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# THE IMPACT OF UKRAINIAN MIGRATION FLOWS ON LABOR AND PRODUCT MARKETS IN POLAND

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**ABSTRACT**. The rapid flow of Ukrainian refugees due to the war has created challenges for host countries. Poland ranks second among host nations, with about 1 million forced migrants in 2025. Many have found employment, while others work remotely, seek jobs, retrain, or care for family members. Additionally, the economic crisis and the 2014 war significantly increased labor migration from Ukraine. Even before 2022, Poland employed 2–3 million Ukrainian workers, making them the largest foreign labor group. Since the beginning of the 21st century, Ukrainians have played a key role in the Polish labor market. This study aims to analyze migration from Ukraine to Poland (2014–2023) and assess its impact on labor and product markets' indicators. The methodology includes descriptive and monographic approaches, sociometric methods to process survey results (Nov 2022–Feb 2023[1], May–Oct 2024)[2], and economic-statistical tools based on the Cobb-Douglas production function. The research enables an evaluation of Poland's GDP growth linked to increased human resources in the labor market.

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[2] The 2nd round survey was conducted at the Andrzej Frycz Modrzewski Krakow University, Poland, on the funding from the Scholar Rescue Fund of the Institute of International Education, USA for the Research Project "Socio-demographic Changes in Ukraine Against the Background of the War: Migration Crisis, Challenges and Prospects".

## Introduction

In 2014-2021, Ukrainian migration to Poland based mainly on the labor necessities and was motivated by economic reasons - the need to improve their financial situation. At the same time, migrants filled the labor shortage in the Polish labor market. On February 24, 2022, the Russian Federation launched a full-scale aggression against Ukraine. The overwhelming military power of the Russian aggressor triggered the largest migration wave in Europe in 80 years. In the first few weeks of the war, millions of Ukrainian citizens, mostly women with children, left their homes to seek safe shelter. The majority of refugees chose the countries of Central and Eastern Europe, especially Poland. This was a fairly obvious choice due to geographical proximity, but also the fact that since 2014 Poland has become the main country of Ukrainian migration. By the end of September 2024, over 978,359 people in Poland, and a total of 4.2 million people in the EU countries fleeing Ukraine, had obtained temporary protection status[3] [4]. Since the large-scale military aggression in Ukraine in 2022, when about 1 million forced migrants arrived in Poland, a significant proportion of whom may become additional labor resources. Thus, migration is one of the most important phenomena of the modern world, affecting almost every aspect of social, economic, political and cultural life. The economic consequences of migration extend beyond labour market adjustments to broader fiscal and wage policy dimensions, including the relationship between migration-driven labour supply and minimum wage regulation as a stabilizing mechanism (Lough, 2024). At the same time, as indicated by the literature and practice, population flows lead to a number of social, cultural, financial consequences, challenges and new tasks for the functioning of national and international socio-economic and legal systems (Lesińska, 2014). One of these tasks is to study the extent of the impact of additional labor resources against the background of the migration flow on the labor market and product market in the host country.

It is important to note that according to surveys conducted among migrants from Ukraine, from 29 to 72 percent of working-age migrants are considering the possibility of staying in Poland, which makes them a potential labor resource in the future. Using the Cobb-Douglas production function, the authors in this work attempted to assess the possibilities of Poland's GDP growth due to the development of additional declared labor resources.

*The main objective of the study* is to characterize and analyze migration from Ukraine in 2014-2023 and to investigate the impact of migration flows on changes in labor markets and the potential for GDP growth in Poland. The following specific objectives are subordinate to the main objective:

1. Observation the main forms of migration (section 1);
2. Characteristics of factors determining migration flows from Ukraine in two-time horizons: 2014-2021 and 2022 - 2023 (section 3);
3. Presentation of the activity of migrants from Ukraine on the Polish labor market, including through the establishment of enterprises by 2021 (sections 3-4),
4. Study of the impact of additional labor resources against the background of migration flows on GDP growth in Poland (section 5).

The study was based on thematic literature, statistical data from government agencies and surveys conducted in two rounds, the first in 2022-2023, the second in 2024. Obviously, these sources reflect certain limitations of this study, which are a consequence of the number of responses received, which reduces the possibility of generalizing the results to the entire population of migrants from Ukraine. However, in the context of closed official current

[3] UNHCR data: https://data.unhcr.org/en/documents/details/97720
[4] Eurostat data: https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Temporary_protection_for_persons_fleeing_Ukraine_-_monthly_statistics

statistics on the background of the war from the Ukrainian Statistical Service, this survey made it possible to examine the diversity of attitudes and plans of migrants regarding their participation and plans in the Polish labor market.

The study consists of five substantive parts, preceded by an introduction and a summary in the conclusion at the end of the work. The introductory part emphasizes the relevance of the problem and the main objectives of the study. The first part reviews the literature on the theoretical foundations and definition of migration from the point of view of social sciences. The second part is devoted to the methodological principles of studying the impact of Ukrainian migrants on the Polish economy, as well as a review of the databases used to conduct this study. The third part of the work analyzes the components of the Ukrainian migrants' activities on the Polish labor market. The fourth part presents the professional plans of migrants in the light of a survey that allowed developing assumptions for assessing the potential impact of migrants on Poland's GDP. In the fifth part of the study, a Cobb-Douglas function was constructed for the Polish economy in 2014-2023 and a statistical evaluation of this model was conducted considering the impact of additional labor. Finally, the last section summarizes the analysis and draws conclusions.

## 1. Review of theoretical foundations and definitions of migration from the perspective of social sciences

Migration, as a complex economic, cultural, demographic and political phenomenon, has been the subject of interdisciplinary research for decades, in particular: social, legal, economic and political sciences (Brzozowski & Kaczmarczyk, 2018). In the literature, migration is defined in different ways, depending on the adopted research perspective. This issue is considered, among others, by Pachocka M., Misiuna J. (2014), pointing out the limited possibilities of conducting a comparative analysis of migration processes, especially in an international context.

In the context of this study, references to legal and social sciences – sociology and economics – are particularly important. References to law, primarily public international law, are found in regulatory acts that determine the legal status of migrants, especially in the context of crossing state borders. National legislation, in turn, regulates in detail the rights and obligations of migrants. It also regulates the system of granting asylum in the host country, that is, the rules concerning the rules of residence of migrants in the host countries, as well as the activities of state institutions and possible employment relationships with employers, etc. In the considerations of the social sciences, especially sociology, attention is paid to the motivations and consequences - social, political, economic, religious and cultural - of migration, pointing to changes in social structure, family ties and culture. In economics, the emphasis is on the financial and economic prerequisites and consequences of population flows. In this approach, the motivation for migration is a consequence of the natural desire of individuals to improve their material situation and standard of living.

