



Analysis of the impact of refugees from Ukraine on the economy of Poland

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Abstract

The beginning of the full-scale war in Ukraine in February 2022 resulted in a large outflow of refugees, reaching more than 6 million globally.

Much of this exodus happened through the Polish border. As of October 2023, almost 1 million Ukrainian refugees were living in Poland. While in the past decade Poland experienced large labour migration from Ukraine, the refugee inflow had a different demographic composition.

It primarily included working age women (41%) and children (40%). These refugees from Ukraine did not plan to move, and many had special needs. Despite these difficulties, refugees began entering the labour market surprisingly quickly – attaining an employment rate of 28% in May 2022 and 65% in November 2022 (NBP, 2023). By July-August 2023 Ukrainian refugee households supported themselves, with 80% of their incomes coming from work.¹

We find that refugees from Ukraine who remain in Poland as workers, entrepreneurs, consumers, and taxpayers have a positive impact on economic output, which will increase in the long run. Results of our general equilibrium Deloitte D.Climate model show that refugees from Ukraine contributed 0.7-1.1% to the Gross Domestic Product in 2023. In the long-term this effect will grow to 0.9-1.35%. In our model, the

long-term is defined as the period over which the economy fully adjusts to the shock of the initial refugee inflow; it does not include other aspects, e.g. refugee children growing-up and entering employment. These results are consistent with previous, similar studies. However, they should be treated as lower-bound estimates, as we do not allow for the possibility of an increase in the labour force triggering a positive productivity shock (e.g., due to increased specialisation), because there is little data to credibly estimate its size.

A feature of our modelling approach is that the resulting GDP gains are reduced due to increased competition on the labour market, which slightly increases the unemployment rate by 0.18-0.3 pp. in 2023, corresponding to 33-54 thousand additional people being unemployed. This effect also slows down real wage growth by 0.65-1.15% in 2023. In reality, these negative effects are likely to be compensated by positive productivity gains, in the form of adjustments on the part of native workers (by their occupational upgrading, see papers by Peri and Sparber, 2009; Foged and Peri, 2016) and firms (by skill-biased technical change, see papers by Lewis and Peri, 2015, or Lewis, 2013), as econometric studies find only small effects on native wages, clustered around zero (Peri, 2014). The case of refugees from Ukraine in Poland is studied in an early paper by Gromadzki and Lewandowski (2023), who find no effect on earnings,

employment, and unemployment rate of natives or other immigrants, except an actual slight positive impact on the wages of native women. Despite our conservative approach, additional government tax revenues trump the costs of refugee-connected expenditure. A larger wage pool, higher private consumption, and influx of capital from abroad result in larger tax revenue. In total, the general government revenue increased by 1.05-1.45% in 2023. In monetary terms, this amounts to 10.1-13.7 billion PLN in 2022 and 14.7-19.9 billion PLN in 2023. If estimates quoted by a government official² of public expenses on refugees of around 15 billion PLN in 2022 and 5 billion in 2023 are accurate, we can conclude that they were more than offset by the additional tax revenue. In the long term, refugees should increase yearly government revenue by around 0.85-1.3%.



1 Deloitte calculations based on Multi-Sector Needs Assessment Poland 2023 survey data provided by UNHCR.

2 E.g. vice-president of Polish Development Found Bartosz Marczuk estimated it at around 16 billion PLN, but this estimation also included spending of NGOs which was combined with spendings of local governments [Polska pomoc dla Ukrainy 2022 - ile kosztowała? - Infor.pl](https://www.infor.pl/pl/artykuly/polska-pomoc-dla-ukrainy-2022-ile-kosztowala?).

Non-technical summary

Inflow of Ukrainian refugees into Poland

The beginning of the full-scale war in Ukraine in February 2022 resulted in large flows of refugees, reaching more than 6 million globally.³ Much of this exodus happened through the Polish border. As of October 2023, almost 1 million Ukrainian refugees were living in Poland⁴ (Chapter 1). In the past decade, Poland experienced large labour migration from Ukraine. The number of workers with Ukrainian citizenship that registered for social security (this data does not include those working in the shadow economy or some minor cases that do not require registration) grew from just 33 thousand in 2013 to 627 thousand in 2021. It has to be noted however, that short-term nature of most of these stays (6 months in a span 12 months), fact that one person could hold several permits (as a result of changing jobs or positions within the same company), legal changes, and decentralized nature of permits all hinder the reliability of these figures. Two-thirds of such migrants have been men, some of whom left families in Ukraine temporarily to bring or send money back. Migration has been primarily based on firm sponsorship, where companies provided job offers and handled formalities, which resulted in very high employment rates – 94% as of November 2022 according to NBP (2023) estimates.

The refugee inflow had a different demographic composition than the pre-2022 economic migration. It primarily included working age women (41%) and children (40%).⁵ Refugees from Ukraine did not plan to move, and many had special needs. In October 2023, nearly half of all refugee households included a person with a chronic illness, and some 10% included one with a Washington Group level 3 disability. Over a third included a single parent and a fifth an elderly person.⁶ Despite these difficulties, refugees began entering the labour market surprisingly quickly – attaining an employment rate of 28% in May 2022 and 65% in November 2022 among working age persons (NBP, 2023) –

753 thousand Ukrainian workers, including 225 thousand refugees, had registered for social security by September 30, 2023.

Situation of Ukrainian refugees on the labour market in Poland

Ukrainian refugees, despite war trauma and other difficulties, have quickly become a part of society as **consumers, employees, entrepreneurs, and taxpayers**. Currently between **225 and 350 thousand** refugees from Ukraine are estimated to be working in Poland. The lower bound is the number from social security data, while the higher bound is the product of employment rate from the surveys and working age population with active PESEL UKR numbers (Chapter 2).

Structural worker shortages, one of the lowest unemployment rates in the European Union, record high vacancies, and high education attainment of refugees eased their labour market integration. The number of Polish citizens aged 20-64 has declined by 2.6 million from its peak in early 2010.⁷ Despite COVID-19 and geopolitical shocks, the unemployment rate oscillated in recent years around 3% in Poland, and in February 2022 only Czechia exhibited a lower rate in the EU.⁸ In Q4'2021 the share of companies reporting vacancies stood at 49%, the highest level on record, and has been slowly declining since then.⁹ In July-August 2023, 56% of refugees declared possessing tertiary education and their employment rate has been almost one-third higher than for others.¹⁰

Swift legal action facilitated labour market integration of refugees. After the beginning of the full-scale war on 26th February 2022, the European Union activated the Temporary Protection Directive on 4th March 2022, and the Polish parliament passed a special act to facilitate refugee integration on 12th March 2022. Ukrainian refugees in Poland were granted instant access to the job market, health care, and education. The authorities granted people escaping Ukraine legal residency for a period of eighteen months and enabled them to access digital services and basic administrative systems like PESEL. Thus, the policies that have previously hampered job market integration of refugees in other contexts, such as temporary labour market bans (Fasani, Frattini, & Minale, 2021) and forced dispersals (Fasani, Frattini, & Minale, 2022), have been avoided.

The high employment rate of refugees in Poland covers not only employees, but also entrepreneurs. Five percent of Ukrainian refugees registered for social security have set up a business or work as freelancers. Similar results can be gleaned from the Multi-Sector Needs Assessment Poland 2023 survey results, which show that slightly more than 5% of respondent households receive income from self-employment or similar activities.

All broad sectors of the economy saw an increase in the number of workers with Ukrainian citizenship and social insurance since 2021, apart from storage and transportation. The number increased the most in manufacturing (almost by 34 thousand), accommodation and food (more than 18 thousand), and wholesale and retail trade (more than 18 thousand).¹¹ While public data does not distinguish between refugees entering these sectors and pre-2022 Ukrainian workers changing jobs, it is largely consistent with the MSNA Poland 2023 survey, in which the most refugees are employed in manufacturing (14%), accommodation and food service (12%), and trade and repair (6%).

Ukrainian refugee households in Poland support themselves, with **80% of their incomes coming from work**.¹² According to the MSNA Poland 2023 survey, 20% of Ukrainian refugee households earn less than 3 000 PLN, 41% earn between 3 000 and 6 000 PLN, and 12% earn more than 6 000 PLN, while 27% of respondents preferred not to answer. That said, the standard of living of Ukrainian refugees may be significantly lower than that of native residents, even at similar incomes, due to their lack of housing, which in Poland is usually occupant-owned.

3 As of December 2023, according to UNHCR, based on governmental sources [Situation Ukraine Refugee Situation \(unhcr.org\)](https://www.unhcr.org/situations/ukraine)

4 According to the active PESEL UKR database.

5 According to the active PESEL UKR database in October 2023.

6 Deloitte calculations based on Multi-Sector Needs Assessment Poland 2023 survey data provided by UNHCR.

7 According to the Labour Force Survey data from Eurostat.

8 According to the harmonized unemployment rates from Eurostat.

9 According to the quarterly NBP survey.

10 According to the UNHCR (2023) survey.

11 According to the social security data until 30th September 2023.

12 Deloitte calculations based on Multi-Sector Needs Assessment Poland 2023 survey data provided by UNHCR.



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Economic impact modelling

Economic impact of Ukrainian refugees has been estimated in the general equilibrium Deloitte D.Climate model that accounts for their labour, consumption, and tax inputs. Such models are a gold standard in policy modelling used by central banks, academia, and other institutions, because they can simulate counterfactual scenarios. Thus, we can distinguish the positive labour market shock from the inflow of refugees and analyse various scenarios independently of all other recent macroeconomic developments (Chapter 3).

We find that refugees from Ukraine as workers, entrepreneurs, consumers, and taxpayers had a positive impact on economic output, which will increase in the long run. The Deloitte D.Climate general equilibrium model finds that refugees from Ukraine in the long-term will contribute **0.9-1.35% to the Gross Domestic Product**. In our model, the long-term is defined as the period over which the economy fully adjusts to the shock of the initial refugee inflow; it does not include other aspects, e.g. refugee children growing-up and entering labour market. These results are

consistent with previous, similar studies. However, they should be treated as lower-bound estimates, as we do not allow for the possibility of an increase in the labour force triggering a positive productivity shock (e.g., due to increased specialisation), because there is little data to credibly estimate its size.

A feature of our modelling approach is that the resulting GDP gains are reduced due to increased competition on the labour market. This slightly increases the unemployment rate, by 0.18-0.3 pp in 2023, which corresponds respectively 33-54 thousand additional people being unemployed. This effect also slowed down real wage growth by 0.65-1.15% in 2023. In reality, these negative effects are likely to be compensated by positive productivity gains, in the form of adjustments on the part of native workers (by their occupational upgrading, see papers by Peri and Sparber, 2009; Foged and Peri, 2016) and firms (by skill-biased technical change, see papers by Lewis and Peri, 2015, or Lewis, 2013), as econometric studies find only small effects on native wages, clustered around zero (Peri, 2014). The impact of refugees from Ukraine in

Poland is studied in an early paper by Gromadzki and Lewandowski (2023), who find no effect on earnings, employment, and unemployment rate of native or other immigrants, except an actual slight positive impact on the wages of native women. Even in a conservative scenario that assumes negative effects of labour market competition in the form of higher unemployment and slower real wage growth, an increase in the labour force translates into larger personal incomes and higher private consumption, which results in a larger tax revenue. These effects were strengthened by an influx of capital from abroad.

In total, the general government revenue increased by 0.8-1.1% in 2022 and 1.05-1.45% in 2023. In monetary terms, this amounts to 10.1-13.7 billion PLN in 2022 and 14.7-19.9 billion PLN in 2023.

If estimates quoted by a government official of public expenses on refugees of around 15 billion PLN in 2022 and 5 billion in 2023¹³ are accurate, we can conclude that they were more than offset by the additional tax revenue. In the long-term, refugees should increase yearly government revenue by around 0.85-1.3%.

Unaccounted positive externalities

All our theoretical economic modelling results are conservative lower bound estimates, as econometric studies from other countries have found immigration to have additionally a positive impact on labour productivity that cannot be accounted for using the available data. According to these econometric studies, immigration can not only raise economic output (i.e., more workers equal more production), but more importantly labour productivity (i.e., more value added per worker). Such results are unfortunately too aggregated to disentangle the constituent effects (Chapter 4).

An inflow of migrants can constitute more than just an increase in the labour supply. Typically, in theoretical models an increase in the number of workers lowers the amount of capital per worker thus lowering productivity until firms invest to return the capital-worker ratio to normal, returning productivity to the previous level (Borjas, 2019). However, immigrants bring new skills to the workforce, extending the scope of specialisation and thus likely making workers more productive. Panel econometric studies from the past decade found, that immigration improves not just GDP or GDP per person (Ortega and Peri, 2014), but has also a causal positive impact for labour productivity (Jaumotte et al., 2016), GDP per capita growth rate (Aleksynska and Tritah, 2015), and total factor productivity (Peri, 2012).

Economists have advanced an array of channels through which immigration could be increasing productivity. Macro-level regressions demonstrate that immigration has a positive influence on productivity, but they are unable to identify the precise mechanisms behind these impacts. In part this may stem from the fact, that immigrants and natives differ in important ways, which triggers complementary occupational upgrading of natives and investment in complementary production technologies by firms¹⁵. Immigrants often exhibit higher entrepreneurship rates from natives.¹⁶ Furthermore, even when immigrants enter seemingly low productivity childcare, elderly care, and housekeeping services, this can allow highly educated and productive native women to increase their labour supply.¹⁷

¹³ E.g. vice-president of Polish Development Found Bartosz Marczuk estimated it at around 16 billion PLN, but this estimation also included spending of NGOs which was combined with spendings of local governments [Polska pomoc dla Ukrainy 2022 - ile kosztowala? - Infor.pl](https://www.infor.pl/pl/artykuly/polska-pomoc-dla-ukrainy-2022-ile-kosztowala?).

¹⁴ For example, found by Beerli and Peri (2017), Tabellini (2020), Cattaneo et al. (2015), Foged and Peri (2016), D'Amuri and Peri (2014), Ortega and Verdugo (2014), Peri and Sparber (2009).

¹⁵ For example, found by Peri (2016), Lewis and Peri (2015), Lewis (2013), Peri (2012).

¹⁶ For example, found by Anelli, Basso, Ippedico, and Peri (2023), and OECD (2011).

