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**MULTIDIMENSIONAL ANALYSIS
OF FACTORS AFFECTING CHANGES
IN POPULATION OF PEOPLE IN THE EUROPEAN
UNION STATES IN TERMS
OF SOCIAL SECURITY IN POLAND**

Abstract

The multidimensional comparative analysis of factors influencing the change in the human population in selected European countries in terms of social security in Poland was conducted in the study. The highest population growth between 2013-2022 out of 31 European countries analysed was recorded in Germany (2,713,378), France (2,271,575) and Sweden (896,433). During that period, a decrease of 408,288 people was recorded in Poland. The main factors influencing changes, especially population declines, include the negative difference between human births and deaths. Another factor was the increase in the arithmetic mean of age of women at the birth of their first child. However, the development of social security in Poland has been influenced by the migration of refugees from Ukraine to Poland since 2022.

Keywords: European Union, borders, migration, security, social security

Introduction

The study presents the following problem for researchers: what factors influence changes in the human population in selected European Union countries in terms of social security in Poland? For the research problem adopted, the purpose of the research was indicated - it is an attempt to conduct a multidimensional comparative analysis of changes

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in the human population in selected European countries in terms of social security in Poland.

The research problem and the aim of the work adopted at the beginning allowed the authors to outline a research hypothesis: it is assumed that the migration of refugees from Ukraine will have an impact on the change in the size of the population in Poland in the future. Analyses and comparisons were used as research methods in the study.

Analysis of the literature on the research subject

Security¹ is a term that should be considered in many aspects in view of the current challenges facing the European Union countries. It is related to the state that gives a sense of survival in terms of providing needs which are considered quantitatively, in terms of value, as well as in other dimensions, e.g. spiritual, according to the existing situations dynamically. One type of security is the social one. It refers to the state and process related to the guarantee of survival, prosperity and sustainable development of society².

The European Union is an economic and political union of 27 democratic European countries, with a registered population of 448,387, 872 in 2023. The country with the largest population is Germany: 84,358,845 inhabitants. France is in the second place (68,070,697) and Italy is in the third place (58,851,717)³. Malta ranks last with 542,051 people. Poland ranks fifth in this ranking with a population of 36,753,736 inhabitants. The EU unemployment rate in 2022 was 6,2 percent and the inflation rate was 9,2⁴. In the same year, 193,5 million people aged 20 to 64 were

¹ G. Mizura, S. Mitkow, B. Kozicki, *Planowanie potencjału osobowego Sił Zbrojnych Rzeczypospolitej Polskiej w obliczu aktualnych wyzwań bezpieczeństwa militarnego*, Warszawa 2023, pp. 13-19; S. Mitkow, J. Tomaszewski, B. Kozicki, *Bezpieczeństwo militarne a potencjał osobowy Sił Zbrojnych RP*, Warszawa 2021, pp. 11-29. See: B. Błaszczak [et al.], *The Forecasting of Transportation of People by Rail in Poland for 2024 in Terms of Economic Security in the Republic of Poland*, "Journal of Security and Sustainability Issues", 2023, Vol. 13, Issue 1, pp. 426-436.

² M. Jurgilewicz, *Legal safety of the Republic of Poland*, "Journal of Security and Sustainability Issues", March 2020, Vol. 9, pp. 869-875.

³ *Fakty i liczby dotyczące życia w Unii Europejskiej*, European Union, <https://european-union.europa.eu> (09.02.2024).

⁴ *Eurostat – statystyki dotyczące migracji do Europy*, European Commission, <https://commission.europa.eu> (9.02.2024).

employed in the European Union labour market, including 9,93 million from outside the EU⁵.

When referring to people from outside the EU, attention should be paid to people crossing its borders illegally. Between January and September, 281,872 people crossed EU borders illegally⁶. Since February 2022, European countries have accepted the largest number of refugees since the end of World War II - those fleeing Ukraine as a result of the attack by the Russian Federation. At the end of 2021, about 10 percent of all the world's refugees lived in the European Union, and by the end of 2022 their number increased to 20 percent⁷.

