SOCIAL SCIENCES

MODELING THE MIGRATION OF UKRAINIANS TO STUDY ABROAD

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Abstract. The dynamics of the number of Ukrainians studying abroad in 2008–2016 has been analyzed. The projected models of these indicators for 2016–2019 for the eight countries of Western Europe, seven of Eastern Europe, five of North Europe, five of Southern Europe, four of partly European, two of North America and one of Australia and Oceania have been constructed. The forecast of the total indicator of Ukrainian students in the 32 countries of the world is forecast.

Keywords: international academic mobility, educational migration, countries of the world, forecasting models, trend lines.

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Introduction

Recently more and more Ukrainian school graduates go to study abroad at higher educational institutions. This is due to the positive reputation and authority of foreign universities, the high quality of studies, the corresponding prices to it (sometimes lower than in Ukraine), good living conditions, the developed infrastructure of universities, the desire to learn foreign languages in the language environment of its natural carriers, the opportunity to see the world, expand the horizons, acquire new acquaintances, find a job and much more.

In addition, the lions of foreign students abroad are replenished by domestic students who, during their studies in Ukrainian universities, take part in various international exchange programs, double diplomas, etc. The regulation of such activities takes place through a number of regulatory acts. In particular, the Law of Ukraine «On Higher Education» deals with the following:

1) persons studying in higher education institutions are entitled to: ... academic mobility, including international (Article 62);
2) academic mobility – the opportunity for participants in the educational process to study, teach, practice or pursue scientific activities in another institution of higher education (scientific institution) on the territory of Ukraine or abroad (Article 1);
3) the central executive body in the field of education and science: ... develops a provision on the procedure for exercising the right to academic mobility and submits it for approval by the Cabinet of Ministers of Ukraine (Article 13);
4) applicants for higher education, who exercise the right to academic mobility, while studying, practice or pursuing scientific activity in another institution of higher education (scientific institution) on the territory of Ukraine or abroad, it is guaranteed the preservation of the place of study and the payment of scholarships in accordance with the provision on the
procedure for implementing the right to academic mobility. Such persons are not deductible from the composition of applicants for higher education (Article 46);

5) in order to create conditions for international academic mobility, a higher education institution has the right to decide on the teaching of one or more disciplines in English and/or other foreign languages, while ensuring knowledge of the relevant discipline in the state language by the students of higher education (Article 48);

6) in order to develop international cooperation in the field of higher education and integrate the higher education system into the world educational space, the state promotes: the harmonization of the National qualifications framework with the framework of qualifications of the European higher education area for the provision of academic and professional mobility and lifelong learning; cooperation with the European network of national information centers on academic mobility and recognition (Article 74).

In the position of the Cabinet of Ministers of Ukraine «On the Procedure for Implementation of the Right to Academic Mobility», which was mentioned earlier, international academic mobility is defined as academic mobility, the right to which is implemented by domestic participants in the educational process in higher educational institutions (scientific institutions) – partners outside Ukraine, and also foreign participants in the educational process in domestic higher educational institutions (scientific institutions).

At the same time, Article 75 of the Law «On Higher Education» states, that the main directions of international cooperation of institutions of higher education, among other things, are:

– participation in programs of bilateral and multilateral intergovernmental and inter-university exchange of students, post-graduate students, doctoral students, pedagogical, scientific-pedagogical and scientific workers;

– sending people studying in higher education institutions of Ukraine to study abroad at higher education institutions;

– promotion of academic mobility of scientific, scientific-pedagogical workers and persons studying, etc.

As you can see, Ukrainian citizens can participate in horizontal academic mobility – studying for a limited period at a foreign institution of higher education, and in the vertical one – to take a full course of study abroad, if they are attracted by the quality and price of educational services provided by local educational institutions.

Issues of educational migration were highlighted in the writings of such Ukrainian scholars, as O. S. Grinkevich, L. A. Zhurakovska, V. I. Kutsenko, N. P. Rudenko, L. K. Semiv, V. M. Cherba, G. D. Tobol, D. V. Mushkatoriova and others. In particular, they investigated the institutional environment and trends of state regulation of educational migration in Ukraine and the world (Grinkevich, 2013), the trends of educational migration in the context of globalization of economic development (Zhurakovska, 2014), socio-economic and professional aspects of educational migration (Kutsenko et al., 2010), educational migration as a factor in the development of territorial migration systems in the national and European context (Semiv, 2013), the causes of educational migration of Ukrainian students abroad (Cherba et al., 2017). In addition, analytical researches in this area were carried out by analytical center CEDOS. But a comprehensive prediction study of educational migration of Ukrainians abroad with the use of mathematical apparatus was not implemented. Our article is intended to fill this gap.