¹⁷ For example, found by Furtado (2016, 2015).

Introduction

Nearly two years after the beginning of the full-scale war in Ukraine, the positive impact of the refugees on the Polish economy becomes clearly visible.

On their arrival, the impact of refugees on the economy primarily manifested through higher consumption, that was financed mainly by increased governmental spending, civil society, international organisations, and savings brought from Ukraine. While these added to a significant initial increase in consumption, multiple sources of financing and a lack of aggregated data (particularly on general government expenses) make its magnitude uncertain. Although in the short term it stimulated the economy, drawing just on savings was not sustainable. Over time, however, refugees started to work as employees and entrepreneurs, adding not only to the demand, but also to the supply of the economy, contributing to its long-term growth. The focus of this report is this structural impact of refugees on the economy as consumers, employers, entrepreneurs, and taxpayers.

The beginning of the full-scale war in Ukraine resulted in a large inflow of refugees into Poland outlined in Chapter 1. This cohort differs from the pre-2022 Ukrainian economic migrants, most notably in its demographic makeup which primarily comprises children and working age women.

The government quickly granted refugees from Ukraine access to the labour market, healthcare, and schooling, facilitating the process of inclusion described in Chapter 2. Considering their psychological stress and needs in terms of child and elderly care, refugees began entering the labour

market surprisingly quickly – attaining an employment rate of 28% in May 2022 and 65% in November 2022 (NBP, 2023). By 30th September 2023 more than 10 thousand ran their own businesses according to the administrative social security ZUS data. Based on the Multi-Sector Needs Assessment Poland 2023 survey conducted in July-August 2023, we calculate that 80% of the income of refugee households is derived from employment, with an additional 5% coming from remittances and 2% from Ukrainian pension benefits. In economic terms, refugees from Ukraine in Poland are not receivers of social services and charity, but primarily consumers, employees, and entrepreneurs.

In Chapter 3, we estimate the economic impact of refugees from Ukraine in Poland in general equilibrium Deloitte D.Climate model. This is the gold standard of economic modelling on the macro-level, which comprehensively accounts for the supply side of the economy including labour supply and productivity, and the demand side including consumption as well as taxation. Unfortunately, such macroeconomic models cannot account for how exactly refugees and other migrants enable native workers to specialise in better paid professions (occupational upgrading), or how firms allow for new skills by adapting different production technologies. As such, our estimates should be treated as a conservative lower bound of the effect.

Furthermore, in Chapter 4, we move beyond theoretical modelling, to examine empirical studies on how immigrants and refugees impact not just output, but labour productivity as well. This effect comes not from traditional supply-demand analysis, but from increased specialisation. Immigrants enable occupational upgrading of residents, supply new skills to firms, enter household works services that allow highly productive native women to increase labour supply, and exhibit high rates of entrepreneurship.



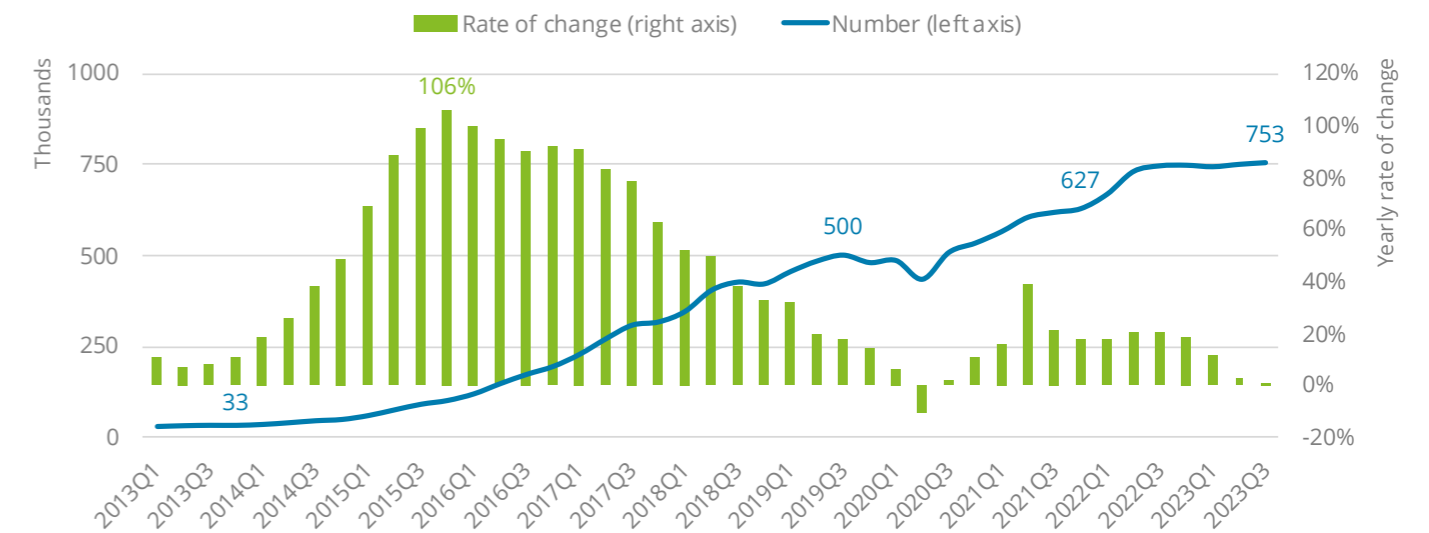
1. Inflow of refugees from Ukraine into Poland

Even before the 2022 full-scale war in Ukraine the number of Ukrainians in Poland was substantial and growing, although their precise number is difficult to measure.

A steady inflow of migrants could be observed in the last decade since 2014, when armed conflict erupted in Eastern Ukraine. As the Ukrainian economy suffered and its currency lost value, many Ukrainians came to Poland looking for work. Most of them came on a guest worker basis, enabled by a law from 2011, that allowed Ukrainians and five other nations to work in Poland for 6 months during a year without a work permit, based on employers' declaration. This was a circular migration, in which they returned to Ukraine once the 6 month period expired. In effect most stayed in Poland for less than twelve months and therefore were not included in the resident population or other national population estimates. A National Bank of Poland research paper estimates that between 2014 and 2018, between one and two million Ukrainian workers arrived in the country (Strzelecki, Growiec and Wyszynski, 2022). Hard data on the number of Ukrainian workers in Poland before 2022 are limited

and might understate their presence. The only hard data on these flows is the number of Ukrainian workers with social insurance, which nevertheless understates the numbers, as certain kinds of legal work often undertaken by temporary employees did not require it, and some Ukrainians worked in the shadow economy. The number of workers with Ukrainian citizenship and social insurance increased from just 33 thousand at the end of 2013, to 500 thousand on 30th September 2019, and 627 thousand at the end of 2021. Some of this increase reflects the transitioning of Ukrainians to more regular work arrangements and securing of work permits. The yearly rate of the number of registrations peaked at 106% at the end of 2015, and even with the recent refugee inflow never reached such a high pace again. The most recent data from 30th September 2023 counts 753 thousand workers with Ukrainian citizenship registered for social security, including 225 thousand refugees.

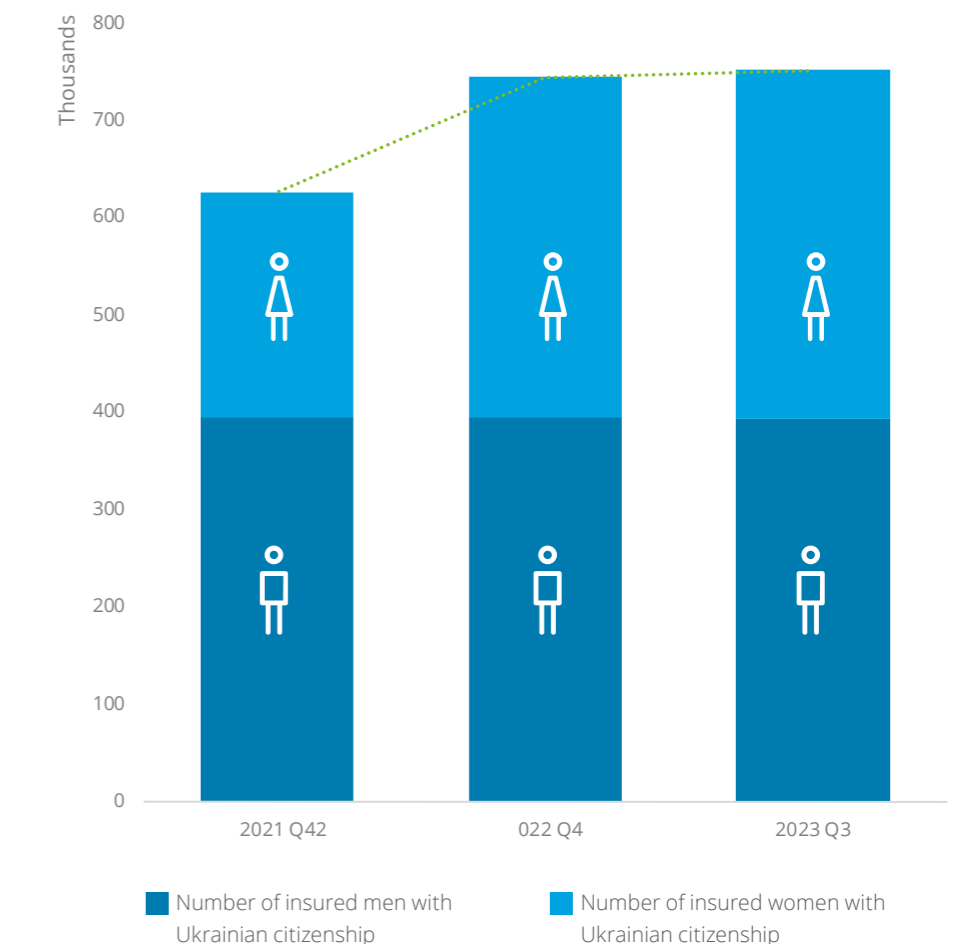
Chart 1. Ukrainian workers with social insurance.



Source: Deloitte own elaboration based on ZUS data.

The structure of the Ukrainian population in Poland changed radically after 24th February 2022. Up until 2021, Ukrainians in Poland were mostly men (close to two-thirds) looking for work, often leaving their families back in Ukraine. After the beginning of the full-scale war in Ukraine, refugees fleeing the war started to arrive. They were primarily women and children. This is consistent with a change in the nature of migration flows, from primarily economic migrants to forcefully displaced refugees.

Chart 2. Number of Ukrainian men and women registered in Poland for social security.

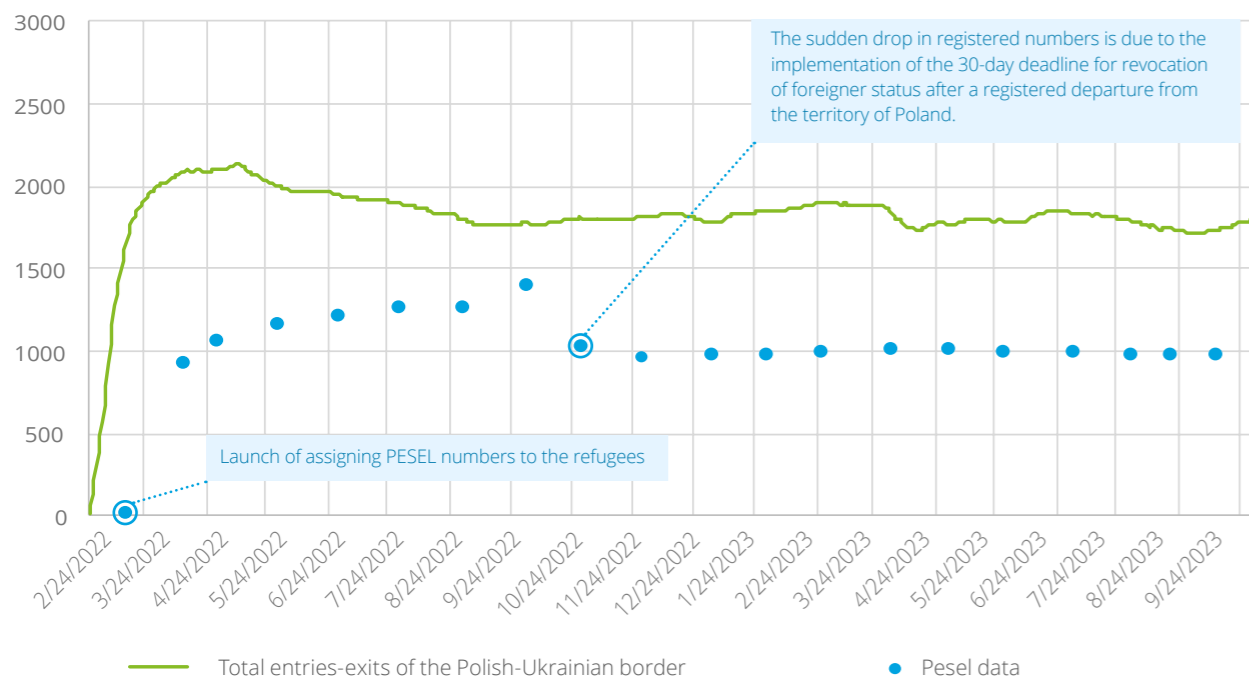


Source: Deloitte own elaboration based on ZUS data. Quarter 3 2023 shows the most recent data available.

The influx of refugees into Poland after the Russian invasion of Ukraine was large, with nearly 16 million border crossings¹⁸ from Ukraine until the end of September 2023 and cumulatively 1.7 million PESEL registrations. It must be noted that such a rapid population movement of that scale was not seen in Europe since World War II. Not everyone

stayed in Poland, however. A large number of these refugees later returned to Ukraine or moved to other European countries. By October 2023, the remaining active PESEL UKR numbers stood at less than 1 million, while the border movement balance between Poland and Ukraine at 2.5 million.

Chart 3. Poland-Ukraine border movement balance and registered/active PESEL data



Source: Deloitte own elaboration based on Polish Border Guard Headquarter and PESEL data.

The Ukrainian population in Poland is significant, both in terms of pre-2022 economic migrants and war refugees.



