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The Polish Migration Review

Forecasting the dynamics of the potential of international migrations by 2050

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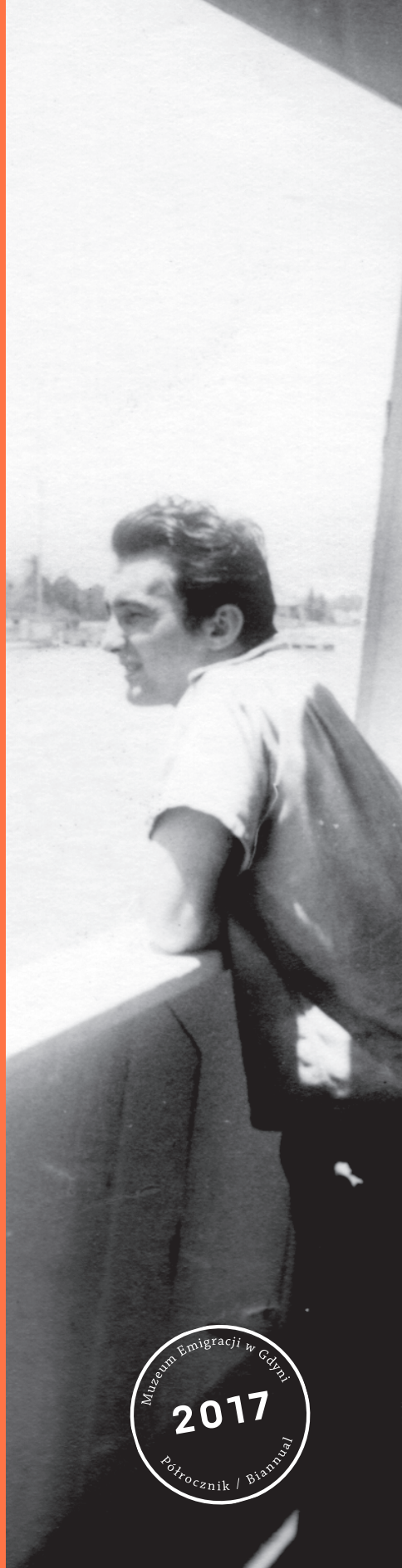

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Forecasting the dynamics of the potential of international migrations by 2050

THE ARTICLE

Abstract

The text is an attempt to estimate changes in the potential sources and targets of international migration (countries with a modern population quantity of more than 5 million were taken into account) in accordance with the prognoses of change of population quantity until 2050. The author attempted to estimate the change in the "difference of potentials of an available population by countries". The research leans on three scenarios of demographic development as offered by the UN – low, medium and high.

To the best of the author's knowledge, the model created by the author is one of the few models of global international migration based on a synergistic approach. With the help of the created model in the course of consistent iterations, matrices were developed of paired indexes of the mutual attractiveness of countries for migrants for every fifth year from 2020 to 2050. Based on these matrices and in accordance with the UN's proposed scenarios of demographic development, three scenarios were constructed for forecasting trends and volumes of legal migration for every five years to 2050 among all countries taken into consideration. The predicted values were determined for the total number of international migrants in each of the countries by 2050.

The conclusion is that there are stable migration directions which are not limited to the direction of "South – North". It was also determined that there is no fundamental difference in the forecasted migration directions according to each of the UN scenarios.

The results of the forecasting and some supplementary materials to this article are available online.

Keywords:
international migration, forecasts of international stock migration by 2050, simulation of international migration

INTRODUCTION

According to the World Bank, international migration "is the component of population change most difficult to measure and estimate reliably. ... Furthermore, the movement of people across international boundaries, which is very often a response to changing socio-economic, political and environmental forces, is subject to a great deal of volatility. Refugee movements, for instance, may involve large numbers of people moving across boundaries in a short time. For these reasons, projections of future international migration levels are the least robust part of current population projections and reflect mainly a continuation of recent levels and trends in net migration"[1]. That is why the construction of models that reproduce migration processes and provide estimates of their subsequent dynamics seems to be a rather important part of the research and forecasts of migration processes.

Currently, there are many theoretical views regarding the causes and factors of migration[2]. Various macro-level and micro-level neoclassical theories that once opposed Marxist theories of dependence are gradually being replaced by more complex and perhaps more realistic theories. These include the NELM-theory, i.e. the theory of new economics of labor migration, the theory of a "dual labor market", the world system theory, the theory of migration networks, the transnational migration theory, the theory of cumulative causation, and others. All of these theories and many others not mentioned above bring us closer to understanding the significant causes of migration. Each of the theories more or less systematically creates its own hierarchy of factors that affect migration movement at both the macro or micro level. Numerous models are built according to these theories, e.g. P. Alvarez-Plata, H. Brücker and B. Siliverstovs developed a model to estimate potential migration from Central and Eastern Europe into the EU-15. The model is based on the so-called human capital approach[3]. Another version of the model also oriented towards illustrating migration in Europe was represented by J. Raymer, A. Wiśniowski, J.J. Forster, P.W.F. Smith and J. Bijak[4]. The authors' main purpose was to build a model that could overcome uncertainty for international migration flows. The authors proposed the Bayesian model to overcome the limitations of the various data sources.