The aim of the study is to build predictive models of Ukrainian migration for studying abroad. Since the State statistics service of Ukraine does not keep records of Ukrainian
citizens, who are educated abroad, the necessary statistics for 2008–2016 we will take in one of the publications (Stadniy, 2017). In particular, we will analyze the available there information on the number of Ukrainian students in full-time study in 32 countries of the world, mostly European:

1) Western Europe (8): Austria, Belgium, France, Germany, Ireland, Netherlands, Switzerland, United Kingdom;
2) Eastern Europe (7): Belarus, Bulgaria, Czech Republic, Hungary, Moldova, Poland, Slovakia;
3) Northern Europe (5): Estonia, Finland, Latvia, Lithuania, Sweden;
4) Southern Europe (5): Croatia, Italy, Serbia, Slovenia, Spain;
5) partially European (4): Azerbaijan, Georgia, Russia, Turkey;
6) North America (2): Canada, USA;
7) Australia and Oceania (1): Australia.

As the analysis of the actual data from the table 1 (columns 1–10) shows, the most popular among Ukrainian students are countries, such as Austria, Canada, Czech Republic, France, Germany, Hungary, Italy, Poland, Russia, Spain, USA. After all, in recent years in each of them more than 1 thousand Ukrainian citizens studied. Moreover, the share of Poland (45,53 %), Germany (13,77 %) and Russia (10,51 %) in 2015–2016 were highest, indicating these countries as leaders of Ukrainian studies. The least attractive from the point of view of Ukrainians is Azerbaijan, Croatia, Georgia, Ireland, Serbia, Slovenia, where in recent years less, than 50 people from Ukraine studied. And in Serbia this indicator in the last year stopped at 0.

To get the forecast data of educational migration, first we will construct for each country and the total number of students of Ukrainians abroad five trend lines:

1) exponential: \( y = a_0 e^{a_1 x} \);
2) linear: \( y = a_0 + a_1 x \);
3) logarithmic: \( y = a_0 + a_1 \ln(x) \);
4) polynomial (power = 2): \( y = a_0 + a_1 x + a_2 x^2 \);
5) power: \( y = a_0 x^{a_1} \).

Of these, let’s leave one, that has the greatest value of the accuracy of the approximation \( R^2 \). The resulting forecasting models will look like this:

1) Australia: \( y_1=2,8512x^2-9,2444x+60,018 \) (\( R^2=0,9592 \));
2) Austria: \( y_2=-0,8274x^2+125,6x+627,77 \) (\( R^2=0,9846 \));
3) Azerbaijan: \( y_3=8,1681x^{0,5651} \) (\( R^2=0,398 \));
4) Belarus: \( y_4=5,381x^2-39,095x+236,46 \) (\( R^2=0,741 \));
5) Belgium: \( y_5=-2,5714x^2+37,167x+64,321 \) (\( R^2=0,9343 \));
6) Bulgaria: \( y_6=2,3155x^2+21,435x+247,62 \) (\( R^2=0,998 \));
7) Canada: \( y_7=27,387x^2+58,649x+638,34 \) (\( R^2=0,9924 \));
8) Croatia: \( y_8=-0,3512x^2+4,5536x-2,4107 \) (\( R^2=0,9054 \));
9) Czech Republic: \( y_9=10,661x^2+89,994x+915,8 \) (\( R^2=0,972 \));
10) Estonia: \( y_{10}=5,4345x^2-38,256x+170,45 \) (\( R^2=0,8497 \));
11) Finland: \( y_{11}=114,82x^{0,1988} \) (\( R^2=0,5194 \));
12) France: \( y_{12}=-3,1071x^2+17,631x+1368,4 \) (\( R^2=0,1945 \));
13) Georgia: \( y_{13}=1,0119x^2-6,7976x+17,286 \) (\( R^2=0,6267 \));
14) Germany: \( y_{14}=13x^2+10,19x+8151,9 \) (\( R^2=0,9843 \));
### Table 1