The 2021 Polish National Census suggests that a year before the 2022 war in Ukraine there were over 1 million people with a Ukrainian citizenship temporarily residing in Poland. Some of these Ukrainian migrant workers who resided in Poland before 24th February 2022, decided to return to Ukraine to join the army or support their families.



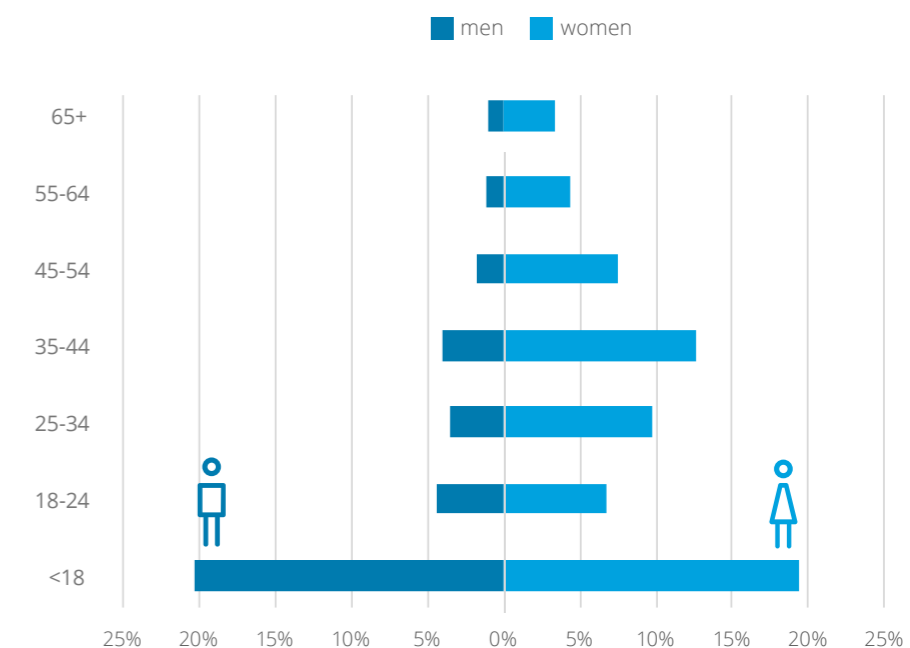
The border crossing data of the Polish Border Guard shows that up until the end of September, nearly 16 million people crossed from Ukraine into Poland, while 14.2 million moved in the opposite direction. It can be assumed that while a significant portion of the resulting 1.8 million remained here, many may have travelled further West.



Ukrainians who arrived in Poland on or after February 24 seeking temporary protection can apply for an identification number – PESEL UKR. The database in October 2023 recorded close to 957 thousand active PESEL UKR holders.

Most of the refugees from Ukraine currently living in Poland are women and children, though over half of the total population is of working age. The best population data available is the active PESEL database as of 10th October 2023. According to the registry, 63.7% of them are women and 36.3% are men. The database also includes the age of the Ukrainian PESEL holders, which indicates that over half (56%) are of working age (18-64), which amounts to more than 536 thousand people. More precisely, women younger than 18 make up 19% of the population, women aged 18-64 account for around 41% of the population, while those aged 65 and above are around 3% of total population. The incoming men are mostly young, those younger than 18 stand for around 20% of all refugees, men aged 18-64 make up 15% of the population and men older than 64 account for only 1%.

Chart 4. Age and gender structure of refugees based with active PESEL numbers in October 2023

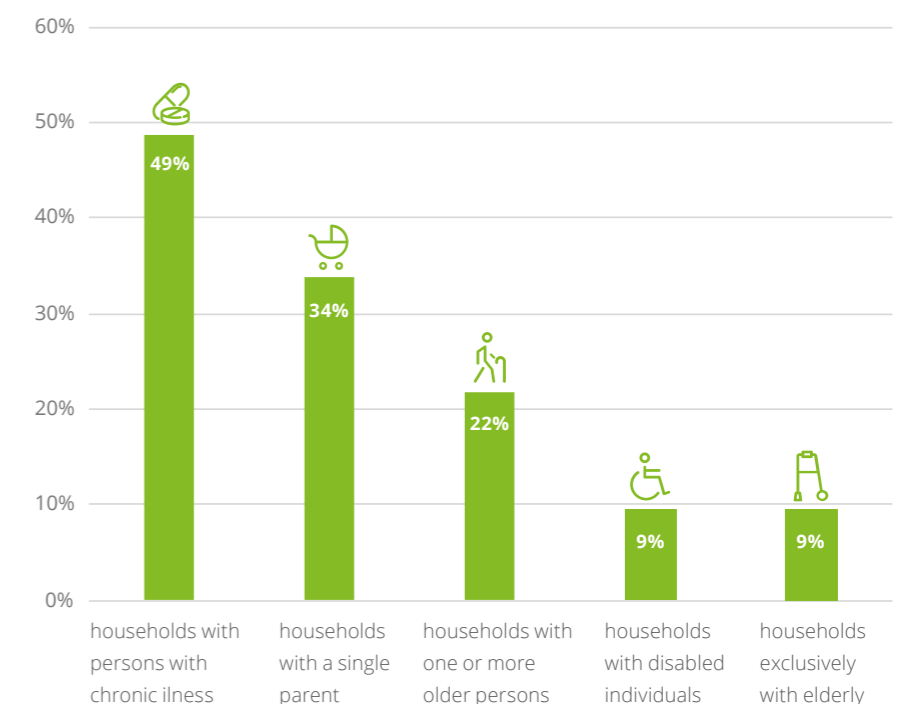


Source: Deloitte own elaboration based on the PESEL database as of October 2023

Many of the refugees that settled in Poland remain in special needs or otherwise precarious households. According to the MSNA Poland 2023 survey, nearly half of all refugee households have a person with a chronic illness, while in nearly 10% there is a disabled person (Washington Group level 3 disability). In over a third of all households is a single parent and over a fifth houses an elderly person (10% of households are comprised of exclusively elderly people).

Note: Disability is defined as Washington Group level 3 disability

Chart 5. Composition of refugee households in Poland



Source: Deloitte own elaboration based on the results of the MSNA Poland 2023 survey

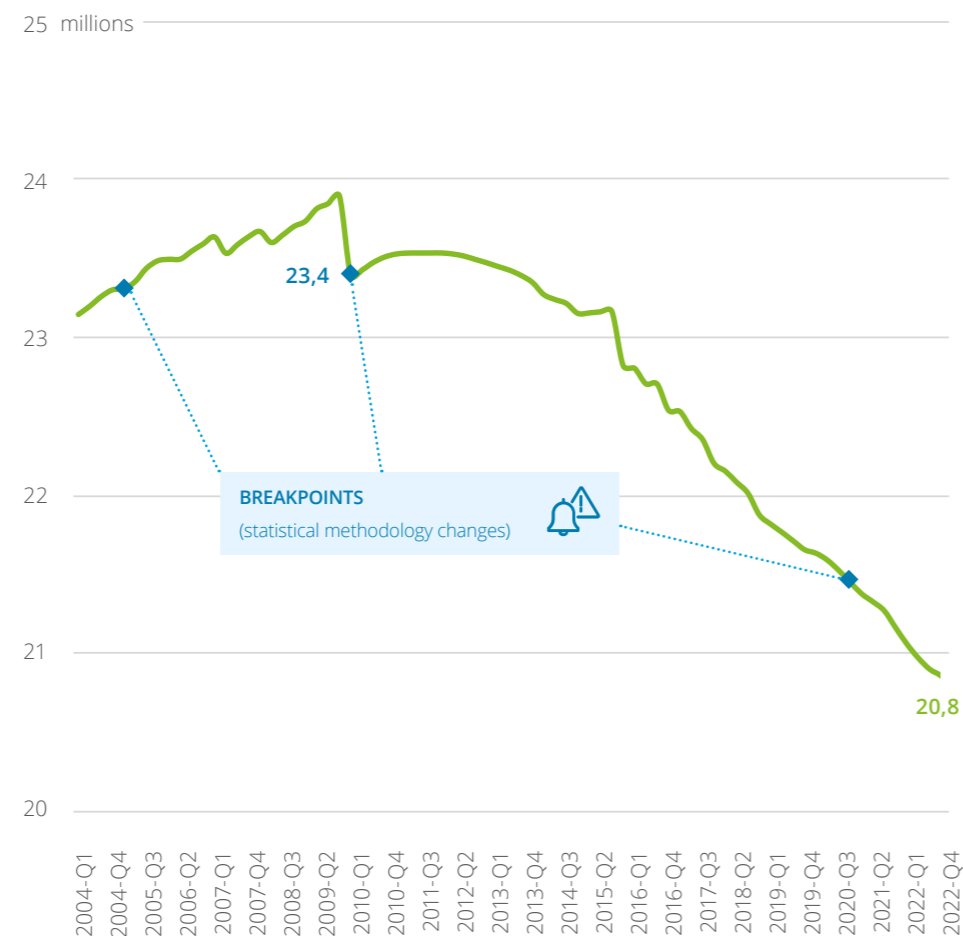
¹⁸ UNHCR data, <https://data2.unhcr.org/en/situations/ukraine>

2. Situation of refugees from Ukraine on the labour market in Poland

Refugees from Ukraine fit well into the needs of the Polish labour market.

Ukrainians arrived on a labour market that structurally needs more workers, as the domestic population is ageing rapidly, while the economy is growing. High levels of education, cultural proximity and previous connections to Poland helped refugees adapt to the labour market. Furthermore, Poland made an important and strategic policy decision by promptly opening the labour market and supporting their inclusion.

Chart 6. Working age population with Polish citizenship (20-64 years old)



Source: Eurostat [Statistics | Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat)

The number of people of working age in Poland is shrinking and is expected to keep declining. Although substantial migrations from Poland after EU accession in 2004¹⁹ distort population data, the domestic working age population is declining. According to the Labour Force Survey, which better accounts for emigration than the prevalent population definition, the number of Polish citizens aged 20-64 peaked in early 2010, with 23.5 million people. Since then, it has declined by 2.6 million. This trend is set to continue. According to the latest Eurostat projections, without migration, the population (counting all nationalities) aged 20-64 years would decrease by 4.8 million by 2050.²⁰

Chart 7. Unemployment rate



Source: Harmonized data, Eurostat, [Statistics | Eurostat \(europa.eu\)](https://ec.europa.eu/eurostat)



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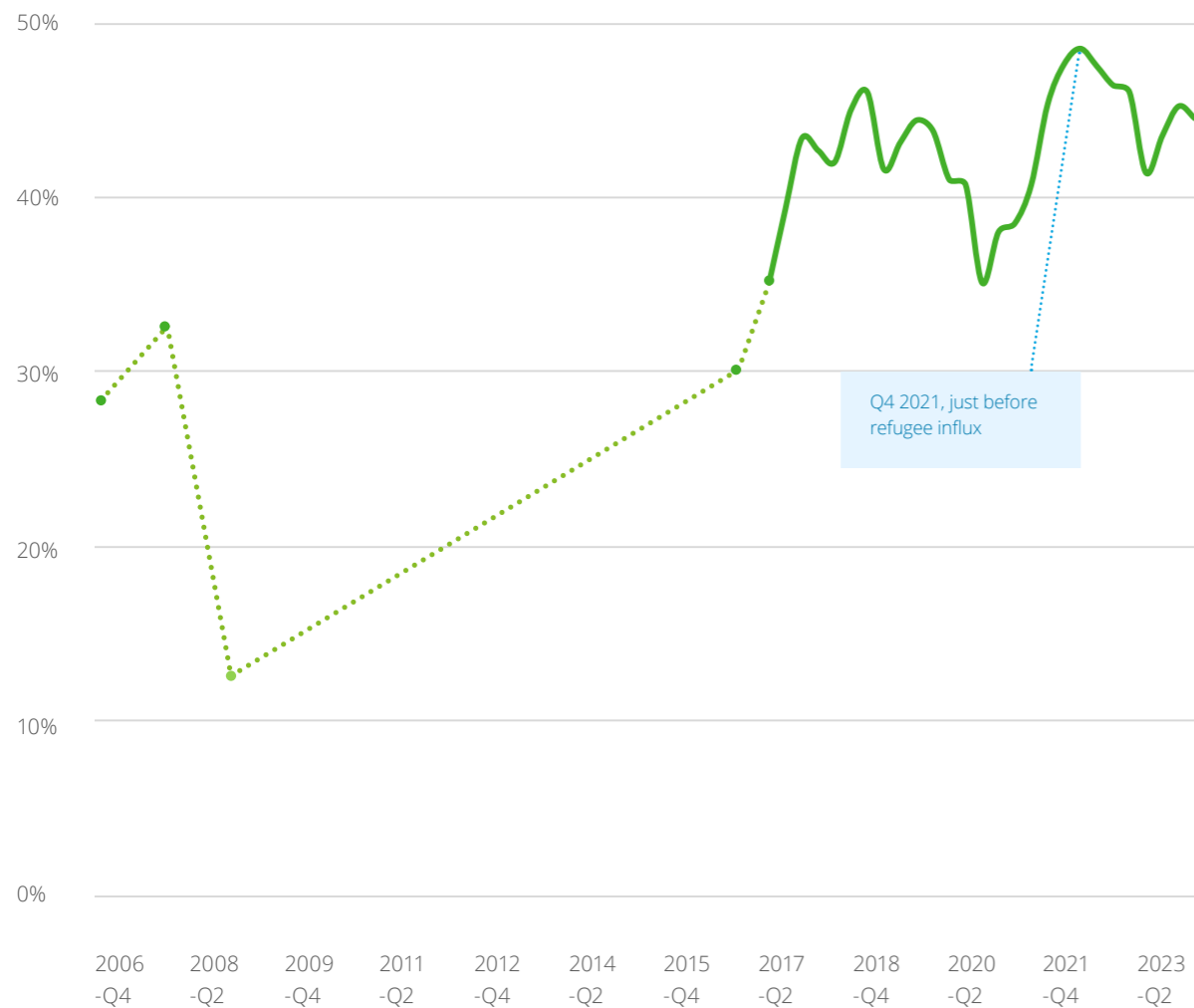
¹⁹ Statistics Poland data, <https://stat.gov.pl/en/topics/population/international-migration/information-on-the-size-and-directions-of-emigration-for-temporary-stay-from-poland-between-2004-2020,8,14.html>