It should simultaneously be admitted that increasing the detailing of theoretical concepts makes it difficult to construct predictive models that could be based on these theories. The main problem at the same time is the deep complication of parametrisation of a model which is designed to take into account a variety of factors and their interactions. In support of this view, we can refer to the conclusion of the Population Division of UN: "As of now, however, the gross data are not available for a sufficiently large set of countries to form the basis for projections"[5]. And attempts of even medium-term forecasting and defining the parameters of such a model become almost impossible. Consequently, if we rely on some of the above-mentioned models we do not see the possibility of constructing a plausible forecasting model that is capable of predicting the dynamics of the world migration system for a period of 10–30 years.

In fact, the only assessment of the volumes and directions of international migration on a global scale existing in open access belongs to the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat and it also relies on a small number of factors – primarily on population projections and the evolution of mortality and fertility rates[6].

Consequently, in contrast to the prevailing approaches regarding further detailing of migratory flows and volumes within certain groups of countries or regions, we consider it necessary to turn to a global assessment of the expected migration flows in the medium and long term. The task of this work is to build a model that can predict flows of migration among countries of the world and analyse the predicted values of the potential of international migration by 2050 on a scale of countries with a population of more than 5 million people.

SOURCE BASE OF THE RESEARCH

There are two large data sets on migration that cover almost all countries in the world, have a relatively unalterable data collection technique and high chronological coverage. These are the World Bank data[7] and the data of the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat[8]. It is important to note that these data within their own arrays contain almost no gaps and are comparable.

The UN data include information on the total number of international migrants per country and territory with uncertain status (232 countries in total) for 1990, 1995, 2000, 2005, 2010 and 2015. The population census from individual countries is the main source of information for the UN. In some instances the data come from population registers and national representative surveys. To estimate the number of international migrants, the United Nations Population Division uses different data for different countries – with regard to persons with a foreign birthplace (approximately 80% of countries) and with regard to persons who have foreign citizenship (in 20% of countries). In more than a third of the countries the number of international migrants includes data on refugees residing in a given country.

For example, in the case of UNPD data we are dealing with somewhat heterogeneous cumulative data on migrants, i.e. "stock estimates include migrations from some considerable time ago and do not capture the current patterns of migration, but the cumulative effects over the years"[9].

World Bank data (for every five years during the period 1960–2015)[10] are also cumulative in terms of the number of migrants but differ from UNPD data for some countries, e.g. according to UNPD data in 2010 in Ukraine there were 5,190,127 migrants and according to the World Bank data there were 4,818,767 of them. At the same time, for many countries these data almost coincide (e.g. for the US, the Russian Federation or Belarus).

Interestingly, the UN data are constantly updated and radically adjusted over time, e.g. in the UNPD data released in 2013[11], in 1990 in Pakistan 850,000 more immigrants were recorded from India than in the UNPD data, which were released in 2015[12].

Based on all of the foregoing, we prefer the UNPD data released in 2015 on which we will base our assessment of the available migrant volumes and on the population estimates of the countries[13].

The UNPD also provides data for three scenarios for forecasting population size by 2010[14]. We will use these data, thus limiting our attempts to provide a forecast by 2050.

Regarding data on international migrants, it is worth noting that for some countries they look rather strange, although formally (according to UNPD criteria) they are true, e.g. according to UNPD data, in 2013 more than 5 million international migrants lived in Ukraine. At the same time, the well-documented history of the past 26 years of post-Soviet existence did not record such a large-scale outflow of foreign population into the territory of Ukraine. Consequently, the affiliation of every ninth inhabitant of a country to international migrants can be explained only by the fact that a person, born at least 40 years ago in one of the former USSR republics and who, possibly, moved to Ukraine in the times of the USSR, is according to this methodology still considered to be an international migrant.

The same picture is observed in the rest of the countries formed on the territory of the former USSR and in other large or small imperial entities. And we are convinced that, for example, among the 3.6 million "international migrants" fixed by United Nations statistics in the United Kingdom as of 1990 there are descendants of British people born outside the Kingdom 40 or 60 years ago who subsequently moved to their ancestral home with or without their parents. Yet until their death they will be considered international migrants according to British and UN statistics.

The cumulative nature of available regular and comparative data on migration put forward additional requirements for their use, i.e. it is necessary to proceed from the assumption that the estimation of migration flows for a certain period can only be conducted due to differences in data from different years. Moreover, it is necessary to accept the complexity of assessing the natural mortality of persons of foreign birth or foreign citizenship as well as their possible transfer to another country.

METHODOLOGICAL PRINCIPLES OF THE MODEL

In constructing the model we relied on the assumption that, in terms of volumes of international flows of migration, migration flows from countries with a total population of less than 5 million was unlikely to be worthy of attention. We also put forward a symmetric assumption about the potential recipient countries of the migrants, i.e. in the model we did not take into consideration countries whose population in 2015 was less than 5 million people.