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15) Hungary: \( y_{15} = 12.185x^2 - 88.363x + 960.55 \) \( (R^2=0.6847) \);
16) Ireland: \( y_{16} = 0.5298x^2 - 3.9464x + 19.375 \) \( (R^2=0.4173) \);
17) Italy: \( y_{17} = -4.5238x^2 + 261.33x + 549.61 \) \( (R^2=0.9963) \);
18) Latvia: \( y_{18} = 101.06x^{0.4464} \) \( (R^2=0.4682) \);
19) Lithuania: \( y_{19} = 5.4583x^2 - 16.137x + 113.55 \) \( (R^2=0.8676) \);
20) Moldova: \( y_{20} = 3.3155x^2 - 46.565x + 311.62 \) \( (R^2=0.9358) \);
21) Netherlands: \( y_{21} = 1.7202x^2 - 6.0893x + 90.911 \) \( (R^2=0.9626) \);
22) Poland: \( y_{22} = 697.86x^2 - 2463.4x + 5161.9 \) \( (R^2=0.9964) \);
23) Russia: \( y_{23} = 83.024x^2 - 306.74x + 3714.7 \) \( (R^2=0.5836) \);
24) Serbia: \( y_{24} = -0.0536x^2 - 0.2679x + 8.9464 \) \( (R^2=0.2682) \);
25) Slovakia: \( y_{25} = 22.286x^2 - 128.4x + 226.79 \) \( (R^2=0.9409) \);
26) Slovenia: \( y_{26} = 9.3692x^{0.6681} \) \( (R^2=0.946) \);
27) Spain: \( y_{27} = -9.4226x^2 + 249.58x + 248.55 \) \( (R^2=0.9829) \);
28) Sweden: \( y_{28} = -12.375x^2 + 82.625x + 202.62 \) \( (R^2=0.5979) \);
29) Switzerland: \( y_{29} = 0.2321x^2 + 9.0417x + 239.52 \) \( (R^2=0.948) \);
30) Turkey: \( y_{30} = 6.2798x^2 - 15.387x + 207.23 \) \( (R^2=0.9762) \);
31) United Kingdom: \( y_{31} = -5.506x^2 + 121.64x + 237.41 \) \( (R^2=0.9578) \);
32) USA: \( y_{32} = 16.571x^2 - 167.4x + 1924 \) \( (R^2=0.8224) \);
33) total: \( y_{33} = 873.52x^2 - 2173.2x + 26910 \) \( (R^2=0.9892) \).

It should be noted, that among the 33 received trend lines, four were power (for Azerbaijan, Finland, Latvia, Slovenia), 29 – polynomials (for the remaining 28 countries and the general indicator). The accuracy of the approximation \( R^2 \) was different and fell into the following ranges:

- > 0.9 – for 18 countries and the total (Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Germany, Italy, Moldova, the Netherlands, Poland, Slovakia, Slovenia, Spain, Switzerland, Turkey, United Kingdom);
- > 0.8 – for three countries (Estonia, Lithuania, USA);
- > 0.7 – for one country (Belarus);
- > 0.6 – for two countries (Georgia, Hungary);
- > 0.5 – for three countries (Finland, Russia, Sweden);
- > 0.4 – for two countries (Ireland, Latvia);
- > 0.3 – for one country (Azerbaijan);
- > 0.2 – for one country (Serbia);
- > 0.1 – for one country (France).

As we can see, for most countries, the parameter \( R^2 \) was close to one, which indicates a stable dynamics of indicators and the adequacy of constructed forecast models.

Based on the received trend lines, we will form forecasts for 2016–2019 (last three columns in table 1).

Conclusions and suggestions

The analysis of the forecast data shows, that in 27 countries the number of Ukrainian students is expected to increase. In addition, the total indicator of educational migration from Ukraine will grow, which will amount to 78106 people in 2016–2017, 92530 – in 2017–2018 and 108701 – in 2018–2019, respectively. A decrease in the presence of Ukrainians will be observed only in higher education in Belgium, Croatia, France, Serbia and Sweden. In other words, educational migration from Ukraine in the coming years will increase its turn.
this situation, it is advisable for domestic higher educational institutions to improve the efficiency of their vocational guidance work, the quality of teaching disciplines, review pricing policies, develop infrastructure, strengthen cooperation in terms of participation in bilateral and multilateral student exchange programs, promote their international academic mobility, etc. As for further research in this area, they can be carried out with the expansion of the number of analyzed countries.

References