²⁰ Eurostat data, https://ec.europa.eu/eurostat/databrowser/view/proj_23np_custom_8710248/bookmark/table?lang=en&bookmarkid=97472dd3-3dd2-4aca-a51f-15c98be37466

An ageing population coupled with a growing economy causes labour shortages. Despite falling number of available workers, the Polish economy is growing steadily, as it modernises and converges to the level of development of old EU Member States. Despite the Covid-19 pandemic, real GDP growth averaged 3.7% during the last decade. As a result, due to steady demand for labour since 2019, the harmonised unemployment rate in Poland has not exceeded 4%, oscillating around 3% in recent years. According to Eurostat data, in September 2023, harmonized unemployment in Poland reached 2.8%, the same level as Malta. In the entire EU, only the Czech Republic reached a lower level: 2.7%. Vacancies stood at record heights before

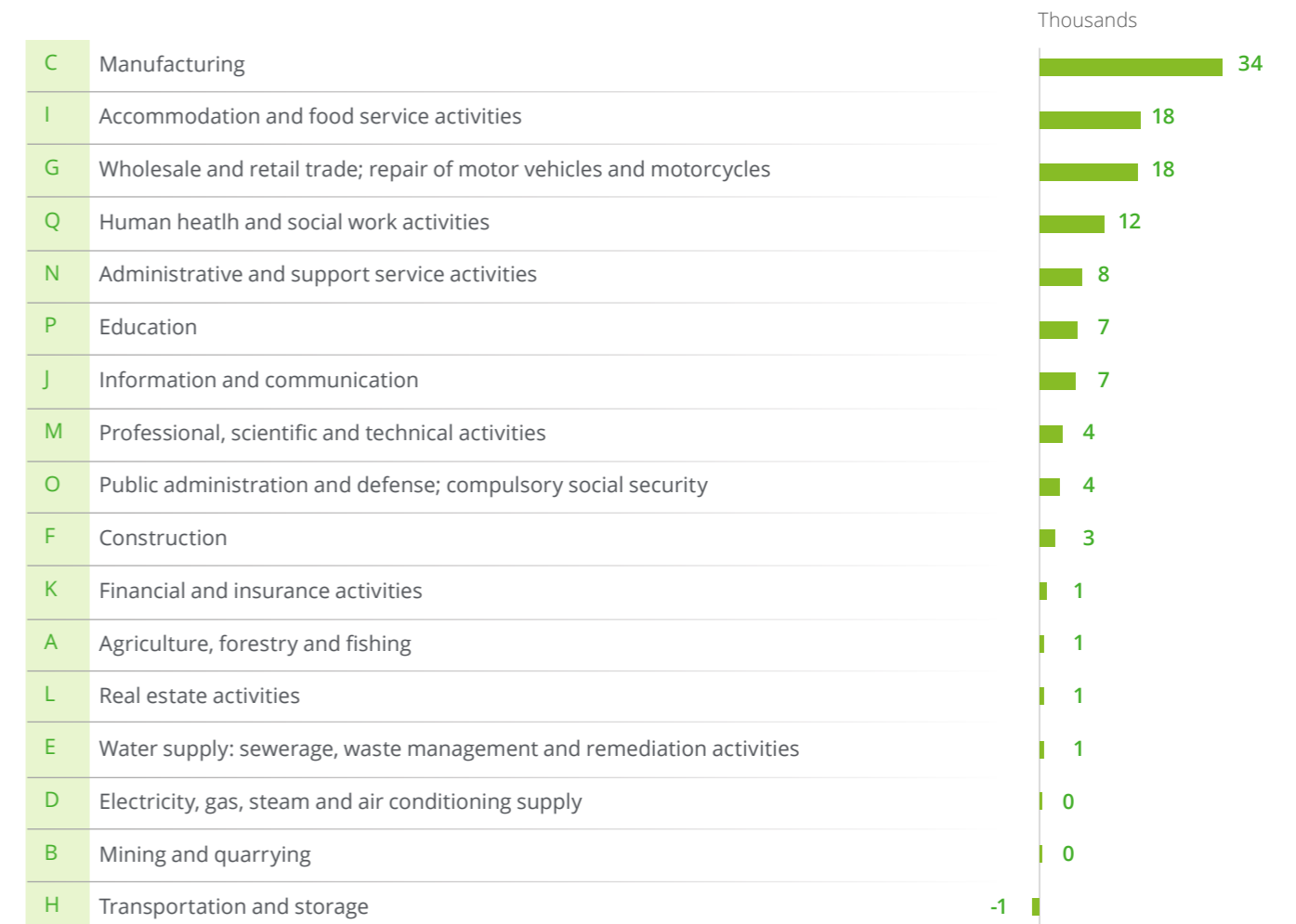
the refugee inflow. Before the refugee influx, the share of companies reporting vacancies in the quarterly NBP survey stood at 49% in Q4 2021 – the highest level on record. This helps to explain the relative ease of the refugees' labour market inclusion in terms of employment rates. After refugee inflow, the share of firms reporting vacancies stopped growing and declined slightly to 45% in Q3 2023. This partly indicates the fact that many refugees entered the labour market, and partly a cyclical economic slowdown. Despite that, the labour market remains relatively strong.

Chart 8. Share of companies reporting vacancies



Source: Deloitte own elaboration based on estimated data from <https://nbp.pl/publikacje/cykliczne-materialy-analityczne-nbp/szybki-monitoring/>

Chart 9. Change in the number of workers registered for social security with Ukrainian citizenship by NACE sector between end of Q3 2023 and 2021



Note: This does not cover type of work that do not require social security insurance, or the informal sector.



Source: Deloitte own elaboration based on ZUS data.

The number of workers with Ukrainian citizenship since the beginning of the full-scale war in Ukraine grew in all NACE²¹ sectors apart from transportation and storage. Since 2021, just before the escalation of war in 2022 in Ukraine, the number of workers with Ukrainian citizenship and social security insurance grew the most in manufacturing (almost by 34 thousand), accommodation and food

(more than 18 thousand), and wholesale and retail trade (more than 18 thousand). The only sector that has seen a decline was transportation and storage (by more than 1 thousand). Unfortunately, public data does not report how much of this change is due to the refugees from Ukraine entering these sectors, or how much due to pre-2022 Ukrainian workers changing their jobs.

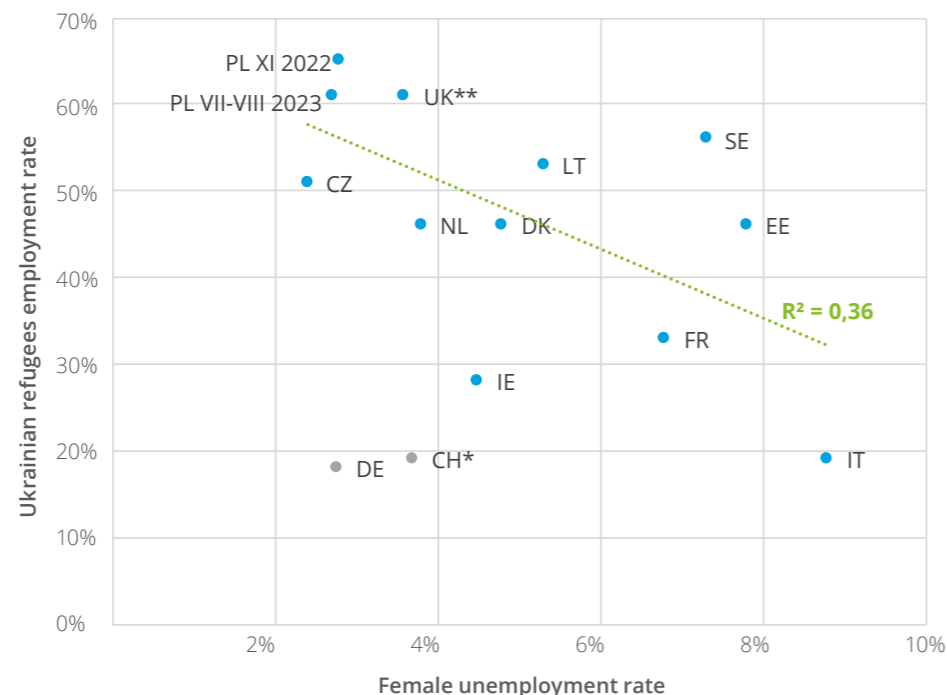
21 Statistical Classification of Economic Activities in the European Community (French Nomenclature statistique des Activités économiques dans la Communauté Européenne).

Data is limited, but it appears refugees found work in sectors where the labour market was particularly tight. Publicly available data does not give the numbers of social security registrations of native workers by NACE sector. For this reason, in the absence of administrative data, to approximate the share of Ukrainian workers in particular sectors it was necessary to use Statistics Poland survey data. The share of workers with Ukrainian citizenship grew more in sectors that were experiencing the highest wage and salaries growth before refugee displacement. This eased their entry into the labour market. The refugees were also quick to set-up their own businesses or become self-employed. Accommodation and food, as a sector, has been experiencing a particularly large growth in wages and salaries in 2021, as it re-opened after the Covid-19 pandemic, and subsequently it recorded a particularly large growth in the share of Ukrainian workers. Transportation has been the only sector in which the share and number of Ukrainian workers declined.

A significant number of refugees are concentrated in the urban areas of Poland. For one, cities generally record lower unemployment rates and higher work productivity, though the costs of living remain higher than in rural areas. According to the active population in the PESEL database, over 30% of all PESEL UKR holders had them issued in the country's 12 biggest cities. At the same time, the results for the MSNA Poland 2023 survey suggest that these 12 biggest cities are inhabited by over 35% of refugees.

Refugees record higher levels of employment inclusion in European countries that have relatively better labour market situations. In countries with lower unemployment, refugees fare better in the labour market. Since women make up the majority of refugees of working age, the situation of women on the labour market is especially important. As such, female unemployment rates explain 36% of the variation in refugees from Ukraine employment rates in studies from 11 EU Member States²²

Chart 10. Female unemployment and refugees from Ukraine employment in Europe

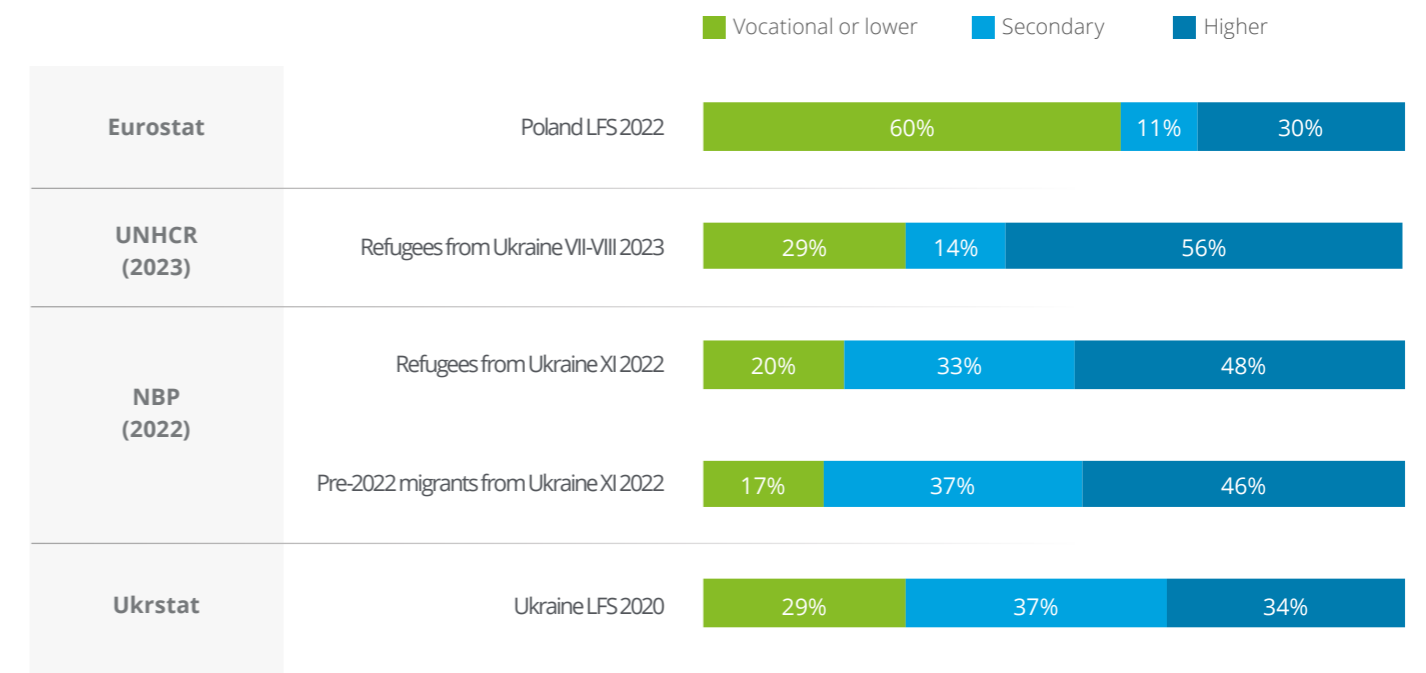


Note: Trendline omits Germany and Switzerland (coloured in grey). Monthly female unemployment rates (not seasonally adjusted) given for the month of the particular survey of refugees from Ukraine employment. Refugee employment studies have not been conducted following identical methodology and may include discrepancies. * Data for Switzerland for June 2023 instead of July due to data limitations in Eurostat. ** Data for UK from ONS.



22 After excluding Germany and Switzerland as outliers.

Chart 11. Education attainment of Poles and Ukrainians



Note: (1) LFS stands for the Labour Force Survey, which is conducted with common methodology in all EU countries, 4 candidate countries, and 3 European Free Trade Association (EFTA) countries. The Ukrainian equivalent is slightly different in its division into complete, basic, and uncompleted higher education. Here we treat uncomplete higher education as secondary education, as we follow the highest level of education attained in line with EU methodology. (2) Ukraine LFS 2020 and Poland LFS 2022 include the 15-64 age group, NBP (2022) cover 18+ age, and MSNA Poland 2023 cover 15+.