Indeed, according to the UN, in 2015 Earth's total population was 7.349 million people, and the aggregate population of 118 countries with a population of more than 5 million people was 7.169 million, or more than 97% of Earth's total population. As a matter of fact, there are 119 countries with a population of more than 5 million people, but we removed the Korean People's Democratic Republic from the list because, despite the estimated population of about 23 million there, the country is so closed that it is not actually a part of the world system of international migration.

At the same time, we proceeded from the assumption that annual growth rates of emigrants for individual countries almost never exceed 1% per year, e.g. in the 2010–2015 period the most active migrant supplier was Syria. In this period, the scale of annual migration from this country was about 4% of the total population. But apart from this, fully explained by the war, for the rest of the most active migrant countries the scale of annual emigration is no more than 0.7% – 0.8% of the total population of these countries (we skip here the problem of assessing the socio-economic consequences of the rapid outflow of such a population from the donor country as this goes beyond our research).

It should be noted that even among the 118 countries we chose, the list of countries with a "high" level of annual migration looks rather unexpected: among the 35 countries whose annual population emigration exceeds 0.1% of the total population, for 19 countries this indicator varies between 0.2 and 0.1%, for 6 countries between 0.2 and 0.3%, and only 10 countries, including Syria, are characterised by annual emigration of more than 0.3% of the total population. Interestingly, these 35 countries with a high annual emigration rate of more than 0.1% of the total country's population include such well-developed countries as Great Britain (0.1%), the Czech Republic (0.11%), Slovakia (0.15 %), Poland (0.16%) and Portugal (0.34%).

Consequently, when constructing and verifying the model we proceeded from the assumption that migration flows between 118 countries of the world can adequately reflect the extent and direction of international migration in the world. Thus, the concepts of "the whole world" and "all countries of the world" shall be understood in this paper only as the set of 118 of the above-mentioned countries.

UN data on these 118 countries are characterised by the fact that 76% of the countries have data on persons with a foreign place of birth and about 24% of the countries have data regarding foreign citizens. In 49% of the countries, data on the volumes of migration also takes refugees into account. The list of countries taken for analysis is provided on the http://myko.name/forecasts/ website.

DESCRIPTION OF THE MODEL

When constructing the model we proceeded from the fact that migration processes in the modern globalised world are a system that is self-organising and self-regulating. All of the countries of the world are somehow involved in this joined process. Many factors influence the state of this system and its development, but if proceeding from the point of view of self-organisation, its further state is eventually determined by its internal parameter of order, i.e. its internal impulses. We constructed our model on this basis. It worth noting that, in a certain sense, our approach corresponds with the theory of the cumulative causation of D. Massey[15], which is connected, in turn, with the concept of migration networks[16].

The ascending hypothesis in constructing our model of migration flows is the assumption that it is possible to determine the degree of mutual attraction of pairs of countries (for the migration flow) at a certain moment of time tn, which will determine the directions and density of migration flows for the next forecasted period (for the time interval tn – tn+1).

We stress that, as opposed to the rather widespread approach, we offer to abandon

the concepts of countries-suppliers and countries-recipients of migrants. Each country in our study *a priori* and during every iteration of the model is considered both as a potential supplier and as a potential recipient of international migrants. It should be noted that even the United States or Great Britain also have a million diasporas of their natives, whose total number is also gradually increasing. However, when developing the model and constructing forecasts we used the terms "country-source of migrants" (cs) and "country-destination (cd) of migrants". These terms were used only for the purpose of establishing in what sense each particular country was considered in each equation of the model.

So, the following interconnections lie on the basis of our model of international migration. In our opinion, the potential attraction of migrants to a country depends on the following factors:

- the presence and a relative number of diasporas from a potential country-source (cs) of migrants in the potential country-destination (cd). It is evident that, as a rule, the larger the diaspora in a given country, the greater the potential number of those wishing to move there from the country-source will be;
- the presence and a relative number of immigrants from other countries in the potential country-destination;
- the nature of the dynamics of increase in the number of immigrants in a potential country-destination, and the ratio between the increase in the number of immigrants from each country with the same increase from all countries.

The volume of potential migrants' flows in each pair of "migration interactions" between countries is influenced by the presence and relative number of "extra people" in a potential country-supplier of migrants. The number of these people is determined by:

- the ratio between the available population in the given country and the number of persons who emigrated from it during the last observation period, as well as
- the number and rate of population growth in a given country.

Thus, within our research "extra people" are those who are potentially ready for emigration, based on the trends of migration from this country in past periods of observation, and those who are "doomed to emigration" by existing socio-demographic trends in a given country. Consequently, these are individuals who are expected to emigrate from a given country in the forecasted period.