In 2022, approximately 3.4 million first residence permits were issued in the European Union, and in the same period in 2021, approximately 2.9 million. The most common reason for permits in 2022 compared to 2021 (an increase of 60 percent of the total) was the asylum. Another factor was education - an increase of 29 percent was observed - and family: by 28 percent in the analysed periods.

It should be emphasized that the largest number of residence permits were granted to Ukrainian citizens in 2021 and 2022. In 2021, 873,493 were issued, and in 2022 approximately 840,064.

The COVID-19 pandemic⁸ and the war between Russia and Ukraine in Europe have led to the emergence of energy, inflation, food and security crises. The COVID-19 pandemic caused previously unobserved spikes in mortality in respective European countries, commonly known as waves, which appeared especially in the autumn and winter periods. The increase in mortality and the risk of contracting the disease, especially in 2020, led to huge declines in respective sectors of the economies of European Union countries. The first sector to be most affected by the COVID-19 pandemic was air passenger transport⁹. Then, the phenomenon of a "cascading crisis situation" was observed, i.e. causing

⁵ *Ibidem*.

⁶ *Ibidem*.

⁷ *Ibidem*.

⁸ N. Zhu [et al.], *A Novel Coronavirus from Patients with Pneumonia in China*, "New England Journal of Medicine", 2020; E. Satomi [et al.], *Alocação justa de recursos de saúde escassos diante da pandemia de COVID-19*, "Considerações éticas. Einstein", 2020, vol. 18, pp. 1-5; B. Kozicki, S. Mitkow, *Analysis of Human Deaths in Regard to Covid-19 Pandemic in European Countries*, "European Research Studies Journal", 2020, Volume XXIII, Special Issue 3, pp. 213-227. See: B. Błaszczak [et al.], *Temporary Protection of Ukrainian Citizens – Selected Issues*, "Journal of Security and Sustainability Issues", 2023, Vol. 13, Issue 1, pp. 415-426.

⁹ *Idem* [et al.], *Safety in unmanned transport in armed conflicts*, "Journal of Sustainable Development of Transport and Logistics", 2023, vol 8, pp. 239-248.

large deviations in the values of various variables in other sectors of the economy. The direct causes of that phenomenon were the pandemic and attack of Russia on Ukraine¹⁰.

The abovementioned phenomena, especially in terms of the war between Russia and Ukraine, may in the coming years result in the risk of recession, debt, disinformation and fake news, weakening of activities aimed at mitigating climate change, as well as widespread geoeconomic rivalry¹¹. The EU brings together technologically and economically strong countries, and its area is approximately 4 million km². Due to the great threat to the European Union posed by the Russian-Ukrainian war, the research focused on Poland, a country that plays a significant role in that conflict. When analysing Poland as one of the EU countries, essential information regarding its borders should be indicated. The Polish border should be analysed in many aspects: as the total length of the entire Polish border, and as the border of the European Union and as specific sections of borders with neighbouring countries.

Due to the war between Russia and Ukraine, which has been ongoing since 2022 and the real threat of an attack on Poland from the Russian Federation, the Polish economy will face many challenges related to exports, imports, education, the labour market, inflation and unemployment. The observation of the European Union economy indicates that in 2023 there was a visible revival of trade, which has a positive impact on the future related to the level of exports and imports of the Polish economic sector. The abovementioned phenomena have a direct impact on the level of social security in the Republic of Poland.

Multidimensional comparative analysis of population changes in Europe

The research began with the analysis of data on the human population in 31 European countries between 2013-2022 (Fig. 1).

¹⁰ B. Kozicki, *Model planowania potrzeb Sił Zbrojnych RP wobec aktualnych wyzwań bezpieczeństwa narodowego w XXI wieku*, Warszawa 2020, p. 36.

¹¹ P. Skwirowski, *Długa lista zagrożeń dla świata w 2023 roku*, Rzeczpospolita, <https://www.rp.pl> (10.02.2024).

