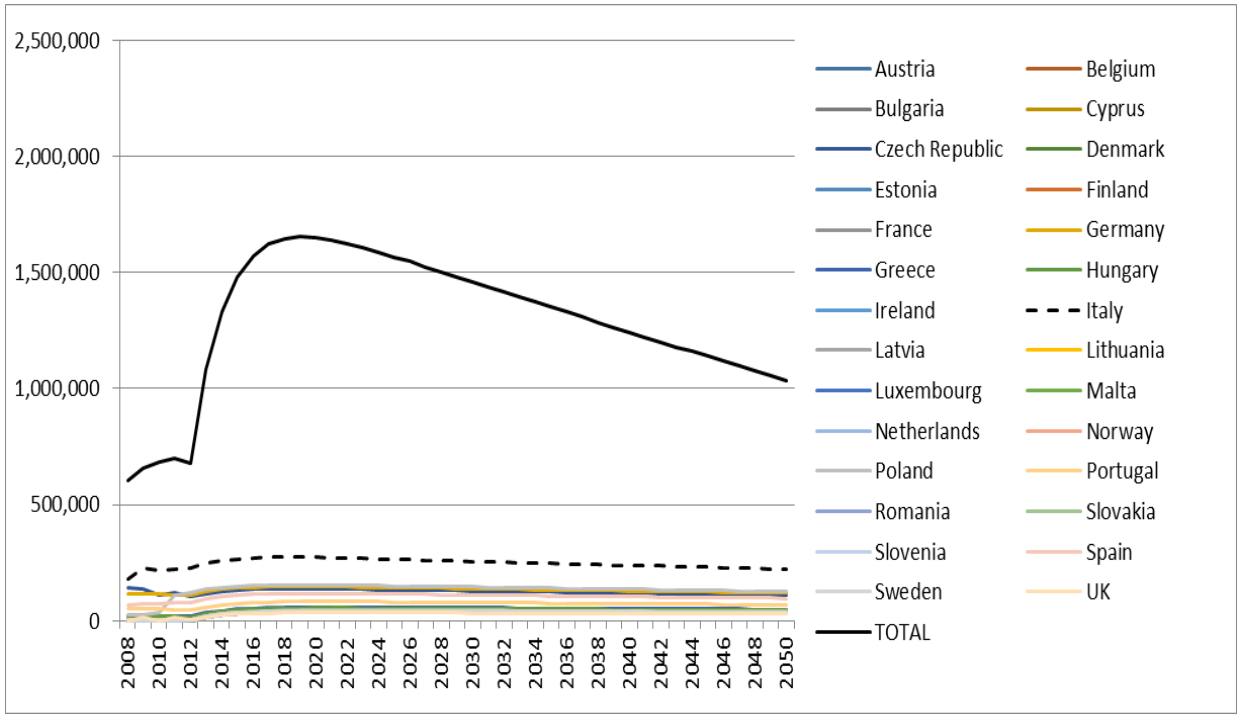


Figure C2. Ukrainian migrants stocks – realistic (medium) scenario
*Source*: Own results.

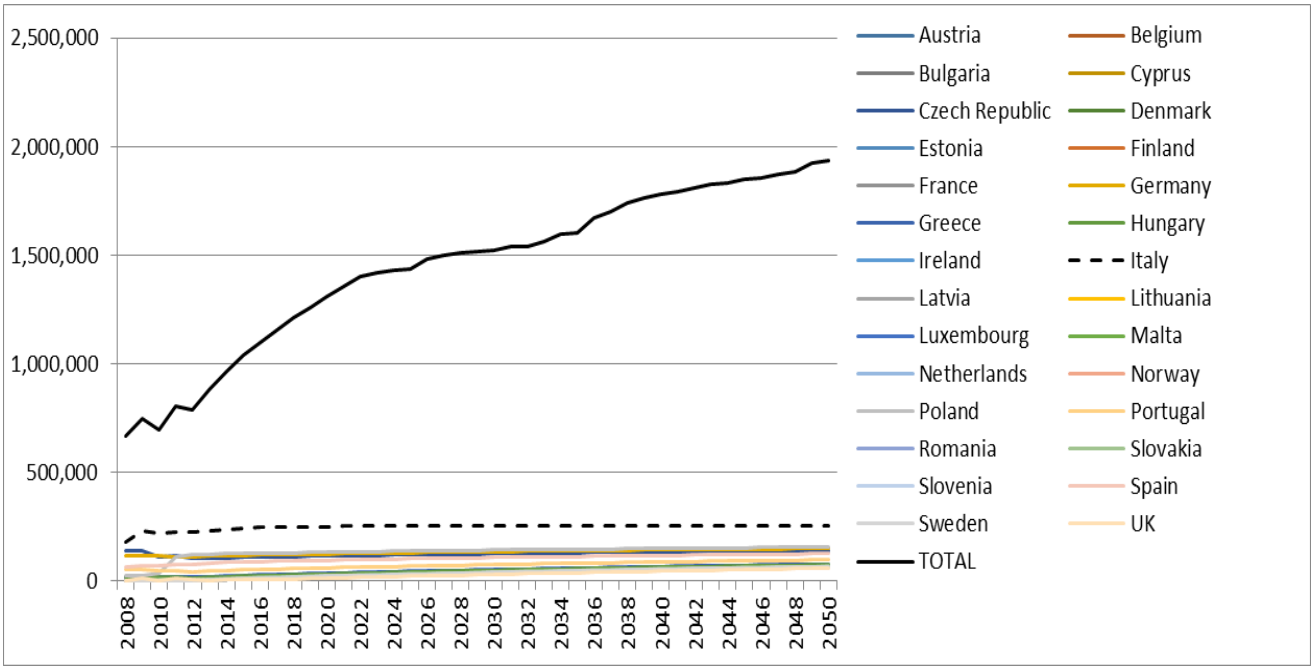


Figure C3. Ukrainian migrants stocks – pessimistic (worst-case) scenario
*Source*: Own results.