Source: Deloitte own elaboration based on Eurostat, https://nbp.pl/wp-content/uploads/2023/04/Sytuacja-zyciowa-i-ekonomiczna-migrantow-z-Ukrainy-w-Polsce_raport-z-badania-2022-r.pdf, UNHCR survey conducted from 13.07.2023 to 21.08.2023, and State Statistics Service of Ukraine (2021).

The high level of education of Ukrainians coming to Poland helped them access the labour market. The percentage of higher education for refugees and pre-2022 migrants from Ukraine in NBP and UNHCR surveys is significantly higher than for the Polish population and even higher than for Ukraine, according to the Labour Force Survey (LFS) in Poland, and its equivalent in Ukraine. According to NBP survey from 2022 the percentage of refugees with higher education was at 48%, while MSNA

Poland 2023 assess that around 56%²³ of refugee arrivals had completed higher education. This means that Ukrainians with higher education were more likely to relocate to Poland or leave Ukraine in general, having the necessary means to achieve this. On average refugees with a bachelor's degree or higher had an over 30% higher employment rate than peers without a degree, according to MSNA Poland 2023 survey.

23 Due to possible differences in methodologies data from this surveys should not be directly compared

Refugees from Ukraine are not yet utilising their full potential in the Polish labour market. In May 2022, 46% of arriving refugees declared that they had no knowledge of the Polish language (NBP, 2023). Over time, this percentage improved, with data from November 2022 showing a result of 21%, though this still represents a large group of people who do not know the local language²⁴, placing them at risk of limiting possible jobs to those below their educational level. Nearly 40% of Refugees from Ukraine insured at ZUS on 30th June 2023 in Poland were employed in elementary occupations²⁵,

while for all employed persons in Q2 2023 this percentage was only 5%. Furthermore, the Deloitte Ukraine Refugee Pulse report indicates that 50% of respondents point to language barriers as an obstacle to accessing services to meet basic needs (Deloitte, 2023). Meanwhile, in the MSNA Poland 2023 survey, when asked about encountered barriers for accessing the labour market, 34% of respondents pointed to lack of language knowledge.

Smooth inclusion of refugees on labour market thus far was enabled by proper policies. In response to the war escalation

in Ukraine and the influx of refugees into the EU, prompt actions were taken both at EU and national level.

Refugees from Ukraine in the European Union are covered by the Temporary Protection Directive TPD, which was activated on 4th March 2022 (European Council, 2022). The regulation aims to support EU Member States' asylum schemes and to ensure harmonised rights for the incoming Ukrainian refugees throughout the EU. It also includes citizens who fled Ukraine not long before 24th February and those who were outside the

country before the full-scale war began. The document primarily includes residency rights and housing access, labour market access, social welfare and medical assistance, as well as access to education and legal guardianship for unaccompanied children and teenagers. Additionally, Ukrainian nationals that become admitted to EU territory are free to move across it for 90 days and are able to choose any EU country where they will make use of the temporary protection. The directive was initially introduced for one year – until 4th March 2023, however in September 2023 it was extended for a second time to remain active until 4th March 2025.

The Polish government introduced a Special Act²⁶ that facilitated refugees' inclusion. The work on the Act started when the activation of TPD was not certain, but later it was used for transposition of TPD. As a result, the Polish framework is very similar to the TPD, though the scope of the Act is wider than the TPD. However, it only covers those that arrived in Poland after 24th February 2022. This legal framework gave access to the job market, health care and education. The authorities allowed those fleeing Ukraine to access basic administrative systems like PESEL and "Trusted Profile", and legalised residency for 18 months. The government's solutions allow refugees to get a job, run a business or register as unemployed or seeking work. On top of that, due to constitutional guarantee of access to education for everyone, refugee children were allowed to access schools and kindergartens.

By granting labour market access to refugees from Ukraine, Poland and other EU Member States created immediate opportunities for refugees to be self-reliant and avoid dependence on humanitarian aid.

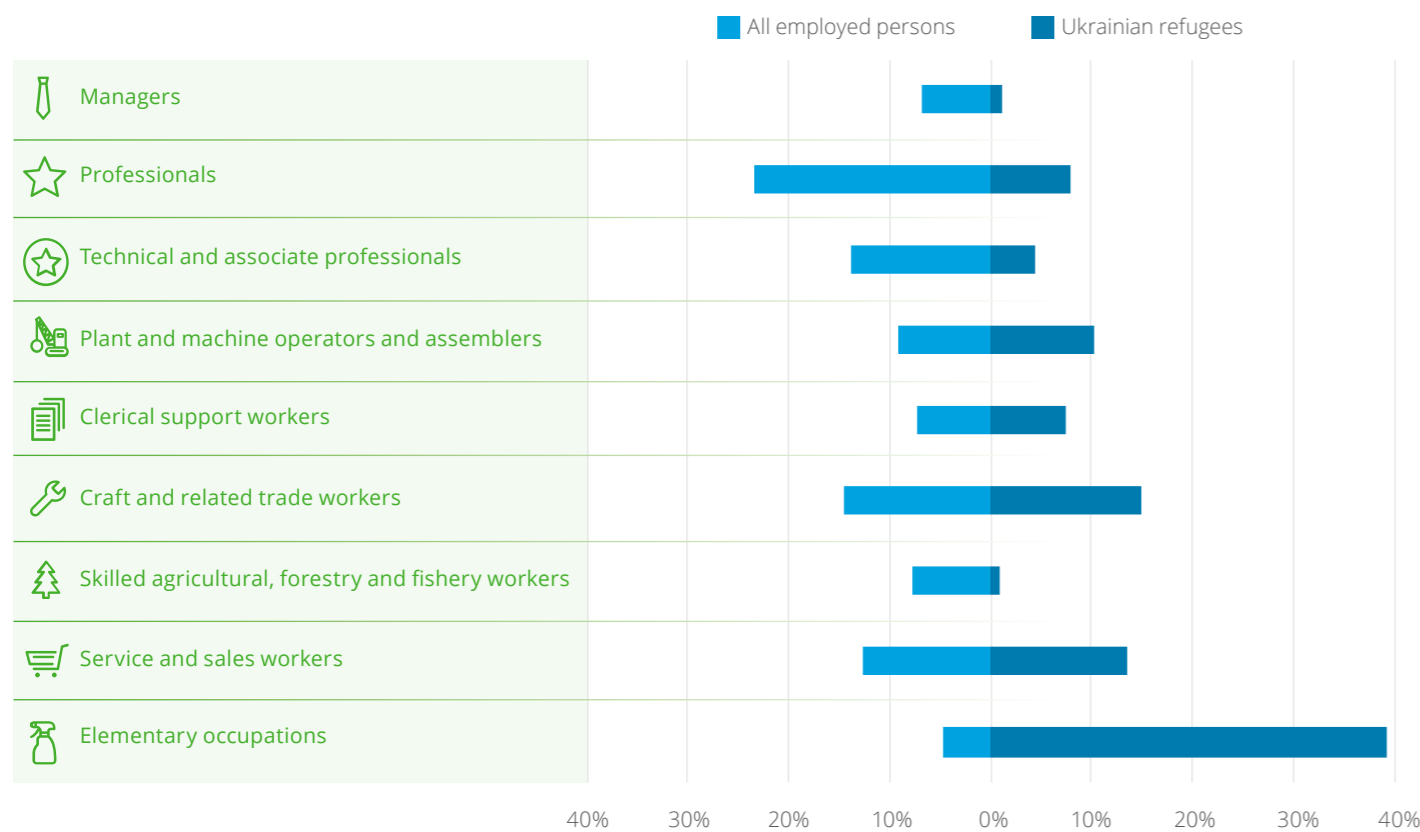
Refugees around the world are often barred temporarily from the labour market. Unfortunately, this slows their labour market inclusion and human capital accumulation, generating costs to the refugees and receiving economies alike. Such policies are evaluated in recent studies by Ahrens et al. (2023), Fasani et al. (2021), and Marbach et al. (2018).

Ahrens, Beerli, Hangartner, Kurer, and Siegenthaler (2023) examine refugee labour market outcomes of temporary employment bans, restrictions for certain sectors and regions, as well of prioritisation of residents that varied between the 26 Swiss cantons over the 1999-2016 period. These policies together produced large negative employment and earnings effects. At median length of 3 months, employment bans alone lowered refugee employment by 2.4 p.p. in the first year, with the effect lowered to half to a third in years 2-4. Additionally, employment bans of more than 3 months reduced wages for the first 4-6 years after arrival.

Fasani, Frattini, and Minale (2021) examine effects of temporary employment bans on refugee labour market outcomes between 1985-2012 in 19 European countries. They find that refugees affected by a temporary ban experienced large and persistent negative effects. Even 8 years after immigration, they were less likely to work (8.9 p.p. lower probability of employment compared to the situation if they were not affected by such a ban) and more likely to remain outside the labour market (9.2 p.p. lower economic activity respectively). Naturally such policies are even more hurtful in the short term. During the 2015 refugee crisis, 26 out of 30 European countries imposed such employment bans on over 1 million refugees, resulting in an estimated GDP loss of EUR 38 bln over 8 years, equivalent to about EUR 4,100 per banned refugees per year.

Marbach, Hainmueller, and Hangartner (2018) exploit a natural experiment, in which a 2000 court ruling in Germany prompted its government to change the employment ban for asylum seekers from indefinite to 12 months. Authors focus on 1999 and 2000 cohorts of refugees from Yugoslavia, showing that the 1999 cohort, who faced, on average, 7 months of additional wait time, experienced much lower employment rates than compared to the 2000 cohort. By 2005 employment rates among the 1999 cohort were only 29%, compared to 49% for the 2000 cohort. The employment gap persisted for up to 10 years. Authors back-of-the-envelope calculation estimates, that a simple shortening of the employment ban for the 1999 cohort by 7 months would save the German taxpayers approximately EUR 1,000 per refugee per year over the 2001-2009 period.

Chart 12. Structure by occupational group of all employed persons and refugees from Ukraine



Note: Total denotes all employed persons average in Q2 2023 from the GUS Labour Force Survey, while Refugees from Ukraine refer to refugees from Ukraine insured at ZUS and identified by their PESEL number as of 30.06.2023. 193 thousand Refugees from Ukraine have been successfully assigned to an occupational group out of 218 thousand (actual working population is larger due to the informal sector and likely some cases of temporary work arrangements).

Source: Deloitte own elaboration based on Statistics Poland and ZUS data.

²⁴ Due to possible differences in methodologies data from this surveys should not be directly compared

²⁵ Elementary occupations include: Cleaners and helpers; Agricultural, forestry and fishery labourers; Labourers in mining, construction, manufacturing and transport; Food preparation assistants; Street and related sales and services workers; Refuse workers and other elementary workers.

²⁶ Act of March 12, 2022 on assistance to citizens of Ukraine in connection with the armed conflict on the territory of the country

By refraining from any refugee dispersal policies, Poland and other EU Member States may have improved labour market inclusion. In many European countries refugees are geographically dispersed after arrival to spread the cost of hosting them, ease the stress on the housing market and public services, and to avoid creating ethnic enclaves. The effects, however, can be detrimental to labour market inclusion and may be contrary to other aims of the policy. Dispersal pushes at least some of the refugees into regions with weak labour markets and few co-nationals already settled, who otherwise could transmit important information about employment opportunities. Fasani, Frattini, and Minale (2022) conducted the first cross-country study of refugee dispersal policies. Their LFS sample covers refugees who experienced dispersal policies in Finland, Germany, Ireland, Netherlands, Norway, Sweden, Switzerland and the UK (no data for Denmark). They find that non-EU15 refugees aged 25-64 who arrived when a dispersal policy was in place experience 4.5 percentage points lower employment rates than for those not exposed to such a policy. This may understate the effect, as for refugees who arrived 10 or less years before the survey, the effect is 17.5 percentage points, while it becomes statistically insignificant afterwards. For the six countries for which data on residence is available, non-dispersed refugees show clearly stronger clustering in economically stronger regions (measured by GDP per capita).

Economic research on dispersal policies and labour market inclusion focuses on the strength of local labour markets and size of local ethnic networks. While some scholars find only the strength of local labour markets to be significant and not co-national networks (Foged, Hasager, and Peri, 2022), or inconsistent results for co-national networks (Müller, Pannatier, and Viarengo, 2022), others find effects only for co-national networks (Damm, 2014).

Migrants dispersed to weaker labour markets experience poorer inclusion outcomes in subsequent years, and vice versa. These outcomes can pertain to employment, earnings, or human capital accumulation, and have been shown in Denmark (Foged, Hasager, and Peri, 2022; Azlor, Damm, and Schiltz-Nielsen, 2020), Germany (Aksoy, Giray, Poutvaara, and Schikora, 2020), Norway (Godøy, 2017), Sweden (Åslund, Östh, and Zenou, 2010; Åslund and Rooth, 2007), and Switzerland (Müller, Pannatier, and Viarengo, 2022), as well as the previously described cross-country study. This could in principle stem from scarring on an individual level from weak initial opportunities, or persistently weak local labour market combined with imperfect geographic mobility. The effects are hard to disentangle, while Åslund and Rooth (2007) find some indication that both phenomena are at play, Godøy (2017) finds evidence only for persistently weak local labour markets.

Migrants and refugees dispersed away from ethnic enclaves experience weaker labour market inclusion outcomes, and vice versa.

Co-nationals can provide important information to refugees about employment opportunities. In Germany, Battisti, Peri, and Romiti (2022) found that immigrants initially located in places with more co-nationals, as well as well as refugees and repatriated ethnic Germans dispersed to such places, are more likely to be employed in the first 3 years. It was found, however, that these groups had lower probability of investing in human capital. In Swiss data, Martén, Hainmueller, and Hangartner (2019) found that refugees dispersed to locations with more co-nationals are more likely to find work, especially in the first 3 years. In Danish data, Damm (2014) found that higher skill levels of non-Western immigrant men in an area raises employment probability of refugee men, while higher employment rates of their co-national men raises their earnings. Also in Danish data, Damm (2009) found that larger size of ethnic network in an area increases earnings of refugees. In Swedish data, Edin, Fredriksson, and Åslund (2003) found that refugees dispersed to areas with more co-nationals experience higher earnings.