The economic nature of migration means that the driving force is the search for new income opportunities in other countries due to the lack of opportunities in the home country (Kupets, 2016; Martyniuk et al., 2025; Fialkowska, 2019). The consequence of migration from an individual perspective is an increase in income levels, while the general consequence of migration is a change in the financial situation of society and the equalization of differences in living standards within regions or countries. The impact of migration on the economy as a whole, including the labor market, is described by Wysieńska and Karpiński (2011), who point to two approaches to this issue: macroeconomic and microeconomic. The macroeconomic approach focuses on explaining the impact on average productivity and wage levels of local

workers and immigrants, while the microeconomic approach highlights the benefits and losses in the context of their distribution among all participants in the labor market. The multifaceted impact of population flows depends on the type of migration. The following forms can be distinguished: emigration, immigration, refugee, evacuation, deportation, repatriation. Each form of population movement can be permanent or temporary, and according to legal criteria - legal or illegal. Legal migration occurs in accordance with legal norms and valid documents that allow residence in a given country, while illegal migration occurs without a legal basis. From the point of view of pressure on migration decisions, they are divided into voluntary and forced. Voluntary means that the decision to migrate is the autonomous will of the migrant, while any form of pressure on the decision to migrate means forced migration. Within its framework, we distinguish: involuntary (the decision is imposed, the person is encouraged to migrate) and forced (the migrant has to leave and cannot return to their place of residence) (Kacperska et al., 2019).

In the context of this study, references to the definition of the United Nations Organization for Migration are important. According to this source, migrants are people who decide to leave their country in order to improve their quality of life by finding a better job, school or joining family members[5]. Refugees, in turn, are people fleeing war or persecution. Unlike refugees, migrants can return safely to their permanent place of residence (Termiński, 2016). In the context of migration from Ukraine, we refer to the legal regulations contained in the Act "On External Labor Migration". In the light of the Act, a labor migrant is a citizen of Ukraine who has performed, is performing or will perform labor activities in the host country, which is not prohibited by the legislation of that country. The Act ensures the rights and interests of labor migrants and their family members, regardless of race, political, religious and other beliefs, gender, ethnic and social origin, property status, place of residence, language or other signs and notes the possibility of reintegration into the society of the home country in order to ensure the freedom and democratic values of citizens[6].

Regarding the study of the impact of migration on the labor market, it should be noted that a number of scientific works note the existence of such changes in relation to Ukrainian migrants in Poland. Brücker et al., 2018; Fihel et al., 2020 confirm that Ukrainian migrants significantly affect segments of the Polish labor market, in particular in the construction, agricultural and service sectors. A significant part of the female forced refugees who arrived in Poland after 2022 are employed in the service sector and are actively opening their own businesses. Although it should be noted that according to the study by Strzelecki et al. (2022), Ukrainian workers often perform low-skilled work, which allows the Polish economy to compensate for the shortage of labor in certain sectors. Some studies show the socio-economic consequences of Ukrainian migration to Poland against the backdrop of the Russian-Ukrainian war of 2014-... and study the impact of migration on economic development. According to the Pieńkowski (2020), the presence of Ukrainian migrants contributes to increased consumer demand in Poland, which in turn stimulates the development of the retail and service sectors, but from the other point of side decreases the demand in Ukraine. Eurofound researches (2024) indicates that the massive influx of Ukrainians after the full-scale war of 2022 created additional demand for housing, medical services, and educational resources.

Oliinyk et al. (2021) examined the impact of migration of highly skilled workers on a country's competitiveness and economic growth. The authors note that the loss of human capital can have long-term negative consequences for the economies of source countries, while

[5]*Migrant definition*. (2019). Emergency handbook. UNHCR https://emergency.unhcr.org/protection/legal-framework/migrant-definition

[6] On labor migration abroad. Law of Ukraine. As amended in 2019, 2022, 2023. Information of the Verkhovna Rada of Ukraine. No. 49-50, 20.III.2023. Kyiv. URL: https://zakon.rada.gov.ua/laws/show/761-19#Text [in Ukrainian]

providing benefits for recipient countries such as Poland. Rausser et al. (2018) analyzed the role of migrant remittances in the development of the economies of the Baltic States. Their results show that remittances have a positive impact on the consumer market, exchange rate stability, and the investment climate, which may also be relevant for the Polish economy. Simionescu et al. (2016) investigated the relationship between GDP and net migration in Eastern and Southeastern European countries using panel data and Bayesian estimation methods. Similarly, analysis of circular economy transitions and sustainable development trajectories in new EU member states confirms that labour mobility and migration dynamics are embedded within broader structural economic change in the Central and Eastern European region (Simionescu, 2023). Their analysis shows a significant correlation between economic growth and the level of migration, confirming the importance of labor mobility in regional economic development. Similar findings are obtained by Mishchuk et al. (2025), Tutar et al. (2024).

On the other hand, Krason-Kopaniazh S. (2025) points to potential risks, including displacement of local workers and increased pressure on the social security system. Other research in this direction also stresses shocks to local labor markets caused by migration (Tutar et al., 2025) and emphasizes appropriate state policy towards migration (Kochaniak et al., 2024). The analyzed sources demonstrate that Ukrainian migration flows have a multifaceted impact on the Polish economy. They contribute to the development of the labor market and the consumer sector, but at the same time create challenges related to social integration and the regulation of labor relations.

## 2. Methodology and data

Considering the diversity of reasons for migration and refugee flows, this study assumes that both phenomena describe the process of population flow in relation to the place of residence. It is noted that in 2014-2021, the main reason for Ukrainian migration was economic motives and such migration movements were of a systematic, often seasonal nature. However, starting from 2022, Ukrainian migration movements have acquired a spontaneous nature, which is typical of forced migration and is associated with the intensification of military operations in the previous places of residence of these individuals. The justification for such approaches is their joint economic consequences for the host countries and the country of departure, which is associated with the influx of people to new settlements.

The article is based on two sources of information: primary, obtained during survey research, and secondary from statistical collections of such institutions as: the Main Statistical Office of the Republic of Poland (GUS)[7], the International Organization for Migration (IOM)[8], the United Nations Organization for Migration (UNHCR)[9], United Nations Economic Commission for Europe (UNECE)[10], the State Statistics Service of Ukraine (Ukrstat)[11], the National Bank of Poland (NBP)[12], the Social Insurance Institute (ZUS)[13], the Ministry of Labor and Social Policy of Poland[14], Central Economic Information Centre in Poland[15]. In addition,

[7] https://stat.gov.pl/
[8] https://www.iom.int/
[9] https://www.un.org/site-search/?query=Ukraine
[10] https://w3.unece.org/PXWeb/en
[11] https://www.ukrstat.gov.ua/
[12] https://nbp.pl/publikacje/
[13] https://www.zus.pl/o-zus/o-nas/finanse/zaklad-ubezpieczen-spolecznych
[14] https://www.gov.pl/web/rodzina
[15] www.coig.com.pl

the analysis used data from Eurostat[16], the World Bank[17], and Internet Portals of international organizations observing Ukrainian migrants.