First, we will clarify the way of calculating "extra people". At first glance, when calculating the number of people potentially ready to leave the country-supplier of migrants, all "extras" should be calculated in relation to the population at a certain point. This may be a specific year, for example, 1990. In other words, those who are already living in a potential country-supplier of migrants have somehow joined themselves in existing economic chains, and the "new people" (mostly youth) cannot find their place and, in addition, are more mobile, thus they comprise many of the potential emigrants. At the same time, the analysis of the United Nations data on the ratio of the number of emigrants and the number of the available populations in the countries for a rather long period, i.e. 1990–2015, shows that despite the increase in the total population of the country (sometimes, as in the case of several African countries, it is rather rapid) the number of emigrants from the respective countries remains almost constant. More precisely, according to data for 1990–2015, the ratio between the number of people who emigrated from the country in a certain period of time and the total population of the respective country remained almost constant. Consequently, according to data for 1990–2015, the ratio between the number of people in the country and the number of actually "extra people" (who indeed became emigrants) remained almost unchanged, although it tended towards a gradual increase. Therefore, when calculating the number of "extra people" we proceeded from the ratio of the volume of emigration in the previous period and the relative increase in the population of the country-supplier of migrants rather than from absolute population growth. In fact, it is precisely determining the "extra people" at a specific time tn+1 that the UN data on the projected population for the period up to 2050 was used.

As a result, for each direction of each pair of countries we obtain an index of mutual attractiveness for migrants (i.e. the index of mutual attractiveness of country 1 for migrants from country 2, and the index of mutual attractiveness of country 2 for migrants from country 1). The values of these indices, calculated for each country for the year tn, determine the percentage of the migrant flow from each country-source to each country-recipient in the time interval tn – tn+1. For the next moment of time, tn+1, we performed the next iteration of calculations of the countries' mutual attractiveness, which determined the distribution of the flow of migrants from each country taken as a source of migrants to the countries of destination for the period tn+1 – tn+2.

Consequently, in the forecast for the next period the potentially ready-to-migrate population of the nth country (i.e. "extra people") was distributed among the countries of destination in proportion to the calculated values of the index of mutual attractiveness.

Verification of the model on material from 1990–2015 showed that it is quite possible that the negative paired index of mutual attractiveness resulted from the low number of representatives from a country-source in a particular country of destination, i.e. if during the basic period of time this number did not increase but, on the contrary, decreased (a certain conditionality for such a name for the available data sources should be taken into account because, we repeat, according to the current statistics of the World Bank and the UN any person who does not live in a territory other than the country of birth is considered to be a migrant for a lifetime). It must be admitted that the movement of such migrants in the event of a decrease in their number in a recipient country is not certain. Generally, there are two possible options: either death or moving to a new place. In the second case, such "repeated migrants" are added to the entire array of migrants of the given country-source, so it makes no sense to separately calculate the number of these "returnees". In addition, the actual data for such calculations are extremely small.

When constructing a forecast, in the case of the negative paired index of mutual attractiveness, we believe that this country-recipient is not attractive to new migrants and, therefore, the value of the paired index of mutual attractiveness as laid down in the calculation of the forecast is equal to zero. At the same time, such a case should not be taken as evidence of the mandatory presence of incentives for "negative migration", i.e. the outflow of natives of a source-country from a recipient country, since such outflow may have many reasons: from returning home to the death of representatives of the previous wave of migration. Consequently, the presence of zero growth of migrants in a country in perspective means a forecast of one of two possible processes: 1) there is no inflow of migrants; 2) there is, at the same time, an outflow of migrants who went to this country in previous years. In this second case we should note that since we are interested in forecasting the migration flows, even if the natives of a certain country left the recipient country for another country they will still be considered as entering the flow of migrants from the relevant country-source. Consequently, our model is not intended to predict the outflow of migrants from recipient countries. However, it should be noted that in practice such cases are rather rare and do not exceed a few percentage points of the total number of migratory flows.

The model also imposes restrictions on the possibility of abandoning the country with an abnormal number of migrants, e.g. by 2015, due to the well-known military actions, almost 27% of the total population left Syria. Compared to 2010, the number of Syrian natives living abroad increased by 3.9 million, or 3.5 times. On the one hand, the model envisages taking into account the subsequent gradual growth of migrants from a country such as Syria; on the other hand, the cases of Afghanistan and Iraq show that the sudden, resulting from hostilities, outflow of emigrants is gradually decreasing; moreover, as the situation starts to calm down there will be a return of former refugees to their native land. Consequently, the model does not foresee the outflow of a population more than 30% of the current population since, based on available data, this state of affairs seems almost impossible.

It should be noted that the model we created as a result of the data used has been adapted to estimate the extent of legal migration. The forecasts based on it are not intended to provide forecasts of illegal, or, for example, seasonal production migration. Building such predictions is one of our next tasks.

Forecasts of migration flows were formed for five-year periods, i.e. from 2020 to 2050.

Based on the existence of three UN population scenarios, i.e. middle, low and large, we formed three predictable scenarios for flows of international migration.