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Dispersing refugees to weaker labour markets can also have negative social outcomes. Albarosa and Elsner (2022) report more anti-immigrant incidents during the European refugee crisis (2015/2016) in areas of Germany with high unemployment rates and shares of right-wing voters. Damm and Dustmann (2014) show that immigrant men dispersed to areas of Denmark with more convicted criminals, experience higher future crime conviction probabilities, but not overall neighbourhood crime rate.

The estimated employment rate of refugees from Ukraine in Poland is above 60% and was among the highest in the OECD²⁷. Although there is uncertainty around employment rate in different countries due to uncertainty regarding refugee numbers and methodological issues, comparable studies put Poland as the leader in labour market inclusion of refugees. NBP estimates their employment rate in Poland at 65%²⁸, while MSNA Poland 2023 gives a slightly lower figure of 61%. In comparison, the employment rate equalled 61% in the United

Kingdom, 56% in Sweden, 53% in Lithuania and 51% in the Czech Republic. The estimate for Poland was based on November 2022 National Bank of Poland survey data. This relatively high value is supported by a UNHCR Assessment from 2nd November, in which survey results show that 72% of refugees are in the labour force, with 61% employed and 11% unemployed. The most refugees are employed in manufacturing – 14%, accommodation and food service – 12%, and trade and repair – 6%. 89% of the survey respondents were women²⁹.

27 Deloitte elaboration based on the aggregation in OECD International Migration Outlook 2023

28 After the closing date for our report, NBP (2024) published new data, showing a slight drop in Ukrainian refugees employment rate to 62% that does not change our general conclusions.

29 UNHCR Multi Sectorial Needs Assessment October 2023

Table 1. Ukrainian employment rate in EU.

	Employment rate	Main sectors of employment	Date	Source
Poland	65%	N/A	Nov-22	Narodowy Bank Polski
Poland	61%	Manufacturing, accommodation and food service activities,	Aug-23	UNHCR
United Kingdom	61%	Hospitality; other sectors; information technology and communication sector	Mar-23	ONS
Sweden	56%	Services; construction; ICT	May-23	IOM
Lithuania	53%	Elementary occupations (including cleaning); services and sales	Jul-23	Lithuanian Employment Service
Czech Republic	51%	Unskilled/manual labour	Dec-22	PAQ Research
Denmark	46%	Cleaning; catering; warehousing	Apr-23	Integration barometer
Netherlands	46%	Business services sector (including employment agencies); trade, transport and accommodation and food services.	Nov-22	Statistics Netherlands
Estonia	46%	Manufacturing; administrative and support service activities; wholesale and retail trade.	Jul-23	Statistics Estonia
France	33%	N/A	Apr-23	Ministry of Labour
Ireland	28%	Wholesale, transport and accommodation	Jun-23	Central Statistics Office
Italy	19%	Domestic services, construction, catering	Dec-22	UNHCR
Switzerland	19%	Other sectors; hotel/catering; planning/consulting/IT	Jul-23	SEM
Germany	18%	N/A	Jan-Mar 23	DIW Berlin

Source: Deloitte elaboration based on the aggregation in OECD International Migration Outlook 2023. The calculation methods of employment rates vary between the countries, the results for Poland, the United Kingdom, Czech Republic and Italy are based on surveys. Additionally, the different statistical offices and organisations may use different employment and working age definitions.

Currently, DIW Berlin data shows that the employment of refugees from Ukraine is much lower in Germany, although many aspire to find employment. In a weekly report from 12th July 2023 the German Institute for Economic Research (DIW Berlin), a survey conducted in the first quarter of 2023 finds that only 18% of working age refugees were employed (Kollman, 2023). Among the non-employed, however, as many as 93% declare willingness to begin working, of which 71% as soon as possible or within a year. Importantly, many refugees are currently attending language courses in Germany – 65% in early 2023 with a further 10% already having completed a course. 87% also took part in inclusion courses that were offered. Per the report, since the beginning of the full-scale war, around one million people have fled to Germany, while Eurostat data on beneficiaries of temporary protection show that there were around 1.17 million Ukrainians under such schemes in Germany³⁰.

Among working refugees there is a significant number of entrepreneurs. The high employment rate of refugees in Poland covers not only employees, but also the self-employed. The available data also shows that refugees from Ukraine in Poland are likely to start their own businesses. ZUS (social security) statistics on insured refugees indicate that around 5% of them have set up a business or are freelancers. Similar results can be gleaned from the MSNA Poland 2023 survey results, which show that slightly more than 5% of respondent households receive income from self-employment or similar activities. This percentage appears to be slightly higher for men, at over 6%, than women.

Although all available sources confirm a relatively high employment rate of refugees from Ukraine in Poland, exact numbers are uncertain.

Three main data sources are available on the employment status of Ukrainian workers:



Surveys – their main advantage is broad definition of labour, in line with the approach used in Labour Force Surveys (standardised, regular pan-European survey). By design surveys yield both number of working and the whole working age population, making calculation of employment rate straightforward. The biggest challenge of such surveys is their representativeness – to what extent the covered sample mirrors the structure of the whole refugee population. The biggest (and thus most representative) surveys were run by NBP and UNHCR, yielding employment rates of 65% and 61% respectively.



Labour offices – Special Act that opened the Polish labour market for refugees requires that employers submit declarations that they will employ foreigners to the labour office. As of February 2023, more than 900 thousand such declarations have been submitted. This number overstates the number of working refugees as not all declarations ended with a job being taken and, most importantly, multiple declarations could have been submitted for the same person as they changed jobs (this includes frequently changed short-term jobs). Furthermore, data from labour offices are not easy to translate into employment rates, as the Ukrainian population in Poland (denominator) is also uncertain, as discussed in Chapter 1.



Social security data – the most reliable and granular data available, offering snapshot of Ukrainian population working at given point of time. Unfortunately, they cover only jobs that are covered by social insurance, excluding some types of contracts and work in shadow economy. Similarly, as in case of labour office, such data cannot be recalculated into employment rate without additional assumptions about number of working-age Ukrainians in Poland.

30 Eurostat data, https://ec.europa.eu/eurostat/databrowser/view/migr_asytspm/default/table?lang=en

Since the beginning of the Russian invasion, the number of Ukrainian workers covered by social security insurance in Poland increased by 126 thousand. The true increase of insured refugees however is larger. By checking previous insurance status, ZUS identified 228 thousand newly registered insured persons active on 31st March 2023.³¹ Considering the number of Ukrainians with active PESEL UKR at the time, this would yield an employment rate of 43%. As this number does not take into account jobs not covered by social insurance and informal work, this can align with the over 60% employment rate noted in the surveys. This number does not take into account over 500 thousand Ukrainians that were paying social security contributions before the beginning of the full-scale war and remained in Poland after its outbreak.

The refugees present in Poland, while not without difficulties, are largely able to provide for themselves and their families. As reported in the Deloitte

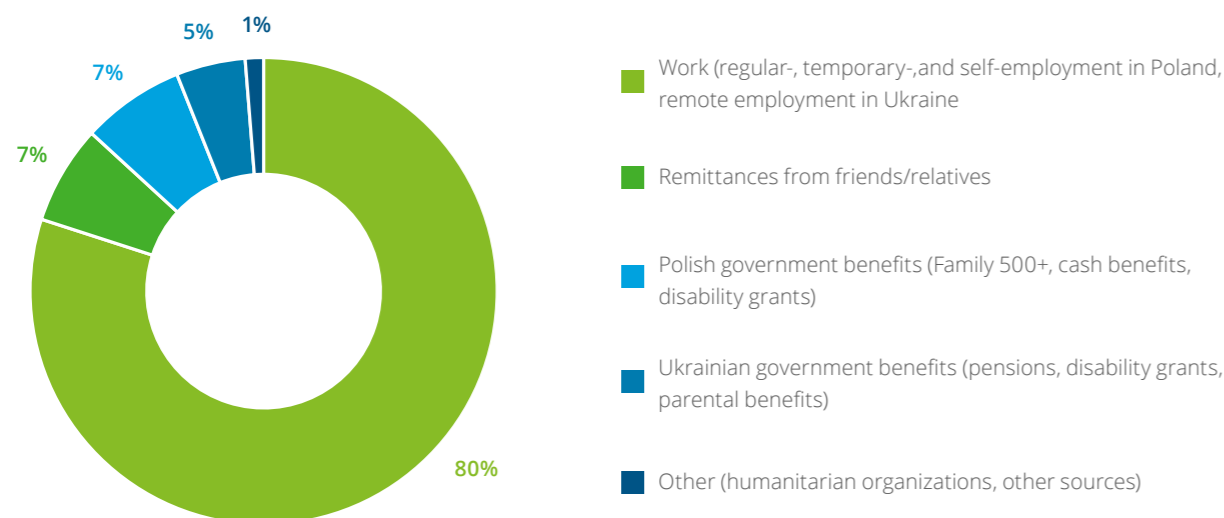
Ukraine Refugee Pulse, which is based on a survey carried out between October and December 2022, 40% of respondents have enough income to meet basic needs or are able to support the same lifestyle they had in Ukraine, while 60% say they do not have enough income or have to rely on savings and welfare. At the same time 62% reported staying in accommodation for which they pay themselves. MSNA Poland 2023 survey also shows that when asked whether they faced any challenges obtaining enough money to meet their needs, the refugees were nearly equally split (around 0.5% more reported no difficulties), with an additional 8% not knowing or refusing to answer. According to the National Bank of Poland survey carried out in November 2022, 28% of refugees said they spend less than half of their income on daily expenses, most spend between 50% and 80%, and 19% spend 80-100% of their income.

Currently between 225 and 350 thousand of refugees from Ukraine are working in Poland. The lower bound is the number from social security, while the higher bound is the product of employment rate from the surveys and working age population with PESEL numbers.

Importantly, most of the income of Ukrainian nationals living in Poland, both refugees and pre-2022 migrants, comes from their work. Our calculations based on the UNHCR MSNA Poland 2023 survey results show that 80% of refugee income comes from employment, with other sources on average playing a much lesser role. The income brackets presented in the survey show that 20% of households earn less than 3000 PLN, 41% earn between 3,000 and 6,000 PLN and 12% earn more than 6,000 PLN, while 27% of respondents preferred not to answer. Meanwhile, in the NBP (2023) survey conducted in November 2022 the net income of refugees oscillated between 2,000 and 3,000 PLN, while the net income of pre-2022 migrants was closer to between 3,000 and 4,000 PLN. In the case of Ukrainians that were out of work, the monthly income was more varied, especially because there were fewer previous migrants in this situation. The median income for non-employed pre-war immigrants was around 2,500 PLN³². Among refugees from Ukraine remaining out of work at the time of the survey, the median income equaled around 600 PLN.

The standard of living of refugees from Ukraine may be significantly lower than natives, even at similar incomes due to their lack of housing capital. 87% of the population in Poland resided in owner-occupied housing in 2021 and 2022, according to Eurostat. As most refugees from Ukraine do not possess housing of their own in Poland, they need to rent in a relatively tight market, especially when they reside in large metropolitan areas that offer the most opportunities. Initially, in the first month after the outbreak of the full-scale war in Ukraine, the number of renting offers in the OLX and Otodom portals dropped by approximately 60%, though it later returned to previous levels.

Chart 13. Income structure of Ukrainian refugee households



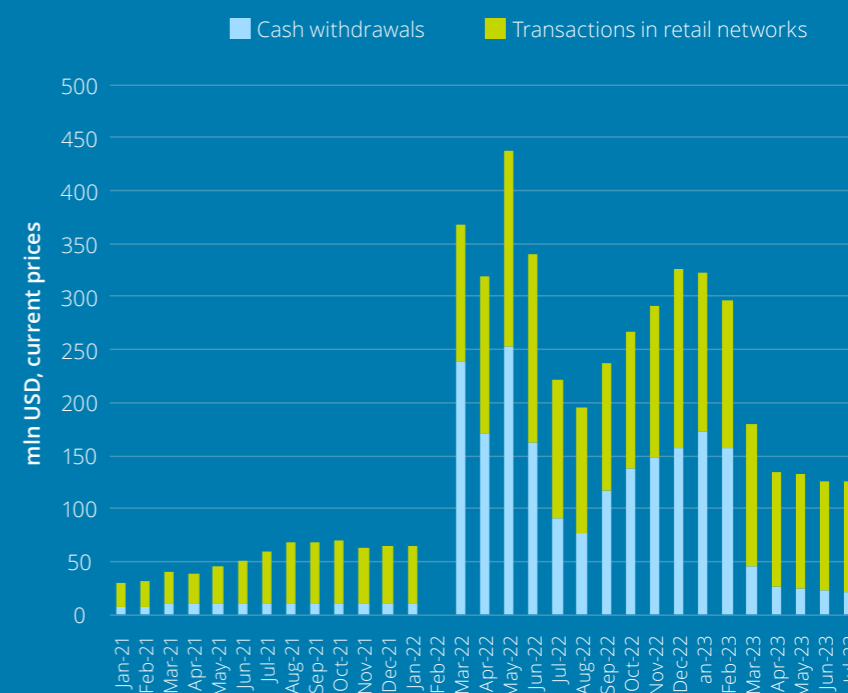
Source: Deloitte elaboration based on the MSNA Poland 2023. The work category includes regular employment, temporary work, self-employment and remote work in Ukraine.

31 [Cudzoziemcy w polskim systemie ubezpieczeń społecznych \(zus.pl\)](https://www.zus.pl)

Box 1. Inflow of savings from Ukraine

Inflow of refugees from Ukraine coincided with an inflow of capital, as they carried their personal savings with them. This is evidenced by a sharp spike in ATM cash withdrawals and retail network transactions with Ukrainian bank cards abroad. In March 2022 Poland accounted for circa 30% of these. Some of the sharp declines in subsequent months reflect strengthening of capital controls in Ukraine, e.g. weekly limits on cash withdrawals. We have estimated the amount of these additional capital transfers into Poland and included them in our D.Climate model economic impact estimates.

Transactions with Ukrainian bank cards in Poland



Source: Deloitte own elaboration based on NBU data.

Note: No data for February 2022. Data before February 2022 are Deloitte estimates based on aggregate data and Poland's share in subsequent months. Data does not include operations in ATM and self-service payment machines and card transfers, as they are not disaggregated between foreign (from the perspective of Ukraine) countries, but these were very insignificant when compared to withdrawals and retail networks.

32 According to NBP (2023), there were few respondents in this situation, and they most likely had secured other sources of income.