The study includes an examination of the dynamics and economic consequences of migration flows in two-time horizons. The first will cover the years 2014-2022 and begins with the occupation of eastern Ukraine and Crimea by the Russian Federation. The second begins with the full-scale invasion on February 24, 2022, and ends with a statistical assessment that covers the impact of Ukrainian migration on Poland's gross domestic product (GDP).

In the course of recognizing the impact of Ukrainian migration processes on changes in the labor market and product market in Poland and the adopted research goal, the following *scientific hypotheses* were formulated:

**H1**: migration flows in 2014–2022 had a significant impact on the formation of additional supply on the Polish labor market;

**H2**: migration flows after February 24, 2022 have a different specificity compared to 2014-2022, which led to the creation of additional revenues to the budgets and product markets of the receiving regions;

**H3**: the outflow of the population from Ukraine has an impact on the formation of Poland's gross domestic product.

The following *research questions* arise from the hypotheses put forward:

**Q1**: Which characteristics of Ukrainian migrants' economic activity on the Polish labor market?

**Q2**: What factors motivated Ukrainian migration flows before 2022 and after 2022?

**Q3**: Can we expect additional economic growth rates through additional employment of Ukrainian migrants in Poland?

The hypothesis H1 will be tested using statistical data obtained from Social Insurance Institute (ZUS), the Ministry of Labor and Social Policy, and the Central Employment Service. The hypothesis H2 will be tested using statistical data from Eurostat, the World Bank, and the International Organization for Migration. H3 will be tested using survey data and the Cobb-Douglas production function. This method allowed us to construct an econometric relationship between gross domestic product (GDP) and key factors of production – labor and capital – in the selected time perspective. This made it possible to assess the impact of possible additional labor resources due to the additional labor force of Ukrainian migrants on production volumes in the economy.

The Cobb-Douglas function was constructed based on the value of GDP in constant prices for 2015 (in US dollars), according to World Bank data[18]. The GDP indicator in current prices was also used, which allowed us to determine the GDP deflator for 2015. The number of employees and the value of fixed assets (in current prices) in Poland in 2015-2023 were taken as labor and capital resources. The source of data for these indicators was the Central Statistical Office of Poland. Using the GDP deflator, the authors determined the value of fixed assets in constant prices of 2015.

Particular attention in Cobb-Douglas models is paid to the study of GDP growth opportunities, both at the general economic and regional levels, by such authors as: Kosmalski (2022), Malaga (2007, 2015), Kliber (2007), Tokarski et al. (2005, 2007, 2010), Dykas et al. (2022). The Cobb-Douglas function is a mathematical model that describes the relationship

[16] https://ec.europa.eu/eurostat/web/population-demography/demography-population-stock-balance/database
[17] https://data.worldbank.org/indicator
[18] The Cobb-Douglas regression determines the degree of influence of production factors (labor and capital) on the size of output. This function was introduced in the late 1920s, inspiring subsequent models of the production function at both the micro and macro levels. For example, the constant coefficient function, known as the Leontief function, the linear multivariate function, the Allen function, the Solow model, etc. These models have become a standard tool in modern economic research (Beer, 1980, Biddle, 2020, Felipe, Adams, 2005, etc.).

between output and the factors of production used, such as labor and capital. The function assumes the stability of production factors, but additional migration flows can affect the stability of these factors. Thus, the traditional Cobb-Douglas model assumes that the production function has constant returns to scale. For economics, this means that an increase in all inputs (capital and labor) by the same percentage should lead to a proportional increase in output. The model assumes that labor and capital are homogeneous, although in reality they have different characteristics (for example, low- and high-skilled labor may have different levels of labor productivity). Therefore, generalizing these factors leads to certain limitations of the model.

In the context of considering changes in labor productivity in the national economy, it looks like this:

$$Y = A * L^{\alpha} * K^{1-\alpha}, \quad (1)$$

where:

Y - production volume, in this case Poland's GDP,

L - workload, i.e. the number of people working. According to the definition of the Central Statistical Office in Poland, it includes people performing work that generates earnings (in the form of remuneration for work) or income (the most important groups include: hired workers, i.e. people employed on the basis of an employment relationship (employment contract, appointment, nomination, election) and people working on their own account);

K - capital, in this analysis it is the value of fixed assets in the Polish economy;

A, $\alpha$ - are constant parameters reflecting the technological level and production flexibility in relation to L and K, characteristic of the Polish economy.

The Cobb-Douglas function allows us to determine how the change in the size of resources (work and capital) affects total production, assuming a constant rate of growth in labor productivity, which in turn is determined by the amount of fixed capital per 1 employee.

By making arithmetic transformations of the expression and logarithmizing it on both sides, we obtain the function:

$$\frac{Y}{L} = A * L^{\alpha} * \frac{K^{1-\alpha}}{L} \quad (2)$$

$$\frac{Y}{L} = A * L^{\alpha-1} * K^{1-\alpha} = A * (\frac{K}{L})^{1-\alpha} \quad (3)$$

$$Ln(\frac{Y}{L}) = Ln\, A + (1-\alpha) * Ln(\frac{K}{L}) \quad (4)$$

The model was developed for the Polish economy considering the specific relations between capital and labor in sixth section of the study, therefore it cannot be directly transferred to other economies due to the specific relations between capital and labor for each of them.

The survey data obtained using the method of generalization of results allowed us to formulate two scenarios of providing the labor market with additional resources as a result of migration. These scenarios are the minimum and maximum, which reflect the intentions of Ukrainian migrants to stay in Poland. This allows us to assess the potential impact of additional labor on the Polish economy.

The study of the situation of Ukrainian migrants on the Polish labor market is part of a research project funded by the Institute International Education Scholar Rescue Fund, USA. This research is organized at the Andrzej Frycz Modrzewski University in Krakow, Poland. The project is "Socio-demographic changes in Ukraine against the backdrop of war: migration crisis, challenges and prospects" (10.2023-10.2025)[19].

The *research methodology* included the use of the following methods:

[19] Project leader – Dr. Svitlana Chugaievska, Project mentor – Prof. UAFM., Dr. hab. Dariusz Fatuła

- descriptive/monographic became the theoretical basis for considering the institutional and legal features of the stay of migrants from Ukraine in Poland,

- the sociometric method made it possible to evaluate the results of an anonymous two-round survey conducted among Ukrainian refugees in Poland in the periods: November 2022 - February 2023, May-October 2024,

- economic and statistical methods involved the construction and statistical analysis of the Cobb-Douglas production function. This became the basis for a statistical analysis of the dependence of Poland's GDP growth rates on the background of additional human resources in the labor market.