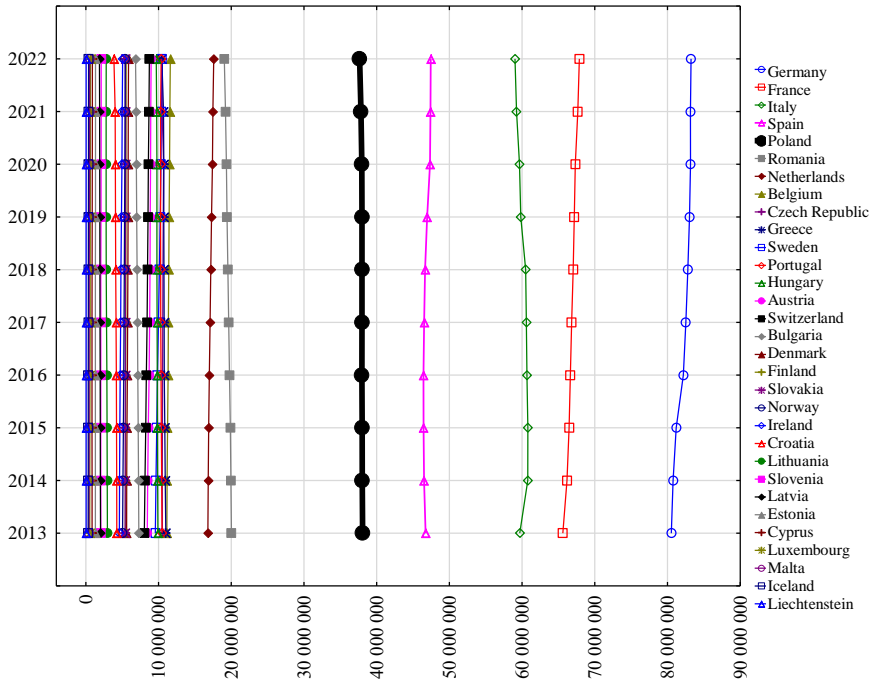


Figure 1. Line chart of human population data in 31 European countries between 2013-2022

Source: own study based on: *Population on 1 January by age and sex*, European Commission, <https://ec.europa.eu> (15.12.2023).

The data presented in Figure 1 shows that out of the 31 European countries considered, only six have a population exceeding 20 million. In the remaining countries analysed, the population oscillates around 10 million, including 19 of those countries below that level. The analyses conducted show that between 2013-2022, in 21 out of the 31 European countries considered, there was an increase in population, and in the remaining ten there was a decrease. The largest increases were recorded in Germany (2,713,378), France (2,271,575) and Sweden (896,433). However, the largest declines occurred in Romania (-977,619), Italy (-655,094) and Greece (-543,833). In Poland, a decrease in the number of people was observed between 2013-2022 amounting to -408,288.

The next stage of the research was a multidimensional comparative analysis of changes in the size of the human population in 31 European countries between 2013 and 2022. The results are presented in Figure 2.