VERIFICATION OF THE MODEL

Verification of our model based on material from 2010 showed the following: the model, which represents the flows of migration between 118 countries with populations of more than 5 million people, allows to take into account 95% of the actual migration between all of these countries.

The correlation coefficient of the forecasted and actual numbers of emigrants from 118 countries is 0.89. If we were to withdraw from the comparable ranks the apparent "outburst" of Afghanistan, where military action was taking place at that time and from which there was an excessive flow of migrants, then the correlation coefficient would be equal to 0.91.

The matrix correlation coefficient between the matrix of the forecasted number of migrant flows from each country in the period 2005–2010 to each country and the matrix of actual values is 0.65. Without the case of Afghanistan, this coefficient is 0.67.

At the same time, the matrix correlation coefficient between the matrix of the forecasted number of migrants from each country in each country and the matrix of the actual values is 0.99.

The next step in verification of the model was taking as the basis the actual values of the number of migrants in 2005, as forecast by the model of the number of migrants in 2010 and the construction of the verification forecast for 2015. For the forecast constructed in this manner for 2015, the matrix correlation coefficient between the matrix of the predicted number of migrants from each country in each country and the matrix of the actual values is 0.95.

The matrix correlation coefficient between the matrix of the projected number of migrant flows from each country in each country in the period 2010–2015 and the matrix of actual values is 0.36, which is significant. But without the cases of the three outburst countries, i.e. Afghanistan, Iraq and Syria, this coefficient could be 0.76. It is interesting to note that these outburst countries were characterised by unusual and difficult to predict migration movement in this period: while Syria was left by more than 3 million people which, of course, was entirely unpredictable in 2010; about 1 million returned to Iraq after certain normalisation of the socio-political situation had taken place there, and more than 400 thousand people returned to Afghanistan (i.e. the number of all natives of Afghanistan living abroad in 2010 decreased by 400 thousand people by 2015). Apparently, since we are not aware of any abnormal deaths of Afghans and Iraqis in emigration during this period, it pertains to their return to their historic homeland.

Consequently, verification of the model shows that sudden movements of large masses of migrants are difficult to consider in it. At the same time, even with such sudden movements the model is capable of predicting, with sufficient precision, changes in the total number of migrants by country, even against the backdrop of sharp migration "jumps" of several million people over five years all over the world. Thus the model is quite suitable for the implementation of forecasts of migration flows according to UN forecasting scenarios for the population of the world. The return of ex-emigrants to their homeland, which is, as we can observe, inherent for almost all post-war countries, is not expected to be predicted in the current version of the model. Such cases of "negative" migration are considered by the model only by way of fixing a zero migration outflow (e.g. outflow from Saudi Arabia to Iraq).

CONCLUSIONS: RESULTS OF FORECASTING VOLUMES OF MIGRATORY FLOWS AND MIGRATION POTENTIAL

The tables containing the forecasted number of migrants by countries until 2050 are posted on the websites: http://myko.name/forecasts/ and https://independent.academia.edu/FieldNick. Below are some of the results of forecasting and the conclusions that were made from them.

As a result of successive iterations in the calculation of matrices of paired indexes of mutual attractiveness, we obtained predictive estimates regarding the potential of international migrations within the framework of the system comprising 118 countries by 2050 and in accordance with the three scenarios of UN population growth.

According to the medium scenario of population growth, the overall forecast for the international migration movement is as follows:

If in 2015 the total number of migrants in the world (in 118 countries) was almost 197 million people, then in 2030 their number will be almost 255 million people. In 2050 the number of international migrants will reach 345 million. As a percentage of the total population of the Earth the increase in the number of migrants does not look so significant: if in 2015 migrants comprised 2.7% of the world's population, then in 2030 this share will be 3.1%, and by 2050 it will increase only to 3.6%. Let us also take into account that of the estimated number of migrants of 345 million, almost 200 million are already migrants as of today. Consequently, by 2050 only about 150 million people will move in the world by moving to other countries for permanent residence. Against the background of the UN's projected increase in the population of the Earth from 7.3 to 9.7 million people, the expected displacement of 150 million migrants makes us pose only one question: Why will there be so few?

All 118 countries are characterised by an increase in their contribution to the absolute number of international migrants in the forecasted period. At the same time, their distribution according to the degree of potential attractiveness for migrants and the potential source of international migrants is very diverse.

In 2015 five countries with the largest emigration potential as compared to their own population, i.e. with the largest share of emigrants according to their own population, included such countries as Syria (27%), Salvador (23%), Kazakhstan (23%), Portugal (21 %) and Laos (20%). According to the forecast, in 2020 the first five countries according to this indicator will include Salvador, Syria, Portugal, Kazakhstan and Laos, with the number of emigrants from 25% to 20% of the total population. In 2030 the top five countries with the largest share of migrants will include Salvador, Portugal, Laos, Kazakhstan and Bulgaria, with an indicator of the number of emigrants from 29% to 21%. According to the medium scenario of the population number, we predict that Portugal, Bulgaria, Salvador, Eritrea and Romania will by 2050 be the first five countries left by almost 29–27% of the population. At the same time, it should be noted that for countries such as Portugal, Bulgaria and Romania, the high forecasted percentage of emigrants as compared to the population of the country is explained by the forecasted significant decline in the amount of the population in these countries by 2050.