## 3. Selected components of Ukrainian migrants' activities on the Polish labor market

In the second and third decades of the 21st century, population flows from Ukraine to Poland occurred in two waves: the first from 2014 to the end of 2022, the second after February 24, 2022. Migration in 2014-2021 was the result of a reorientation of flows from the east (Russia) to the west (to the EU). Already in 2013, for the first time, the number of Ukrainian trips to Poland was greater than to Russia. The rapid growth of migration flows after 2014 was due, on the one hand, to political events, especially the occupation of eastern Ukraine, and on the other hand, to economic factors.

The difference in the level and quality of life affected the scale of migration of Ukrainians to European countries, especially to Poland (Matyja et al. 2015). The importance of the economic factor of migration is illustrated by the disparities in key economic indicators, such as: average income per capita and wage levels between Ukraine and other European countries. For example, in 2021, according to the World Bank, 60% of Ukraine's population lived in extreme or moderate poverty[20]. This statistic was also confirmed by GDP per capita[21], which, although it increased by 4.5% from USD 12,386 to USD 12,949 between 2014 and 2021, Ukraine still remained one of the poorest countries in Europe in terms of GDP per capita[22]. The low level of average prosperity was confirmed by the level of wages. In 2021, the average salary in Ukraine was USD 513.6, while in Poland it was USD 1,438.4, i.e. 3.4 times more (Figure 1). In turn, the minimum gross salary, which dominated the wage structure, in Ukraine was 6,500 UAH, or about 750 PLN, while in Poland it was 2,800 PLN, or 3.7 times more[23]. That is, on average, during this period, every fifth working Ukrainian remained a poor person.

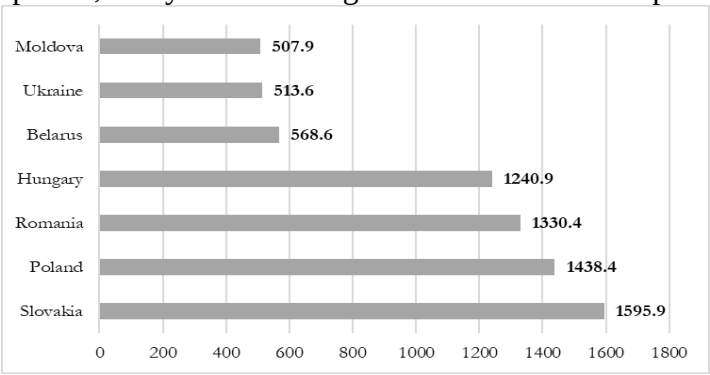


Figure 1. Average gross wages in Ukraine and selected European countries, 2021, USD
Source: *calculated based on Eurostat and UNECE data*[24]

[20] The World Bank distinguishes between two types of poverty: extreme, when daily income per capita is less than 1.25 USD, and moderate, when income is less than 2 USD.
[21] Calculated in USD at purchasing power parity
[22] https://pl.tradingeconomics.com/ukraine/gdp-per-capita-ppp
[23] https://index.minfin.com.ua/ua/labour/salary/min/
[24] https://w3.unece.org/PXWeb2015/pxweb/en/STAT/STAT__20-ME__3-MELF/60_en_MECCWagesY_r.px/

Poland became an increasingly attractive migration destination in the analyzed period. Its scale is illustrated by the growing number of work permits issued for foreigners in 2014-2021 (Table 1). While in 2014 the number of permits issued amounted to 43.7 thousand, in 2021 it increased to 504.2 thousand, which was almost twelve times higher. The dynamics of the number of permits issued in 2015-2021 amounted to 50.1%, 93.6%, 85.0%, 39.5%, 35.3%, -8.6% (2020) and 24.0%, respectively.

Table 1. Work permits for foreigners and share of permits for Ukrainian workers in Poland, 2014-2021

| Year | Work permit applications | Permits issued | Including for women | Including for Ukrainian citizens | Share of permits for Ukrainian citizens (%) (5/3) |
|---|---|---|---|---|---|
| 1. | 2. | 3. | 4. | 5. | 6. |
| 2014 | 46,905 | 43,663 | 14,381 | 26,315 | 60.3 |
| 2015 | 74,149 | 65,786 | 18,170 | 50,465 | 68.1 |
| 2016 | 139,119 | 127,394 | 33,099 | 106,223 | 76.4 |
| 2017 | 267,136 | 235,626 | 61,275 | 192,547 | 72.1 |
| 2018 | 366,898 | 328,768 | 74,861 | 238,334 | 65.0 |
| 2019 | 472,667 | 444,738 | 111,197 | 330,495 | 69.9 |
| 2020 | 411,902 | 406,496 | 108,802 | 295,272 | 71.7 |
| 2021 | 550,831 | 504,172 | 124,524 | 325,213 | 59.0 |

Source: *own study based on work permits for foreigners announced by the Ministry of Labor and Social Policy in Poland, 2014-2021*

Ukrainian citizens accounted for an average of about 2/3 of all foreigners employed in Poland. The dynamics of the number of works permits for Ukrainian citizens in 2015-2021 amounted to 91.8%, 110.5%, 81.3%, 23.8%, 38.7%, -10.7% (2020), 10.1%, respectively. Comparing the changes in the number of work permits issued, we note that the growth dynamics for Ukrainian citizens until 2017 exceeded the average, and then was below the average growth rate. It should be particularly emphasized here that in 2014-2021 the share of men in the number of permits issued remained at a relatively constant and very high level, oscillating around the value of 72% to 77%.

The growing share of economic migration from Ukraine was also confirmed by the number of people covered by mandatory pension and disability insurance. In Poland, this includes people such as employees, contractors, and those running non-agricultural businesses (Table 2).

Table 2. Number and share of Ukrainian citizens registered for pension and disability insurance in Poland, 2015-2021

| Index\ Year | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|
| Number of people | 101,150 | 194,418 | 316,474 | 420,723 | 479,113 | 532,503 | 627,028 |
| Share, in % | 54.9 | 66.3 | 71.9 | 73.8 | 73.5 | 73.4 | 71.7 |

Source*: own study based on the Report of the Department of Statistics and Actuarial Forecasts of the Social Insurance Institution (ZUS)*[25]

In the years 2015-2021, the number of foreigners registered for insurance increased by 620%. The national structure was dominated by Ukrainian citizens with a share of 54.9% in 2015, reaching the highest value of 73.8% in 2017, with a downward trend to 71.7% in 2021. It is worth emphasizing that on average 63% of all applications for social insurance were men.