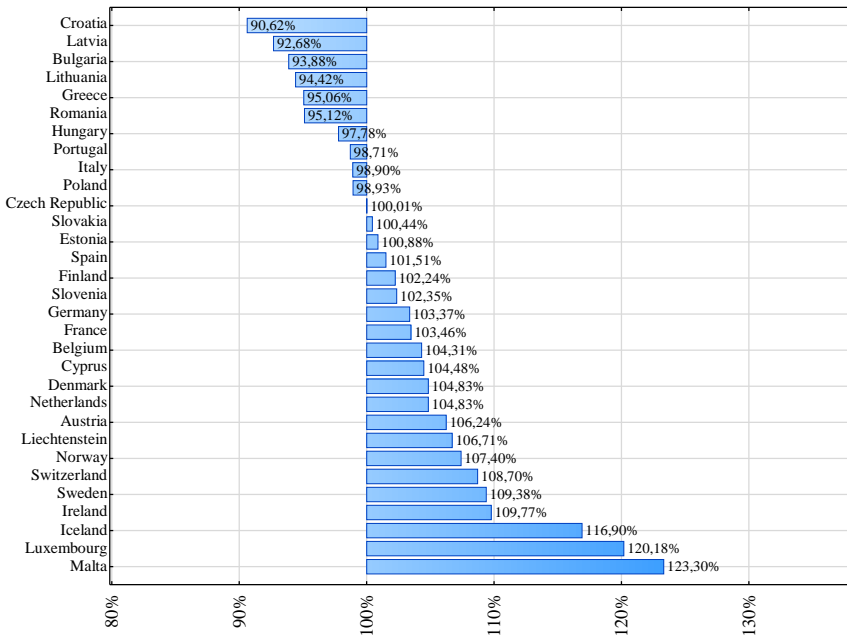


Figure 2. Multidimensional comparative analysis of human population changes using dynamics indices on a constant base in 31 European countries between 2013 and 2022

Source: own study based on: *Population on 1 January by age and sex*, European Commission, <https://ec.europa.eu> (15.12.2023).

The analysis conducted (Fig. 2) shows that in twenty-one out of thirty-one European countries considered between 2013 and 2022, an increase in population was observed. The remaining ten countries show declines. The largest increases, when analysing dynamics indices on a constant base, where the constant was the number of people in respective 31 European countries in 2013, were recorded in Malta: by 23.30 p.p., then in Luxembourg (20.18 p.p.) and Iceland (16.90 p.p.). However, the largest declines were observed in Croatia: by 9.38 p.p. Poland took the 21st place in the ranking of population changes with a decrease of 1.07 p.p.

Then, data concerning the arithmetic mean of life expectancy in 30 European countries between 2011-2022 was analysed. The research results are summarized in Figure 3.

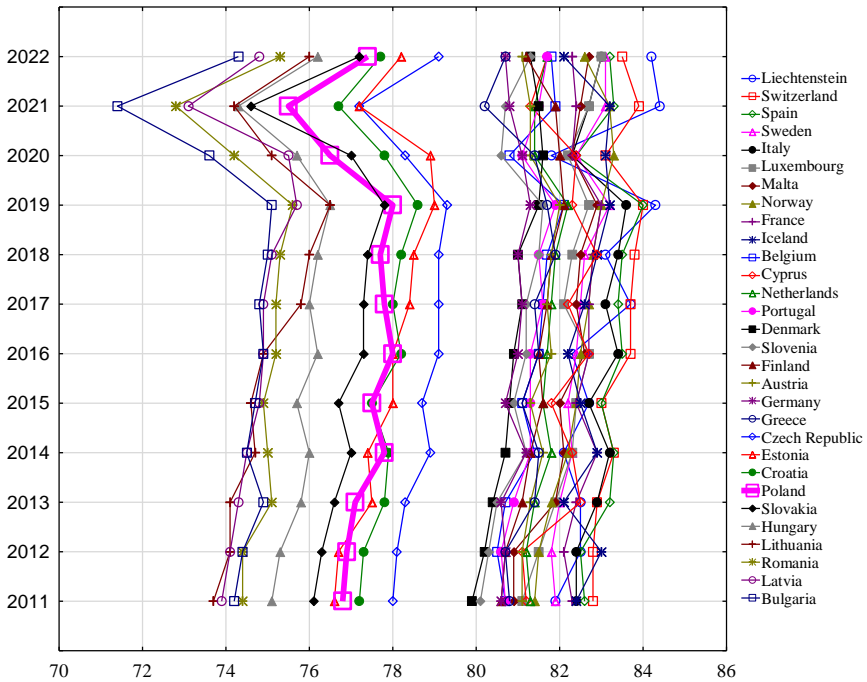


Figure 3. Line chart of life expectancy data in 30 European countries between 2011-2022

Source: own study based on: *Life expectancy at birth by sex*, European Commission, <https://ec.europa.eu> (15.12.2023).