In absolute terms, the number of emigrants will increase by 6–3 times in 8 countries, among which are Southern Sudan and Eritrea (6 times), Sudan (5 times), Congo (4 times), Somalia, Zimbabwe, Niger and Ethiopia (3 times). In another 28 countries the absolute number of emigrants will increase more than twice. In total, the representatives of these 34 countries will comprise 98 million migrants in 2050.

Interestingly, Salvador, Bulgaria, Portugal, Romania, Kazakhstan and Belarus as mentioned by us are among the countries with the smallest growth in the number of emigrants. The growth's increase is only forecasted by 1.3 – 1.2 times. In absolute numbers, by 2050 we forecasted the following increase in the number of migrants: from Portugal – by 570 thousand people, from Bulgaria – by 370 thousand people, and from Romania – by 800 thousand people. At the same time, Salvador, Eritrea and Laos are characterised by parallel growth in the number of emigrants and in the number of the population. For 2015-2050, the inflow of migrants from these countries will increase as follows: from Laos – by 1.4 million people, from Eritrea – by 2.3 million people, and from Salvador – by 480 thousand people.

It should be noted that an almost twofold increase in the absolute number of emigrants is characterised by such different countries in many parameters as the US (increase by 1.95 times) and India (increase by 1.98 times). In absolute terms, this pertains to an increase in the number of emigrants from the US by 2.5 million people (from 2.6 to 5.1 million people) and from India by 12.3 million people (from 11.1 million to 24.9 million people).

In fact, according to the absolute number of emigrants forecasted by 2050, countries with the largest number are listed as follows: India (almost 25 million), Mexico (16.5 million), China (15.9 million), the Russian Federation (12 million), Pakistan (11.8 million), Sudan (9.6 million), the Philippines (8.9 million), Bangladesh (8.4 million), Ukraine (8.1 million), Somalia

(6.8 million), the United Kingdom (6.8 million), Indonesia (6.5 million), Myanmar (6 million), Poland (6.4 million), Afghanistan (6.4 million), etc. As we can observe, the predicted composition of the largest international migrant suppliers includes quite different countries.

According to our forecast, by 2050 the countries with the smallest migration potential will be Brazil, Nigeria, Tanzania, Madagascar and Papua New Guinea, with a share of emigrants from 0.9 to 0.03% relatively to the general population. Among these countries, Nigeria deserves special attention. Regarding this country, fears were expressed that its population would increase by more than double from 2015 to 2050, and in 2050 it would be almost 400 million people who would massively emigrate, thus creating a wave that could absorb not only Europe[17]. However, the previous boom of population growth in Nigeria in 1970-2000 hardly caused an additional impetus to the emigration of Nigerians. The same fairly calm picture until 2050 was also depicted by our forecast. In absolute numbers, in 2015 among international migrants there were 1 million Nigerians, and we forecasted that by 2050 the number of migrants from Nigeria will increase to almost 2.3 million.

The distribution of countries by indicator of the dynamics of migration potential in relation to the number of the population in 2015–2050 as forecasted by the UN is interesting. Six countries in the world are characterised by an increase in the number of emigrants relative to the population more than twice: Southern Sudan (an increase in the percentage of emigrants by three times, from 5% to 16% of the population), Eritrea (an increase that almost tripled from 9% to 28%), Sudan (from 4% to 12%), Serbia (from 9% to 20%), Slovakia (from 6% to 12%) and Cuba (from 12% to 24%). Interestingly, an almost double increase of the share of emigrants is forecasted even for several developed countries: for Spain – from 2.5% to 5%, for Ukraine – from 13 to 23%, and for Poland – from 11% to 19%.

At the same time, it should be noted that according to our forecast, 23 countries are characterised by a decrease in the share of emigrants relative to the population. Among such countries there are many disadvantaged ones, such as Turkmenistan, Tanzania, Rwanda, Kyrgyzstan, Niger, Senegal, Tajikistan and Angola. For the rest, i.e. almost 90 countries, we forecasted a moderate increase in the proportion of emigrants relative to the population of the country – on average by 1.4 times.

Thus the above was a general description of the potential of emigration in the world according to our forecast.

Regarding the potential of receiving immigrants, between 2015 and 2050 there will be 26 countries in the world that will receive more than 1 million immigrants. Among them are (in descending order in the number of immigrants): the United States (almost 35 million), Saudi Arabia and the UAE (16 million), South Africa (9.6 million), Thailand (7 million), Afghanistan (6.4 million), Ethiopia (5.7 million), Uganda (3.9 million), France (3.3 million), Australia (3.1 million), Argentina (3.1 million), the Russian Federation (3 million), Nigeria (2.9 million), Switzerland (2.8 million) and Canada (2.7 million).