[25] https://www.zus.pl/o-zus/o-nas/finanse/zaklad-ubezpieczen-spolecznych

In the years 2015-2021, in the light of data from the Department of Statistics and Forecasts of the Social Insurance Institution, the most numerous age groups of Ukrainians were: 25-29 years (16.4%), 30-34 years (15.4%) and 35-39 years (15.0%)[26]. This is very important information from the point of view of the next period of analysis, as men covered by the military service obligation constituted over 40% of the total migrant population. It can therefore be stated that the migration from the first wave involved primarily men of working age and was motivated by economic factors. A factor contributing to the inflow of labor migration from Ukraine was the growing problem of the lack of workers in Poland since the second decade of the 21st century. In 2021, the Association of Polish Entrepreneurs and Employers estimated the needs of the Polish economy to employ an additional 5 million people in order to maintain the pace of economic growth in the perspective of 2040[27] [28]. According to research covering the analyzed period, ⅓ of Polish companies had problems with recruiting staff, primarily representatives of low-skilled professions[29]. At the same time, 39% of companies reported their readiness to employ Ukrainians. According to the study "Labor Market Barometer VII" and newsweek.pl, among large enterprises, almost 50% of companies with staff shortages were ready to employ Ukrainian workers[30]. It is therefore worth emphasizing that migrants filled the shortages on the Polish labor market, not replacing domestic workers, which means that there was no phenomenon of displacement of domestic labor resources. Moreover, they contributed to keeping wages at a stable level and thus stabilizing the inflation level.

Ukrainian citizens not only filled the labor market, but also created enterprises, contributing to the growth of global production in Poland. It should be noted that the number of newly created economic entities with Ukrainian capital is systematically growing. While 726 were created in 2014, in 2021, more than six times as many were created - 4,350. At the end of 2021, there were over 20,000 enterprises in Poland in which at least one of the shareholders was a Ukrainian company or an individual with Ukrainian citizenship (Figure 2). After February 24, 2022, the flow of people from Ukraine to European countries, especially neighboring ones, changed dramatically. The reasons for this wave of migration did not result from the desire to improve financial conditions, but from the need to find a safe haven from the Russian aggressor. In order to determine the scale of the threat to the Ukrainian civilian population, several data regarding Russia's military potential can be indicated. Russia entered the war as one of the two largest armies in the world (along with the USA). Russian military spending exceeded $60 billion annually in 2018-2021, while Ukraine spent an average of $5.5 billion annually in the same period. The power of the Russian army was confirmed by its 2nd position in the Global Firepower Index (GFP) in 2021. In the same year, Ukraine was ranked 15th in the world[31].

As a result of the disproportionately larger military forces and resources deployed by the Russian aggressor, the number of Ukrainian external migrants amounted to 8.5 million people at the end of 2022. This constituted approximately 20.2% of the country's population before the outbreak of the war (Chugaievska, Wisła, 2023), as indicated in Figure 3. Such significant migration volumes and its characteristics allow us to assert the existence of a Ukrainian migration crisis against the backdrop of the war in Ukraine[32].

[26] https://www.newsweek.pl/biznes/ukraincy-coraz-bardziej-potrzebni-do-pracy-w-polsce/t9bqygp
[27] https://shoppingpl.com/post/344-polskyj-rynok-pratsi-problemy-ta-perspektyvy
[28] https://www.newsweek.pl/biznes/ukraincy-coraz-bardziej-potrzebni-do-pracy-w-polsce/t9bqygp
[29] https://www.newsweek.pl/biznes/ukraincy-coraz-bardziej-potrzebni-do-pracy-w-polsce/t9bqygp
[30] https://naszwybir.pl/51748-2/
[31] https://www.globalfirepower.com/countries-listing.php
[32] What is a migration crisis and how to address it integrally? IOM Portal Media Centre. https://lac.iom.int/en/blogs/what-migration-crisis-and-how-address-it-integrally

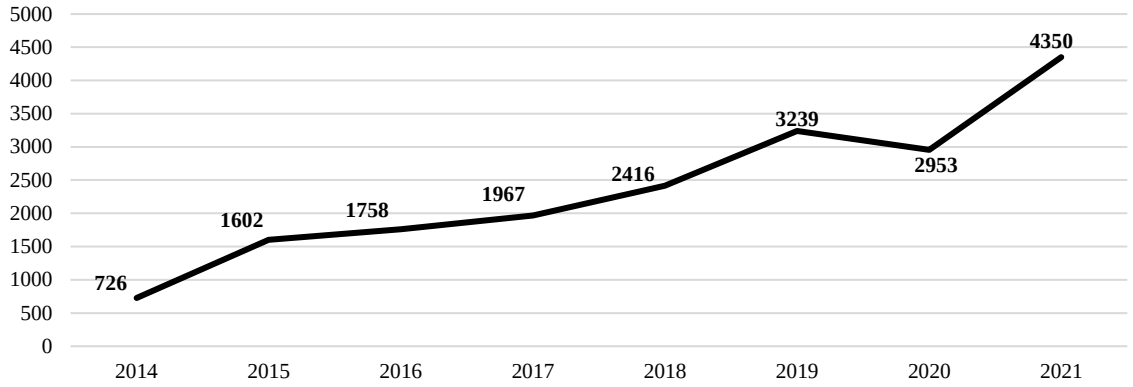


Figure 2. Number of companies with Ukrainian capital in Poland, 2014-2021
*Source*: own study based on data from the Central Economic Information Centre in Poland[33]

Against the background of population growth due to the flow of migrants in Poland, consumer demand for goods and services is increasing. The main groups of goods and services where consumer demand is growing: food products and retail trade, housing and utilities, education and services for children, medical and pharmaceutical services (Kahn & Koper, 2025, Vinokurov, 2023). Demand for food products has increased, especially for those that are familiar to Ukrainians (flour, cereals, dairy products, vegetables, meat products). Polish supermarket chains have even adapted their assortment, including more Ukrainian products for sale. Significant changes are also taking place in the housing market due to additional demand. Due to a significant increase in the number of Ukrainian migrants, rental prices for housing, especially in large cities (Warsaw, Krakow, Wroclaw, Gdansk), have increased by 20-40% compared to 2021. The additional number of users led to an increase in the popularity of public transport, rail transport and car sharing has grown significantly, which prompted companies to increase the number of flights and update their fleets. At the same time, changes and new challenges have occurred in educational institutions and companies providing services for children. The large number of Ukrainian children who arrived with their parents has increased the demand for places in kindergartens, schools, as well as for educational services and Polish language courses.

Obviously, there has been additional demand and a number of new challenges for medical and pharmaceutical services in Poland. Along with mothers and their children, many elderly people and people with certain needs who require medical care and treatment have arrived. Therefore, the increased demand for medicines, medical consultations and insurance services for Ukrainians has stimulated the expansion of the healthcare sector. Thus, the growth of consumer demand has had a positive impact on Polish business, creating new jobs and increasing tax revenues. Polish entrepreneurs are actively adapting to new conditions, introducing products aimed at Ukrainian consumers and hiring Ukrainian-speaking staff. At the same time, the rapid growth of consumer demand creates challenges, such as increasing the burden on social and communal services, rising housing costs, and the need to expand service infrastructure.