Among the thirty analysed European countries, Poland is in 24th place in the ranking of arithmetic mean of life expectancy: 77.25 years old. Switzerland takes the first place (83.375). Next places: Spain (83.158) and Liechtenstein (82.958). Bulgaria has the lowest result in the ranking (74.316). In twenty out of the thirty European countries analysed, the arithmetic mean of life expectancy exceeded 80 years old. In the remaining ten it is lower. An important observation is the decrease in life expectancy in most of the analysed European countries in 2020 and 2021 caused by the impact of the COVID-19 pandemic.

Life expectancy in every country is extremely important because it affects many issues. What is crucial in terms of the functioning of the state is that every citizen pays taxes, which, as a result, is related to the size of the budget. The longer one lives, the longer one has to pay taxes. Life expectancy also has a direct impact on the number of pensioners and people who, at a certain age, no longer contribute to the workforce of their country and who need to be paid wages. The next stage of the

research will be the analysis of data on the number of births and deaths in respective European countries in 2021 (Fig. 4).

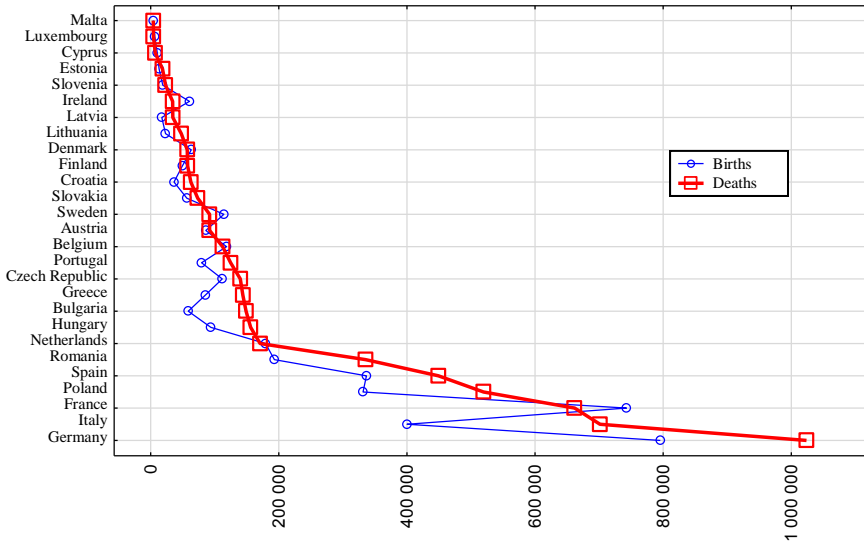


Figure 4. Line chart of the number of births and deaths in European countries in 2021

Source: own study based on: *Live births (total) by month*, European Commission, <https://ec.europa.eu> (15.12.2023); *Deaths (total) by month*, European Commission, <https://ec.europa.eu> (15.12.2023).

The analysis shows that the most people of the 27 European countries in 2021 lost their lives in Italy: approximately 301,097, followed by Germany (228,195) and Poland (188,006). The increase in 2021 was recorded in nine countries. France was the leader, with an increase of 80,823 people. Then, the data was examined on the arithmetic mean of women's age at the birth of their first child in 31 analysed European countries between 2010-2021.

The data presented in Figure 5 shows that in all 31 European countries analysed, from 2010 to 2021, the arithmetic mean of women's age at the birth of their first child increased by approximately 1.2 years and amounts to 31.1 years old. It appeared to be longest in Portugal (2 years), Estonia (1.8) and Greece (1.7). Least in Slovakia: by 0.3 years. In 2021, the highest arithmetic mean of women's age at the birth of their first child was in Ireland at 32.7 years old, followed by Spain (32.6) and Luxembourg (32.5). The lowest arithmetic mean was recorded in Bulgaria (27.9), and Poland took 28th place (29.9).