Let us now focus on two European countries: Belgium and the Netherlands. As for these countries, we expect not only a significant increase in absolute numbers of immigrants: over the period from 2015 to 2050 we forecasted that more than 2 million people would go to Belgium, and over 2.5 million people would go to the Netherlands; but there would also be a significant increase in the share of immigrants relative to the native population of these countries (from 12% to 27% and from 10% to 24%, respectively). This increase in the proportion of immigrants will be the largest during this period in Europe. In general, by 2050 about 17.3 million immigrants will enter the analysed European countries (with a population of more than 5 million people). This is a significant number, but we should recall that this is only 11% of the total forecasted volume of international migration movement. The total number of international migrants in Europe will be 65.2 million in 2050. According to our forecast, only between 2015 and 2020 a total of 2.7 million of international migrants will arrive in European countries.

According to the forecast, by 2020 there will be only 56 countries characterised by an increase in the number of immigrants relative to their own population, and only a few countries will experience a fairly rapid increase in the share of immigrants: the UAE (an increase of almost 10% from 86% to 97% of its own

population), Saudi Arabia (an increase by 3%), Switzerland, Belgium and Chad (an increase by more than 2%). Several quite different countries, namely Singapore, Afghanistan, South Africa, the Netherlands and Thailand, will be characterised by an increase in the share of immigrants relative to their own population by 1-2%). The rest of the 56 countries will be characterised by a slight increase in the number of immigrants relative to their own population. It is important that, according to the forecast, 62 countries will be characterised by a gradual decrease in the number of immigrants relative to their own population. These countries include Spain and Lebanon.

According to the forecast, by the end of the 2015–2030 period only 50 countries with a growing share of immigrants will remain. Moreover, their composition will change somewhat, e.g. Spain and Lebanon will join the list. Accordingly, 68 countries can be attributed to the list of countries with negative growth in the proportion of immigrants in this period.

For the 2015–2050 period, according to our forecast, we can state the presence of already 70 countries in which the share of immigrants relative to their own population decreased during the specified period. Moreover, an increase in the proportion of immigrants to at least 2% during this period is forecasted only in 23 countries. Among the countries in which the share of immigrants will increase significantly are the following: the UAE (more than double), Saudi Arabia, Switzerland and Singapore (more than 20% growth), Belgium, South Africa, the Netherlands, Thailand and Afghanistan (an increase of 11–15%). Interestingly, despite the alarming forecasts[18], Great Britain in the 2015–2050 period will move to the list of countries with a relative decline in the share of immigrants, i.e. after rising by several tenths of a percentage point by 2030 there will be a decline of several tenths in comparison to the starting level and it will remain at 10.7%).

It should be noted that in some countries, such as Romania or Portugal, the projected increase in the share of immigrants (9.6% and 4.8%, respectively) is not accompanied by a significant increase in the absolute number of immigrants but is more closely related to a decrease in the native population.

The peculiarity of our approach to constructing a model in which each country is viewed both as a potential supplier of migrants and as a potential migrant recipient made it possible to invent some unexpected, at first glance, migration trends that have promising growth prospects. Our forecast shows that, for example, Afghanistan will inevitably gradually become a gravitation site for several million immigrants. According to the forecast, the share of immigrants in Afghanistan will gradually increase from 1% in 2015 to 11% in 2050. In absolute terms, this means an increase in the number of immigrants from 400,000 to 6.8 million. A significant part of these migrants, i.e. over 6 million people, will be emigrants from the neighbouring Pakistan.

The described phenomenon of immigration gravity to Afghanistan suggests that the situation of migratory flows is already backtracking now and will gradually backtrack later from the typical "poor South" – "rich North" model. Moreover, the analysis of forecasts of paired migration between countries shows that migration of "poor countries" -> "poor countries with other living conditions" is already happening and will increase. In addition, migration of "poor countries" -> "average countries" and "average countries" -> "rich countries" will continue to increase. Also, separate lines of migration are emerging and gradually growing, e.g. "average countries" -> "average countries with other living conditions" and "rich countries" -> "average and rich countries with different living conditions". This conclusion fully corresponds with the results of the research of C. R. Parsons, R. Skeldon, T. L. Walmsley and L. A. Winters[19].

The forecasting results in high and low predictive scenarios of the United Nations, in general terms, repeat the forecast described by us in the middle scenario. At the same time, there is a slightly different amplitude of the predicted values in the world and in individual countries.

In the world, according to the high scenario, by 2030 the estimated number of international migrants will be almost 256 million people. In 2050 the number of international migrants will reach 353 million. In the percentage of the total population of Earth in accordance with the high scenario of the United Nations the

share of migrants will be 2.9% in 2030, and by 2050 it will increase to 3.3%, i.e. in percentage points it is even slightly less than in the medium scenario.

According to the low scenario, by 2030 the estimated number of international migrants will be 253 million people. In 2050 the number of international migrants will reach 336 million. In the percentage of the total population of Earth in accordance with the low UN scenario the share of migrants will be 3.1% in 2030, and it will increase to 3.9% by 2050. Thus in percentage points it is slightly more than in the medium scenario.