[33] www.coig.com.pl

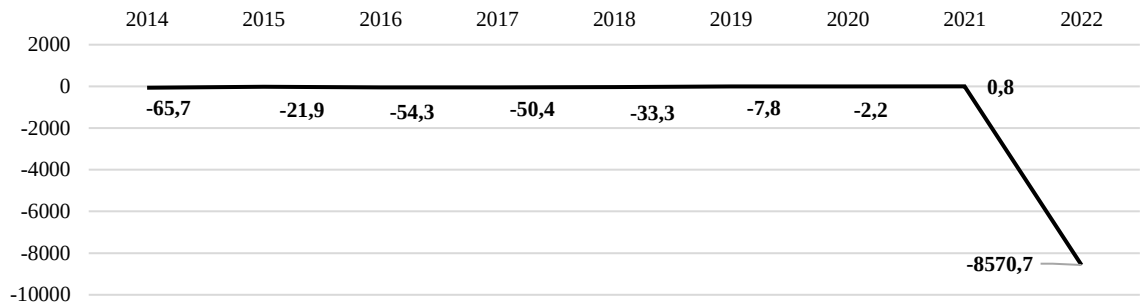


Figure 3. Ukrainian migration net, 2014-2022, thousands of people
*Source*: data as of the end of 2022 from the World Bank[34] and the International Organization for Migration[35]

The significant influx of people from Ukraine, especially after the outbreak of the war, prompted the authors of this study to put forward a scientific hypothesis (H3) regarding the impact of migration from Ukraine on Poland's global production (GDP) in the perspective of 2028. The researchers assumed that migration could have a significant impact on Poland's economic growth, contributing to an increase in the supply of labor and domestic demand. The increase in the number of migrants from Ukraine could affect various sectors of the economy, supporting their development and bringing benefits in the longer term. The next part of the study presents the results of surveys regarding the willingness of Ukrainian refugees to remain on the Polish labor market.

## 4. Professional plans of migrants from Ukraine in the light of survey research

The next stage of the research was to collect the opinions of Ukrainian migrants on staying and potentially taking up employment in Poland. Further analysis is based on the results of our own research conducted as part of the IIE-SRF Project. The focus was on learning the opinions of Ukrainian migrants regarding making decisions about further professional activity. The research was conducted in the period May - October 2024, and responses were obtained from 305 respondents, of whom 72.9%, or 222 people, came to Poland after February 24, 2022. In this way, preliminary information was obtained on plans to stay on the Polish labor market, thus constituting potential labor resources. In the light of the research results, the largest group were young people aged 18 to 35 (53%, 43% of respondents were women and 10% men), i.e. of economically active age (Figure 4). The smallest group were people of retirement age - about 10%. The group of middle-aged people (36-55 years old) also has a significant share, including 31% of surveyed women and 5% of surveyed men. Therefore, these two groups of respondents belong to the most professionally active population and have every opportunity to further adapt to the new labor market. Very similar results were obtained in the NBP survey on the economic situation of Ukrainian migrants[36]. It is worth emphasizing that migrants not only plan to take up hired work, but also start their own business. According to the survey, 28 people (9.2%) have opened their own business since arriving in Poland. This means that almost every tenth respondent works for themselves and often creates new jobs by employing other people, especially migrant women.

[34] https://data.worldbank.org/indicator/SM.POP.NETM?locations=UA
[35] https://mailchi.mp/iom/iom-ukraine-operational-weekly-sitrep-5794822?e=e771809828
[36] https://nbp.pl/wp-content/uploads/2023/04/Sytuacja-zyciowa-i-ekonomiczna-migrantow-z-Ukrainy-w-Polsce_raport-z-badania-2022.pdf

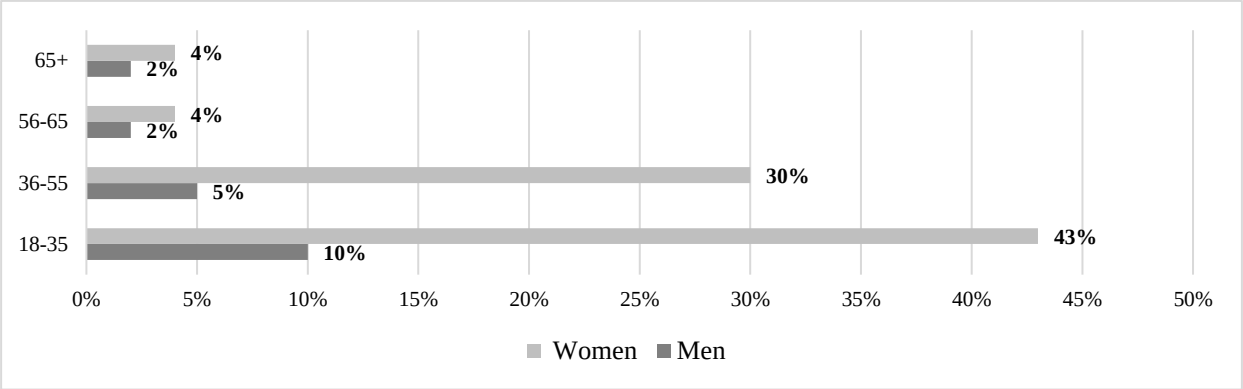


Figure 4. Age and gender structure of respondents, %
Source: *own studies based on the results of Ukrainian migrants' surveys conducted as part of the IIE-SRF Projec*t

Based on the respondents' opinions, it was found that 29% of them plan to stay in Poland, 38% have not yet made a final decision, 5% plan to return to Ukraine, but periodically, to travel abroad for work purposes, and 7% plan to go to another country. 21% of respondents - declared their willingness to return permanently to Ukraine, immediately after the end of the war (Figure 5).

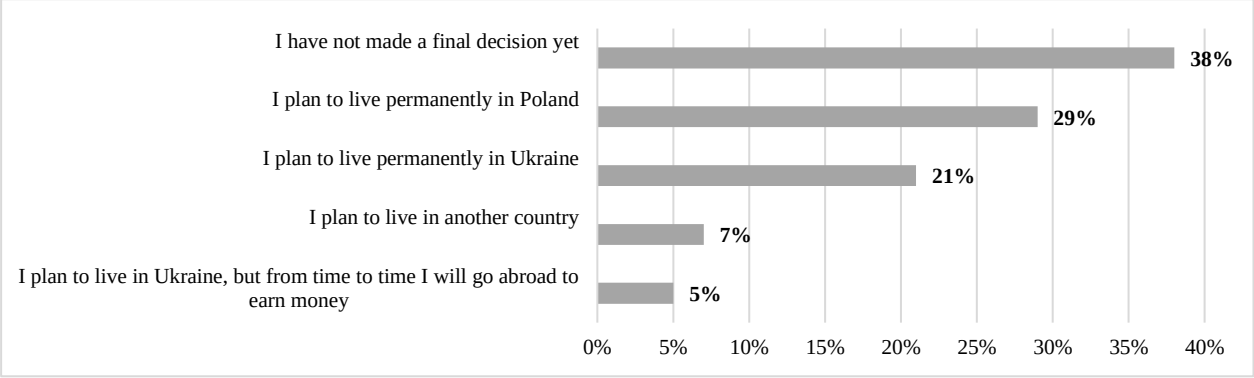


Figure 5. Migrants' plans to remain on the Polish labor market
Source: *own studies based on the results of surveys conducted as part of the IIE-SRF Project*

It is obvious that the plans of Ukrainian migrants may change over time, depending on the course of the war. Based on the declarations expressed in the survey, two options were adopted - minimum and maximum - of additional labor resources for the Polish economy. Considering the above assumptions, the Authors formulated two possible scenarios for Ukrainian migrants to remain permanently in Poland:

1) minimum, for 29%, which translates into 250.3 thousand people;

2) maximum, for 72% (38%+29%+5%), which translates to 621.4 thousand people (Table 3).