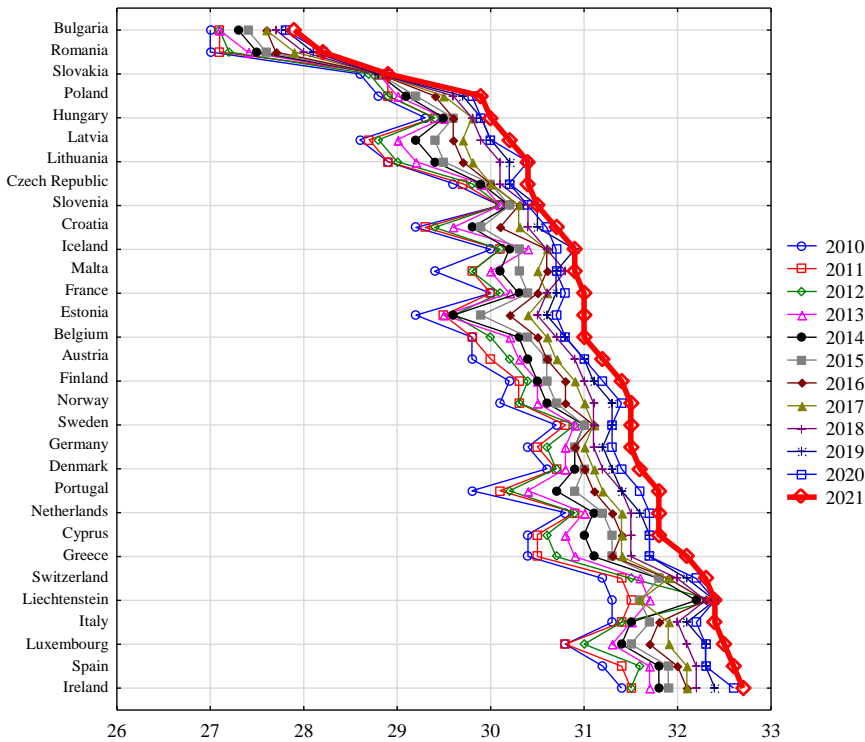


Figure 5. Line chart of the average age of women at the birth of their first child in the 31 analysed European countries between 2010-2021

Source: own study based on: *Mean age of women at childbirth and at birth of first child*, European Commission, <https://ec.europa.eu> (15.12.2023); *Deaths (total) by month*, European Commission, <https://ec.europa.eu> (15.12.2023).

Then, the phenomenon of migration of people from Ukraine to the Republic of Poland from January 2022 to December 2023 was examined. The results are summarized in Figure 6.

Analyses show that from January to March 2022, the largest differences were visible between the arrival and departure of people from Ukraine to the Republic of Poland. In the remaining months, the two variables under consideration showed values close to each other and of an uneven oscillatory nature. Observations also show that the highest values of arrivals and departures of people from Ukraine to Poland occur in the same months from July to September (excluding the period from January to March 2022). In 2022, 19,619,119 migrants from Ukraine came to Poland, and 17,722,640 left. However, in 2023, 21,316,060 arrived and 21,480,114 departed.