Consequently, we can state that the construction of a forecast of migration potentials based on all three UN population scenarios is residual and uninformative. For medium-term forecasting purposes it is enough to rely on the medium scenario.

It should be noted that our forecast indicates a large discrepancy between the number of actual migrants and those who wish or would like to emigrate. Thus, out of the 700 million people who, according to the study by Gallup Inc.[20] would like to migrate, more than three quarters, according to our forecast by 2050, will remain in the homeland.

In the process of constructing the model and its verification it was found that, despite the fact that 118 countries cover more than 97% of the Earth's population, the aggregate number of migrants of all paired migration relations of these countries by 2015 will be about 80% of the total international stock of migrants. Similarly, based on the data of the early 2000s, the contribution of the 118 analysed countries to the total migration flows in the world is more than 80% of the total number of migrants in the world in this period. The positive point is that according to the 1990-2015 data, migratory flows in the system we chose of 118 countries constantly covered about 80% of all migratory flows in the world. Consequently, the proposed model is capable of adequately reflecting the overall increase in the volumes of international migrants in the world with an appropriate correction. But, it turns out, that totality of more than 100 small countries has a significant 20% contribution to the global distribution of migration flows. Thus one of the important directions of further improvement of the proposed model is to include all 232 countries of the world into the analysis and system of forecasting.

Undoubtedly, any forecasting has its weak points. In our case, we may indicate the following weaknesses: when constructing the forecast, the shortcomings of the existing scenarios of demographic development are reproduced; it is impossible to take into account the influence of the catastrophic events called by Nicholas Taleb "black swans"; the accuracy of the model forecast decreases with distancing from the starting point.

Consequently, the forecasts constructed based on our model lay the grounds for medium- and long-term forecasting of the volumes and directions of illegal migration, as it is obvious and almost commonly accepted that illegal migration is well correlated with the size of existing diasporas.

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Kino, emigracja i On

Z Marianem Marzyńskim rozmawia Iwona Demska

ROZMOWA

Proszę powiedzieć coś o korzeniach rodziców, skąd pochodzili mama, tata, może dziadkowie, jak daleko sięga pamięć historyczna pana rodziny?

Urodziłem się 12 kwietnia 1937 roku w Warszawie, w klinice położniczej, która była własnością wuja mojej matki, słynnego warszawskiego pediatry dra Jana Przedborskiego. Rodzina Przedborskich i Hermanów była od strony matki, pochodzili z Łodzi i z Łęczycy. Pradziadek Przedborski był jednym z niewielu Żydów, którzy mieli prawo posiadania ziemi i był dziedzicem w Kucharach. Dziadek był z zawodu ekonomistą, zajmował się też biznesem, ponieważ odziedziczył po Hermanach drukarnię w Łęczycy, jak również sklep, jak to się wówczas nazywało, win i wódek. Przedborscy nie uprawiali religii, mimo że dziadek Przedborski był przedstawicielem społeczności żydowskiej w radzie miejskiej w Łęczycy i reprezentował Żydów, również tych religijnych. Mieli do niego zaufanie, ale wiedzieli że on do synagogi nie chodzi. Dziadkowie stawiali świece w oknach, żeby przechodzącym ludziom się wydawało, że jest tam szabes.

Matka poznała w Łęczycy Borysa Kusznera, syna dentysty. Jego ojciec miał praktykę na rynku i był religijnym syjonistą, ale dzieci odeszły od wiary. Rodzina Kusznerów pochodziła ze Stołpców, przy przedwojennej granicy rosyjskiej. Patriarcha rodu był piekarzem. Miał jedenaścioro dzieci. Przy tak licznej rodzinie trudno, by każde z dzieci odniosło sukces, zwłaszcza w małym mieście. Ale pojawił się zdolniacha - mój dziadek Markus, który jako jedyny z tej całej rodziny wyjechał do Saratowa, do Rosji, zdobył wyższe wykształcenie i został dentystą w Łęczycy.

Żeby zrobić przyjemność Kusznerom, w roku 1930 moi rodzice wzięli ślub w synagodze. Jednak największym aktem niesubordynacji mojego ojca, który był lewicowcem i internacjonalistą dalekim od religii, było to, że na przekór rodzicom postanowił nie obrzezać mnie w 1937 roku. Było to zdarzeniem niesłychanym, bo nawet niereligijni Żydzi czuli się w obowiązku obrzezania swoich synów jako symbolu przynależności do wspólnoty. Mój ojciec przewidywał zagładę Żydów i kto wie czy nie dzięki temu pozostałem przy życiu.

Najwcześniejsze dzieciństwo przypada na czas wojny. Co Pan zapamiętał?

W 1939 roku pamiętam dźwięk syren na moście Poniatowskiego i naloty na Warszawę i jak we mgle, matkę bardzo szybko biegnącą z moim