The presented survey results were then used to estimate the impact of additional labor resources on global production (GDP) in Poland in the coming years.

Table 3. Scenarios for Ukrainian migrants staying in Poland

| Indicator | Scenarios of labor resource movement: | |
|---|---|---|
| | minimum | maximum |
| Percentage of migrants planning to stay in Poland, % | 29.0 | 72.0 |
| Number of people of working age planning to stay permanently in Poland, thousands of people | 250.3 | 621.4 |

Source: *calculated by the authors based on the statistical analysis of the survey results*.

## 5. The impact of Ukrainian migration on product market changes in Poland

The main part of this study is the analysis and statistical assessment of the impact of additional labor resources from Ukraine on Poland's GDP. The statistical analysis was performed using the Cobb-Douglas production function, which is widely used in economic modeling to predict productivity and resource allocation in various sectors of the economy. To study the scale of the impact of changes in labor resources on the volume of production, statistical data from the World Bank and the Central Statistical Office were prepared, as well as a number of calculated obtained as logarithms of data indicators necessary for constructing the production function (Tables 4-5).

Table 4. Macroeconomic data of Cobb-Douglas function for the Polish economy, 2014-2023

| Year | GDP at constant prices 2015, billion USD [37] | Employees, million people [38] | Value of fixed assets in the national economy: | | | Value of fixed capital at constant prices 2015 per 1 employee, thous. USD | Labor productivity at constant prices 2015, thous. USD |
|---|---|---|---|---|---|---|---|
| | | | in current prices in billion PLN [39] | in current prices in billion USD | in constant prices 2015 in billion USD | | |
| | Y | L | | | K | K/L | Y/L |
| 2014 | 457.08 | 14.6 | 3259.0 | 1030.6 | 873.8 | 60.0013 | 31.3855 |
| 2015 | 477.11 | 14.8 | 3471.8 | 922.0 | 922.0 | 62.1720 | 32.1724 |
| 2016 | 491.20 | 15.3 | 3660.9 | 929.9 | 971.8 | 63.5459 | 32.1186 |
| 2017 | 516.45 | 15.7 | 3831.9 | 1015.6 | 999.8 | 63.6350 | 32.8723 |
| 2018 | 547.15 | 15.9 | 4029.7 | 1118.5 | 1039.5 | 65.1708 | 34.3047 |
| 2019 | 571.50 | 16.1 | 4263.5 | 1111.6 | 1065.8 | 66.1168 | 35.4515 |
| 2020 | 559.96 | 14.8 | 4486.1 | 1152.7 | 1076.8 | 72.8107 | 37.8630 |
| 2021 | 598.75 | 15.0 | 4728.2 | 1226.7 | 1078.0 | 71.8510 | 39.9097 |
| 2022 | 632.55 | 15.2 | 5008.1 | 1125.8 | 1032.4 | 67.8799 | 41.5886 |
| 2023 | 633.56 | 15.2 | 5321.6[40] | 1267.5 | 989.9 | 65.2171 | 41.7417 |

Source: *own study based on data from the World Bank and the Central Statistical Office*

[37] https://data.worldbank.org/indicator/NY.GDP.MKTP.KD?end=2021&fbclid=IwAR1KzEN4O3GXA84CVfuobY_d5aEjv3fBRVe4kEPSl9MK_e09h7_K7GNdQ2c&locations=PL&start=2001

[38] https://bdm.stat.gov.pl/

[39] https://stat.gov.pl/obszary-tematyczne/przemysl-budownictwo-srodki-trwale/srodki-trwale

[40] The data on the value of fixed assets in the national economy in 2023 were calculated as a forecast of a given indicator before the regression line: $y = 0{,}9101t^3 - 7{,}718t^2 + 212{,}31t + 3060{,}2$; $R^2 = 0.9997$, where is: t=10

Table 5. Data for the construction Cobb-Douglas function of Polish economy, 2014-2023

| Year | Ln (K/L) | Ln (Y/L) | Ln (Y/L)* | $E^2$ |
|---|---|---|---|---|
| 2014 | 4.0944 | 3.4463 | 3.4780 | 0.0010 |
| 2015 | 4.1299 | 3.4711 | 3.5178 | 0.0022 |
| 2016 | 4.1518 | 3.4694 | 3.5422 | 0.0052 |
| 2017 | 4.1532 | 3.4926 | 3.5437 | 0.0026 |
| 2018 | 4.1770 | 3.5353 | 3.5704 | 0.0012 |
| 2019 | 4.1914 | 3.5682 | 3.5865 | 0.0003 |
| 2020 | 4.2879 | 3.6340 | 3.6943 | 0.0036 |
| 2021 | 4.2746 | 3.6866 | 3.6794 | 0.0001 |
| 2022 | 4.2177 | 3.7278 | 3.6159 | 0.0125 |
| 2023 | 4.1777 | 3.7315 | 3.5712 | 0.0257 |

Source: *own study based on data from the World Bank and the Central Statistical Office*

The calculations showed a strong statistical relationship - Pearson's correlation coefficient is 0.721 - between the logarithm of production volume (Y) and the logarithms of human resources (L) and fixed capital formation (K) (Figure 6).

**Descriptive Statistics**

| | Mean | Std. Deviation | N |
|---|---|---|---|
| VAR00002 | 3,5763 | ,11090 | 10 |
| VAR00001 | 4,1856 | ,06074 | 10 |

**Correlations**

| | | VAR00002 | VAR00001 |
|---|---|---|---|
| Pearson Correlation | VAR00002 | 1,000 | ,721 |
| | VAR00001 | ,721 | 1,000 |
| Sig. (1-tailed) | VAR00002 | . | ,009 |
| | VAR00001 | ,009 | . |
| N | VAR00002 | 10 | 10 |
| | VAR00001 | 10 | 10 |

Figure 6. Descriptive statistics, correlation of the Cobb-Douglas function model for the Polish economy, 2014-2023
Source: *own calculations using SPSS software*

The coefficient of determination was 0.520, i.e. changes in the size of labor productivity depend in 52.0% on changes in the value of fixed capital per 1 employee and in 48.0% - on the influence of other factors not examined in the model (e.g. technical progress), as indicated by the ANOVA test (Figure 7).