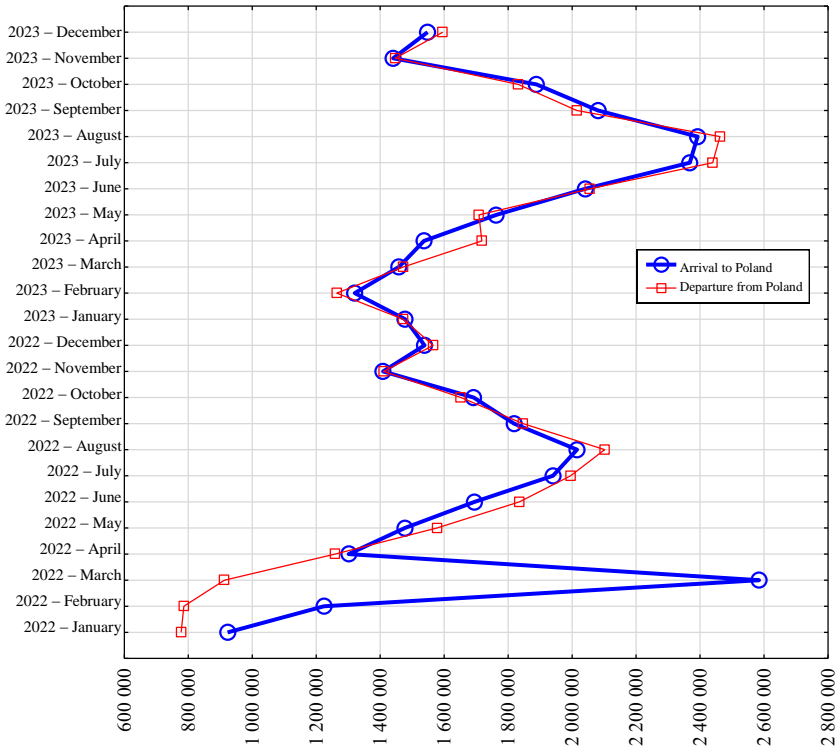


Figure 6. Line chart of arrivals of Ukrainian citizens in Poland and their departures from Poland to Ukraine from January 2022 to December 2023

Source: own study based on: *Dane statystyczne dotyczące sytuacji na granicy z Ukrainą*, Gov.pl, <https://gov.pl> (15.12.2023).

Conclusions

Analyses show that in six out of the thirty-one countries analysed the population exceeds 20 million. In the remaining countries analysed, their population oscillates around 10 million, including 19 below this level. Between 2013 and 2014, population increases were observed in ten European countries. The remaining ten show declines. The largest increases were observed in Malta (an increase of 23.30 pp), followed by Luxembourg (20.18 pp) and Iceland (16.90 pp).

One of the most key factors influencing the population decline in the analysed European countries is the difference between births and deaths observed in 2021. The largest declines were recorded in Italy: by 301,097 people, followed by Germany (228,195) and Poland (188,006).

The decline in the human population in Europe is certainly influenced by the increase in the average women's age at the birth of their first child: in the 31 analysed European countries between 2010-2021 by an average of about 1.2 years and amounts to 31.1 years old.

The above factors undoubtedly influence the level of demographic security in Europe, including Poland. Another important aspect regarding Poland is the war between Russia and Ukraine and the huge migration of war refugees. In 2022, 19,619,119 migrants from Ukraine came to Poland, and 17,722,640 left. However, in 2023, 21,316,060 arrived and 21,480,114 left. From 2022 to the end of 2023, 1,732,425 refugees from Ukraine remained in Poland.

This affects various sectors of the economy in Poland. Refugees staying in its area purchase products and pay taxes. Some of them have been employed in enterprises operating in the territory of the Republic of Poland. More and more Ukrainian children attend Polish primary and secondary schools and study at universities. In the future, this may most likely lead to an increase in the population of Poland, as Ukrainian and Polish citizens will marry and have children. Children from those relationships are only part of the future population, it will also be expanded by people who, for example, will stay in Poland after graduation.

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**Wielowymiarowa analiza czynników mających wpływ
na zmiany populacji ludzi w państwach Unii Europejskiej
w aspekcie zapewnienia bezpieczeństwa społecznego Polski**

Streszczenie

W opracowaniu wykonano wielowymiarową analizę porównawczą czynników mających wpływ na zmiany populacji ludzi w wybranych państwach Europy w aspekcie zapewnienia bezpieczeństwa społecznego Polski. Z 31 analizowanych państw europejskich największy wzrost liczby ludności w latach 2013-2022 odnotowano w Niemczech (2 713 378), Francji (2 271 575) i Szwecji (896 433). W tym okresie w Polsce zaewidencjonowano spadek wynoszący 408 288 osób. Do zasadniczych czynników mających wpływ na zmiany, w tym szczególnie spadki populacji, należy ujemna różnica pomiędzy narodzinami a zgonami ludzi. Innym czynnikiem był wzrost średniej arytmetycznej wieku kobiet podczas urodzenia pierwszego dziecka. Z kolei na kształtowanie się bezpieczeństwa społecznego w Polsce ma wpływ migracja uchodźców z Ukrainy do Polski od 2022 roku.

Słowa kluczowe: Unia Europejska, granice, migracja, bezpieczeństwo, bezpieczeństwo społeczne