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3.

Economic impact modelling

Refugees' impact on the economy manifests in a multi-layered fashion. An influx of refugees means first and foremost an increase in population. As such, they enter the economy boosting the labour market as new workers, increase demand as new consumers, and stimulate business by creating market niches catering to their needs and as potential new business owners. However, their characteristics differ from the local population (in terms of gender, age, education, skills etc.) meaning their impact as both workers as well as consumers would not be proportional to increases in population. Refugees also differ in their characteristics with other migrants. Although their economic impact in the literature is modelled similarly to the impact of other migrant groups, they also differ from them due to life circumstances. While immigration systems generally rely on

employer sponsorship (immigrants come following a job offer – popular in Poland), family reunions (immigrants have family ties to a citizen abroad – like often in the USA) or point systems (immigrants fulfil certain characteristics judged by the state as valuable – like in Australia), refugees as involuntary migrants may not possess any such characteristics. Additionally, they may suffer from war trauma and be subject to policies that impede their labour market integration (like temporary labour bans or dispersals described in the previous chapter). This translates into lower employment and wages of refugees, which are key characteristics in terms of economic impacts. Moreover, their spending needs due to a sudden shift in living situation may be disproportionately higher, while their propensity to save lower as their future situation is more uncertain, resulting in the

need to finance their consumption using capital generated outside the country e.g. savings from their home countries.

High employment rate of Ukrainian refugees translates into more workers and thus additional economic growth. In July 2022, OECD estimated the contribution of Ukrainian refugees to the labour force and employment in European host countries, based on a 2014 Labour Force Survey ad-hoc module that includes refugee labour market outcomes and 2019 LFS with outcomes of recent non-EU migrants. They estimated that Ukrainian refugees would increase employment in Poland by 1.2-1.8% (Dumont & Lauren, 2022). As refugee employment rates are higher than expected, the actual increase is higher, between 1.4% and 2.2% (estimates of 0,23-0,35 million relative to LFS employment).

Simple back-of-the-envelope calculations give the intuition behind how additional workers help to grow the economy. The simplest estimate would be to assume that an increase of employment by 1.4-2.2% will grow the Gross Domestic Product by an equal percentage. In such a case, we would need to assume that labour is the only production factor, and thus all of GDP can be equally divided between workers. However, this is not the case, as GDP is not just a function of labour, but also of capital that workers have at their disposal – all the machines, computer programs, offices, and the like. As displacement is unexpected and refugee status (both legal and intent to stay long term) at first is uncertain, companies take time to increase their stocks of capital to the new workers. A more elaborate estimate would account for the part of GDP

that is produced by labour alone. This can be estimated by assuming that it is equal to the labour compensation share of GDP (GDP can be divided into compensation of labour and capital), which in 2022 and 2023 stood in Poland at 48% according to the European Commission's AMECO database. Accounting for that, gives a lower estimate of 0.7-1.0% GDP. Such calculations are very abstract, and do not account for other phenomena developing simultaneously in the economy, like the various effects of the war and energy shock. For this reason, we turn next to formal general equilibrium modelling, where equations of the model state explicitly every assumption about the workings of the economy and allow for a credible estimation of counter-factual scenarios.



To assess the impact of refugees on the Polish economy, a simulation was performed using the Deloitte D.Climate model^{33,34}.

It is a general equilibrium model using consumer and producer optimisation to calculate changes in the economy in response to shocks. This allows to assess the impact of shocks considering supply and demand channels as well as connections between different sectors of economy. This provides information about their total impact on many aspects of the economy including the labour market, government revenue as well as main economic aggregates. It is deemed the most appropriate tool to account for refugees' multi-layered impact. To account for the effects of other shocks happening in the economy (such as the energy crisis) counterfactual analysis was performed using the newest data for the Polish economy. In other words, we were able to isolate the refugee inflow from all other shocks in the economy, like the other macroeconomic consequences of the war in Ukraine. The results were calculated for 2022 and 2023 with additional long-term analysis to check how the economy would adapt assuming no new shocks including no counter-shocks³⁵.

³³ [Economics of climate change | Deloitte Australia](#)

³⁴ [Analiza ryzyk klimatycznych – badanie scenariuszy z modelem D.Climate | Deloitte](#)

³⁵ E.g. refugees keep having lower productivity rather than adapt to level of natives.

Box 2. Labour productivity of refugees in relation to the rest of population

To gauge the labour productivity of Ukrainian refugees in relation to the rest of the population we performed back-of-the-envelope calculations. Unfortunately, publicly available data for the refugee and general populations is gathered differently and for different time periods. Assuming that such results are broadly correct – educational attainment and geographical distribution imply higher earnings (a proxy for labour productivity) of refugees than the general population, while their employer firm sizes, economic sectors, and occupational groups imply lower earnings.

In particular:



Ukrainian refugee educational attainment implies from 18% (assuming refugees' educational attainment from November 2022 survey) to 19% (July-August 2023) higher earnings than the general population.³⁶



Smaller firm sizes of employers of Ukrainian refugees imply their 8% lower productivity (and thus earnings) from the general population.³⁹



Poviat-level geographical distribution of Ukrainian refugees is more concentrated in high productivity agglomerations, implying 7% higher earnings than for other workers registered for social security.³⁷



Most of all, occupational distribution of Ukrainian refugee workers from ZUS implies 21% lower earnings from the general population when measured by nine large occupational groups and 23% lower by detailed occupations.⁴⁰



There is no publicly available hard data on the sectoral distribution of Ukrainian refugees, which we proxy by the growth in employees with Ukrainian citizenship registered for social security since the outbreak of the full-scale war in Ukraine (unfortunately this to some extent will be Ukrainian workers previously present in Poland who changed jobs) – this imperfect proxy implies 7% lower earnings than general workers.³⁸

36 Note that these percentages are only indicative, as Ukrainian refugee educational attainment is assumed on the basis of November 2022 NBP (2023) survey for 18+ age group and July-August 2023 UNHCR (2023) survey for 15+ age group, while the general population is taken from the 2022 Labour Force Survey for 15-74 (broadest available) age group, and earnings by educational attainment are taken from the GUS (2022) "Structure of wages and salaries by occupations in October 2020".

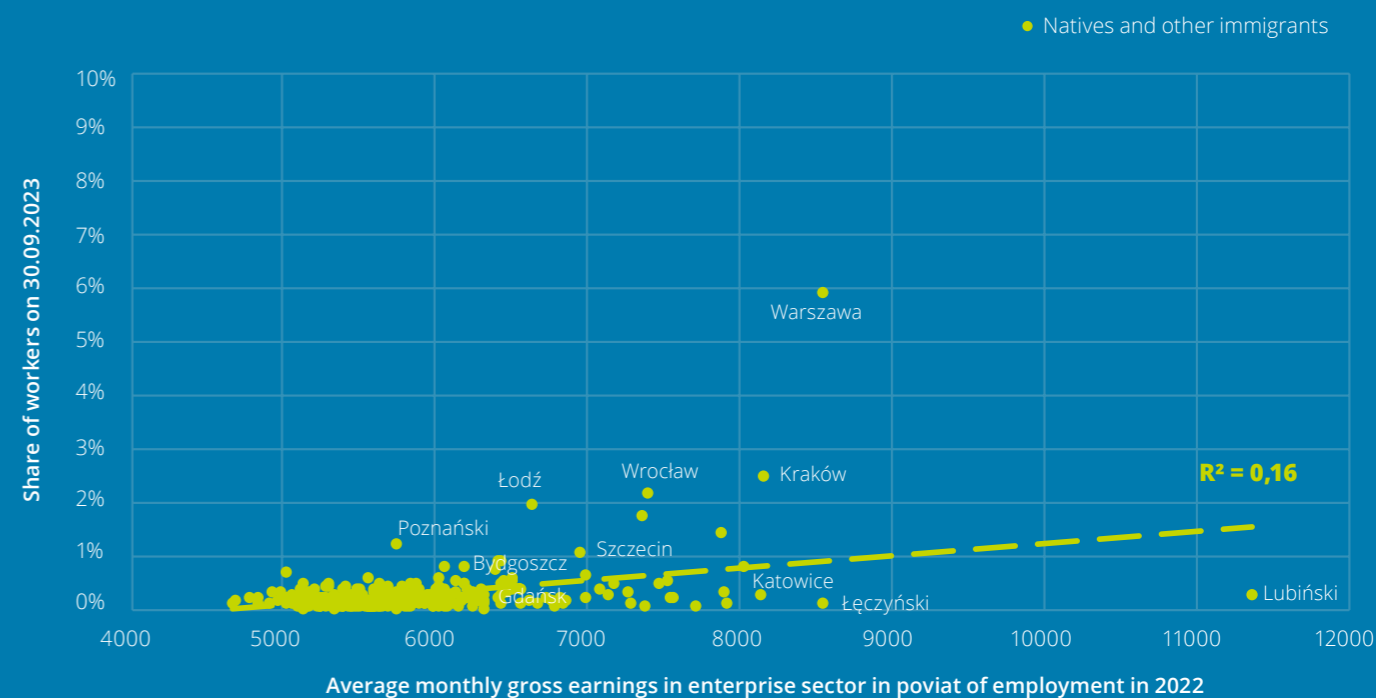
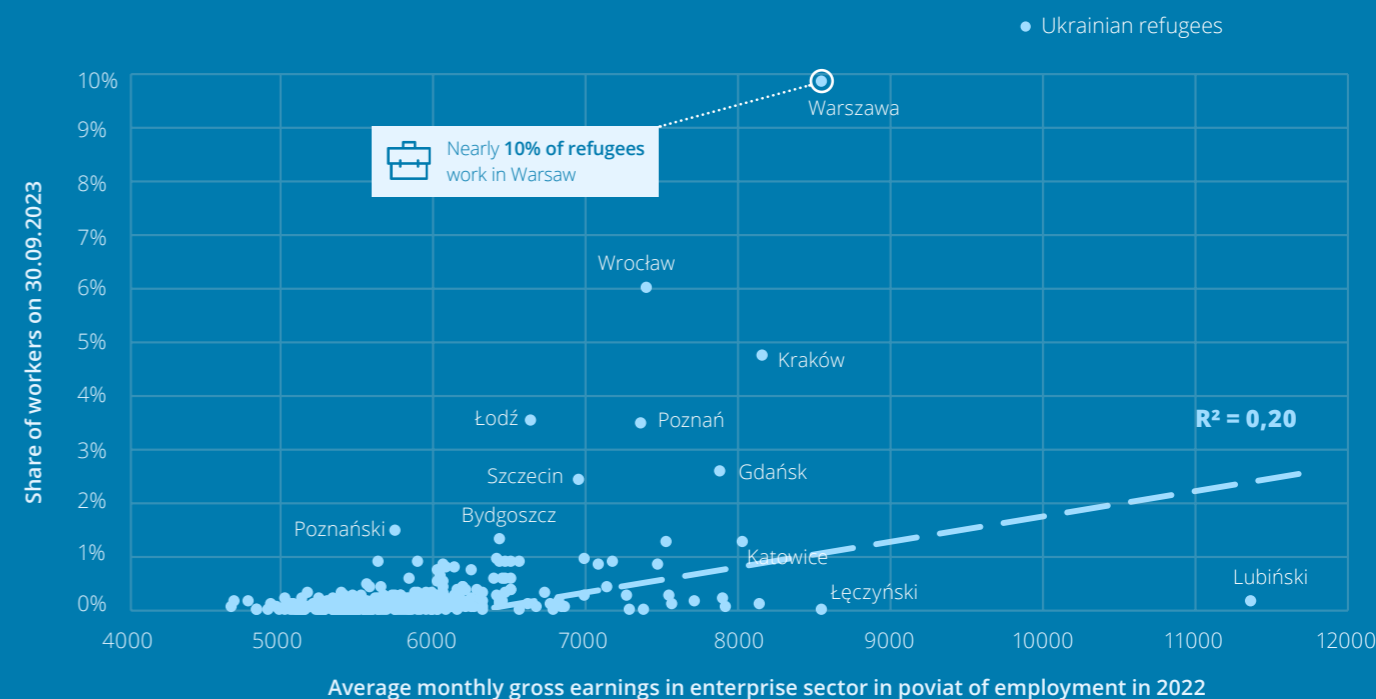
37 Note that the numbers of Ukrainian refugees and all workers numbers by poviats are taken from ZUS Statistical Portal on 30th September 2023 from the universe of workers registered for social security (this does not cover the informal sector and some jobs that do not require social security). Ukrainian refugees are identified by PESEL UKR. Salaries and wages are taken from Statistics Poland BDL GUS database for 2022, but cover only the enterprise sector (firms with 10 or more employees).

38 Note that there is no publicly available administrative data on the sectoral distribution of Ukrainian refugees. We proxied their sectors by taking the difference in workers with Ukrainian citizenship registered for social security between H1 2023 and end of 2021 in A-Q 1-letter NACE sections. For the general population we used employment in the 15+ age group in Q2 2023 from the Eurostat Labour Force Survey. Earnings by NACE section have been taken from Statistics Poland Statistical Bulletin wages and salaries for the enterprise sector and public sector in Q2 2023.

39 Note that Ukrainian refugees have been allocated to firm sizes based on the July-August 2023 UNHCR (2023) survey, while general workers from the GUS (2023) "Employment in the national economy in 2022". Productivity of firms by size is based on gross value added per person employed in industry, construction, and market services sectors (broadest available) in 2021 from Eurostat Structural Business Statistics.

40 Note that data on occupations of Ukrainian refugees is for persons with PESEL UKR registered for social security on 30th September 2023. It is then compared to the general population by nine main occupational groups from GUS LFS in Q2 2023 and earnings from GUS (2023) "Structure of wages and salaries by occupation in October 2022", and by detailed occupations workers and earnings from GUS (2022) "Structure of wages and salaries by occupations in October 2020".

Chart 14. Distribution of workers (refugees from Ukraine vs. natives and other immigrants) by average earnings in a poviat
Persons registered for social security on 30.09.2023



Note: Earnings in poviat Lubiński are so high, as it is the site of KGHM, state-owned copper mining corporation.



Source: Deloitte own elaboration based on ZUS, and Statistics Poland data.