**Model Summary[b]**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | ,721[a] | ,520 | ,460 | ,08151 | ,520 | 8,659 | 1 | 8 | ,019 | ,518 |

a. Predictors: (Constant), VAR00001
b. Dependent Variable: VAR00002

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | ,058 | 1 | ,058 | 8,659 | ,019[b] |
| | Residual | ,053 | 8 | ,007 | | |
| | Total | ,111 | 9 | | | |

a. Dependent Variable: VAR00002
b. Predictors: (Constant), VAR00001

Figure 7. Analysis of variations of the Cobb-Douglas function model for the Polish economy, 2014-2023
Source: *own calculations using SPSS software*

The next step of the study was to check the reliability of the Cobb-Douglas function model using the Fisher-Snedecor statistical test. It requires verification of two hypotheses: null (about the existence of significant discrepancies between the descriptive statistics indicators and the calculated values) and alternative (about the lack of such discrepancies), which characterizes the reliability of the adopted model. In this analysis, the empirical value of the test is 8.659.

The determination of the critical value (Fcr) using Fisher-Snedecor distribution tables, which for α=0.05 was Fcr=5.32. Thus, the empirical value of the F test significantly exceeds its critical value, i.e. the premises for rejecting the null hypothesis and accepting the alternative hypothesis were met. Thus, with a high probability of 0.95 (i.e. 95%), it can be stated that the model is adequate for the adopted statistical data (presented in Tables 3 and 4) and is reliable for further economic analyses. The authors determined the coefficients of the regression model, which is presented in Figure 8. Therefore, the regression equation for the Cobb-Douglas function and parameter A has the form (formulas 5-6):

$$\mathrm{Ln(Y/L)} *= -1{,}934 + 1{,}316 * Ln(K/L) \tag{5}$$

$$A = exp^{-1{,}934} = 0{,}1446 \tag{6}$$

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | | 95.0% Confidence Interval for B | | Correlations | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | t | Sig. | Lower Bound | Upper Bound | Zero-order | Partial | Part |
| 1 | (Constant) | -1,934 | 1,873 | | -1,033 | ,332 | -6,252 | 2,385 | | | |
| | VAR00001 | 1,316 | ,447 | ,721 | 2,943 | ,019 | ,285 | 2,348 | ,721 | ,721 | ,721 |

a. Dependent Variable: VAR00002

Figure 8. Cobb-Douglas model's regression analysis for the Polish economy, 2014-2023
*Source*: own calculations using SPSS software

In this way, the estimated value of the Cobb-Douglas production function for the Polish economy in 2014-2023 is as follows:

$$Y = 0{,}1446 * L^{-0{,}316} * K^{1{,}316} \ (R^2 = 0{,}520) \tag{7}$$

The function estimated above allows us to determine with accuracy determination coefficient of the model: $R^2 = 0{,}520$ that under the current conditions of labor resources and fixed capital and the given labor productivity, it is impossible to maintain a constant trend in the GDP growth rate due to the declining rate of capital growth. In summary, the collected and developed data on the number of employees, GDP and capital values in Poland, and then the statistical analysis based on the Cobb–Douglas function, allow us to state the decreasing technical equipment of labor in the Polish economy as formula 7 shows. This fact prevents the absorption of additional labor resources resulting from the willingness of Ukrainian migrants to take up employment, while ensuring a constant rate of growth in labor productivity. As a consequence, additional labor resources from Ukraine require additional investments in the fixed capital of Polish enterprises in order to ensure sufficient technical equipment of labor, i.e. the amount of fixed capital per 1 employee. These investments are necessary for the effective absorption of migrant labor resources, which would allow for the full use of their potential for building stable economic growth.

## Conclusion

Population flows from Ukraine to Poland from 2014 to the end of 2022 were heterogeneous and had different specificities. In 2014-2021, they were voluntary, short-term or seasonal. These were primarily economically motivated migrations, caused, among other things, by wages in Ukraine being many times lower than in other European countries. At the same time, Ukrainian migrants replenished the labor shortage in Poland, especially in seasonal jobs that were not within the scope of interests of domestic workers. This trend was reflected in the number of work permits issued, which increased from 26.3 to 325.2 thousand in 2014-2021. Similar trends were observed in the number of people covered by mandatory social insurance. In addition, there is a high activity of Ukrainians in the Polish labor market, when the percentage of employed Ukrainians reaches 65-70% and this indicator has a steady growth trend.

If since the beginning of the 21st century, the main reasons for Ukrainian migration were economic factors, then after February 24, 2022, the nature of migration has completely changed, the influx of people was motivated by security considerations, but at the same time they became forced and completely legal. As of the end of September 2024, more than 4.2 million people had received temporary protection status in EU countries, including 978.4 thousand in Poland. This is a significant influx of labor resources for the Polish economy, which creates the emergence of additional labor resources and forms additional consumer demand in the market.

In light of the conducted research, hypotheses H1 and H2 should be confirmed positively, since migration flows in 2014-2022 had a significant impact on the labor market, especially in seasonal work. H2 should also be positively tested, since migration flows after February 24, 2022 are characterized by a different sex and age structure. The most important difference lies in the basis of decision-making regarding migration, from voluntary (economic) to forced (for security reasons). It was also found out during the survey of Ukrainian migrants in Poland that, against the backdrop of the ongoing war in Ukraine, a significant part of the respondents plans to stay and work in Poland (29%). Along with this, it should be noted that there is a very large interval of respondents (43%) who have not yet fully decided on this decision. This made it possible to build possible scenarios for the creation of possible additional labor resources as a result of Ukrainian migrants in the Polish labor market.

In the current economic conditions, with a constant level of technical progress, which follows from the nature of the Cobb-Douglas function, hypothesis H3 was tested for the Polish economy. Verification of this hypothesis made it possible to construct a Cobb-Douglas production function and estimate its parameters. Statistical evaluation of the constructed model shows that at the current growth rates of labor resources and their possible growth scenarios, sustainable growth in output is impossible. This is due to the actual decrease in the growth rates of fixed assets, which are not ready to absorb significant additional labor resources. Additional employment of Ukrainian migrants requires an increase in investment costs of Polish enterprises.

To ensure sustainable growth in output, it is necessary to increase additional investments in fixed capital, which, in turn, requires thoughtful state investment decisions in the light of new migration policy tasks. These investments are necessary for the effective absorption of labor resources of migrants from Ukraine, which would allow to fully use their potential for building long-term economic growth in Poland. The analysis emphasizes the global nature of demographic and social challenges facing the Ukrainian economy in the context of ensuring its development processes and future integration into the European Union.

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