To account for refugees impact on economy shocks for economy were calibrated according to existing data. As the refugees started coming to Poland by the end of February and in March 2022 it was assumed that their impact on the economy should be seen starting from the second quarter of 2022. As such their primary impact on yearly data was divided as between 2022 and 2023 setting ¾ of it in 2022 and ¼ in 2023. The total number of refugees was set according to the newest data from the PESEL registry (Chart 3. in Chapter 1). Their employment was calibrated to match data presented in Chapter 2. Changes in population and

labour supply in Poland were offset by equivalent changes for Eastern Europe region⁴¹. It was also assumed that refugees should have higher spending needs which means a lower saving rate than natives. Moreover, data shows that it is partially financed by savings they have in Ukrainian banks which was calibrated as them having negative saving rate while being offset by lowering investment levels in Eastern Europe⁴². Lastly, their productivity may differ from productivity of natives (Box 2) which also was taken into account. In total there were three major sources of uncertainty: total level of employment, productivity, and impact on consumption.

As such **4 scenarios** were calculated with options corresponding to different mixes of low and high estimation for employment and productivity while keeping stable impact on consumption: high or low employment level, similar (baseline) or lower (conservative) productivity. In the conservative productivity scenario, we assumed approximately 10% lower refugee productivity estimated based on incomes reported in MSNA Poland 2023 and data from Statistics Poland.



Table 2. Cumulative changes in main indicators in 2023

	SCENARIO 1	SCENARIO 2	SCENARIO 3	SCENARIO 4
	Low employment conservative productivity	High employment conservative productivity	Low employment baseline productivity	High employment baseline productivity
GDP	+0.70%	+0.97%	+0.76%	+1.07%
Unemployment rate	+0.2 pp	+0.3 pp	+0.2 pp	+0.3 pp
Real wages	-0.69%	-1.10%	-0.64%	-1.02%
General government income	+1.30%	+1.53%	+1.35%	+1.61%

41 Aggregate region in model consisting of Ukraine, Russia, Belarus, Moldova, Czechia, Slovakia, Hungary, Romania and Bulgaria.

42 In other words it was assumed that money that would be spent e.g. through credit action for investments in Eastern Europe were spent for consumption in Poland.

The main impact of refugees is in growth of the economy. Refugees increase both supply as workers and entrepreneurs as well as demand as consumers. Increase in GDP is not directly proportional to the increase in population or employment. Net benefits are lowered both due to a decrease in capital to labour ratio as well as an increase in competition on the labour market. Moreover, increase in demand in tight labour market conditions results in higher inflation and lower price competitiveness of Polish products which lower its overall positive impact. Nevertheless, the positive impact of refugees on the economy is significant in every scenario considered.

In 2022 it amounts to real GDP being higher by 0.5-0.8% and in 2023 cumulatively by 0.7-1.1%. This corresponds to GDP being higher by 24-36.9 billion PLN in 2023⁴³.

In the long term, total potential GDP should be higher by around 0.9-1.35% due to refugees contributions.⁴⁴

Our results are consistent with the previous, similar studies. In estimating GDP impacts we take an approach that is most similar to the previous studies of the pre-2022 Ukrainian migrants by NBP economists (Gradzewicz, Jabłonowski, Sasiela, and Żółkiewski, 2021; Strzelecki, Growiec, and Wyszyński, 2022), but unlike the previous Oxford Economics and ours impact estimates of Ukrainian refugees (Urban, 2022; Deloitte, 2022) we do not allow for the possibility of a positive productivity shock, because there is little data to credibly estimate its size. Below, we summarise impacts yielded by these studies. As studies were done under different assumptions on the number of

refugees, we have adjusted all the results proportionally to a 1.4-2.2% employment growth. First, Gradzewicz, Jabłonowski, Sasiela, and Żółkiewski (2021) use the NBP CGE model to estimate the economic impact of pre-2022 Ukrainian migrants over the 2015-2018 period, treating their inflow as a positive unskilled labour shock. If the Ukrainian refugee inflow had the same characteristics, it would yield a 0.5-0.8% higher GDP – the lower bound of our estimate. Second, Strzelecki, Growiec, and Wyszyński (2022) perform a growth accounting exercise to gauge the economic impact of the pre-2022 Ukrainian migrants over the 2014-2018 period, accounting for hours and worker characteristics to arrive at a productivity-adjusted labour supply. If Ukrainian refugees had the same characteristics, they

would increase GDP by 0.9-1.3% – the mid to higher bound of our estimate. Third, Urban (2022) uses an Oxford Economics model to estimate the impact of Ukrainian refugees on the potential GDP by 2030 and 2050, including a positive shock to the total factor productivity growth. This yields GDP higher by 1.5-2.6% by 2030, significantly higher than our long-term estimate – the higher result is likely due to the increase in TFP that we do not include in our modelling. Fourth, Monitor Deloitte (2022) provided an early wide estimate of the economic impact of Ukrainian refugees. This would translate into 0.9-2.4% higher GDP, also due to the possibility of a positive productivity shock. We review the relevant literature on the impacts of immigration on productivity in Chapter 4.



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43 Data from forecast of Ministry of Finance from October 2023, [Wytyczne dotyczące wskaźników makroekonomicznych - Ministerstwo Finansów - Portal Gov.pl \(www.gov.pl\)](https://www.gov.pl).

44 Note that long term refers to the time when the economy fully adjusts with no additional shocks. We do not model the current refugees from Ukraine children growing up and entering the labour market.

Increased competition on the labour market could partially offset benefits from refugees. Although (due to a tight labour market) increase in labour force is almost entirely absorbed into working force, there should be slight increase in unemployment rate. Ultimately, it is estimated that it was higher by 0.14-0.25 pp. in 2022 and by 0.18-0.3 pp in 2023 which corresponds to respectively 24-42 thousand and 33-54 thousand additional people being unemployed⁴⁵. In the long run, the unemployment rate should remain higher by 0.15-0.3 pp. Because of that, it is estimated that growth of real wages was slower in 2022 and 2023. It is estimated that due to the influx of refugees, real wages were lower in 2022 by 0.45-0.85% and in 2023 by 0.65-1.15%. Although in effect this is negative, it also means lower inflationary pressure from the labour market in the short term. Long-term real wages should be around 0.55-1.0% lower than in a scenario without refugees. That said, the actual labour market effect is likely to be null as evidenced by econometric studies (Gromadzki and Lewandowski, 2023; Peri, 2014), which are elaborated on in Chapter 4. Gromadzki and Lewandowski (2023) in the early months of 2022 find no effect of Ukrainian refugees on earnings, employment, and unemployment rate of natives and other immigrants, except an actual slight positive impact on the wages of native women.

Even with the increase in unemployment and lower real wages, an increase in labour force means a higher wage pool, which means higher tax income.

Moreover, boosts in private consumption both due to increase in population as well as higher average spending rates means that refugees increased state income from taxation on consumption. These effects will be strengthened by influx of capital from abroad. In total it is estimated that this increased the total income of the general government sector by 0.8-1.1% in 2022 and 1.05-1.45% in 2023. Financially this respectively amounts to 10.1-13.7 billion PLN in 2022 and 14.7-19.9 billion PLN in 2023. Comparing this to government expenses on refugees (where although there are no accurate data about government spending on refugees, estimates quoted by a government official put it around 15 billion PLN in 2022 and around 5 billion in 2023⁴⁶) we can conclude that the additional income from taxation more than offset the additional expenses⁴⁷ that were needed to accommodate them. In the long term, refugees should increase yearly general government revenue by around 0.85-1.3%.

Ultimately, refugees provide the Polish economy an additional boost both in total product and demand. That allowed for an increase in real GDP. This situation was especially beneficial for public finance. Although the influx of refugees was costly at the start, the additional revenue they provided was more than enough to compensate for this⁴⁸. The cost for local labour force due to increased competition was in most part mitigated due to a tight labour market.



As such, the increase in unemployment was much lower than increase in employment. To maximise the positive impact of refugees on economy, policies helping their integration into the labour market that both allow their maximal employment as well minimise market mismatch between demand for specific skills and their abilities are crucial. The second part of this recommendation, achieved either through improvements in utilisation of skills of refugees or trainings giving them abilities demanded by the labour market, is integral as it should lower costs for the local labour force.

⁴⁵ Based on number of economically active people in III quarter of 2023 according to labour market survey.

⁴⁶ E.g. vice-president of Polish Development Found Bartosz Marczuk estimated it at around 16 billion PLN, but this estimation also included spending of NGOs which was combined with spendings of local governments Polska pomoc dla Ukrainy 2022 - ile kosztowała? - Infor.pl.

⁴⁷ Excluding spending of private households estimated as further 10 billion PLN.

⁴⁸ Model treats general government sector as a whole, as such cost and income internal structure may differ creating institutions with financial losses while other may have disproportionate increase of income.



4.

Unaccounted positive externalities

Macroeconomic modelling underestimates the positive economic impacts of immigration, compared to econometric estimates.

Macroeconomic modelling generally finds that immigration increases output, while cross-country econometric estimates find also positive impacts on labour productivity. The first approach builds a theoretical model of the economy calibrated to the particular circumstances, which allows us to simulate counterfactuals and observe all changes in the economy. The second approach relies on empirical data, usually over many years and countries, trying to isolate the effect of immigration, but gives no information on the channels through which these effects operate. In the present case it would not be practical to follow anything else than the first approach. Unfortunately, it relies on the canonical labour market model. As Peri (2014) elaborates, that model assumes that immigration is simply a shift in the labour supply for a given labour demand and given labour supply of native workers. It further assumes that immigrants are essentially identical to natives in that they enter the same

occupations and perform the same tasks, the native workers do not change their occupations and tasks, while firms do not adjust (at least in the short term). In effect, immigrants grow output, but slightly lower wages. This is the case in the modelling performed (Chapter 3), as well as in the NBP general equilibrium modelling exercise for the pre-2022 Ukrainian workers 2013-2018 performed by Gradzewicz, Jabłonowski, Sasiela, and Żółkiewski (2021). Conversely, Peri (2014) surveys 270 econometric estimates from 27 studies published over the 1982-2013 period on the impact of immigration on native wages. He shows that effects for a very large immigrant inflow of 10 percentage points (five-times larger than the refugees from Ukraine share in Poland) on native wages range from -1% to +1%, with most estimates clustered around zero, from -0.1% to +0.1%. Similarly, Gromadzki and Lewandowski (2023) examine econometrically the monthly impact of refugees from Ukraine inflow from January

to April 2022 on wages of native workers and other immigrants. They find no effect on wages, employment, or unemployment rate, except a very small positive impact on the wages of native women. Understanding how immigrants create positive productivity effects that counteract negative wage pressures and improve economic efficiency, requires moving beyond the canonical model of labour supply and demand. In reality, immigrants and native residents differ in important ways, which triggers complementary occupational upgrading of natives (Beerli and Peri, 2017; Tabellini, 2020; Cattaneo et al., 2015; Foged and Peri, 2016; D'Amuri i Peri, 2014; Ortega and Verdugo, 2014; Peri and Sparber, 2009) and investment in complementary production technologies by firms (Peri, 2016; Lewis and Peri, 2015; Lewis, 2013; Peri, 2012). We survey this literature in this chapter, underlying that our model should thus be treated as a conservative lower bound of the effect.

Immigration can raise not only economic output (i.e., more workers equal more production), but more importantly labour productivity (i.e., more value added produced per worker). Such a result may appear counterintuitive to a simple supply-demand intuition, where an increase in the number of workers lowers the amount of capital per worker thus lowering productivity until firms invest to return the capital-worker ratio to normal, returning productivity to the previous level (Borjas, 2019). Even if that was the case, GDP per person (though not GDP per worker) would still rise because immigrants are typically younger than the native population, which improves the general worker to population ratio. However, an inflow of immigrants can be more than just an increase in labour supply, e.g., immigrants bring new skills to the workforce, extending the scope of specialisation and thus making workers more productive. In fact, economic research from the past decade has found, that immigration improves not just GDP or GDP per person (Ortega and Peri, 2014), but has a causal positive impact for labour productivity (Jaumotte et al., 2016), GDP per capita growth rate (Aleksynska and Tritah, 2015), and total factor productivity (Peri, 2012).

Immigration's impact on productivity

- Jaumotte et al. (2016) in an IMF taskforce report examine economic impacts of immigration in a sample of 18 developed OECD countries during the 1980-2010 period. Authors find that increase of immigrant share in the adult population by 1 percentage point raises labour productivity and GDP per capita in the long-term by about 2%. They also examine impacts for the population in top 10% and bottom 90% of income distribution of tertiary and non-tertiary educated immigrants. Effects are similarly 2-3%, apart from the impact of tertiary educated immigrants on population in the top 10%, which are about 6%. These are not just correlations, but causal estimates, as authors carefully address potential problems of reverse causality (i.e., that immigrants may migrate to countries with better growth prospects, instead of improving them). They want to estimate the impact of immigrant shares on GDP per capita, but these could be correlated (biasing the result) as GDP per capita is a pull factor for immigrants. To resolve this, they first create an "instrument" for immigrant shares by estimating a model that predicts them based on country-of-origin push factors and bilateral migration costs determined by geography and culture. In effect they can now control for reverse causality.
- Aleksynska and Tritah (2015) look for economic impacts of immigration in a sample of 20 developed OECD countries at 5-year intervals during the 1960-2005 period. They find that a higher rate of immigration by 1 percentage point increases GDP per capita growth rate by 0.3 percentage point. They try to disaggregate this effect in further regressions, finding positive effects for the growth of income per capita, output per worker, and total factor productivity for higher rate of immigration among prime-age workers (25-54 years old), but negative or statistically insignificant for the young (15-24 years old). These estimates are causal, as authors similarly to Jaumotte et al. (2016) quoted above instrument the immigrant shares by estimating them beforehand based on a separate model, which is orthogonal to subsequent GDP growth.
- Peri (2012) in a seminal paper models the impact of immigration on total factor productivity, which is the part of labour productivity coming from organisational and technological innovations, in a sample of U.S. states in the period 1960-2006. He finds that a 1 percentage point increase in the shares of immigrants raises labour productivity by 0.9% and TFP by 1.4%. These estimates are causal, as the author uses distance from the Mexican border and previous immigrant communities, which are both orthogonal to economic growth in host states. What is further interesting, is firms in reaction to immigration adapt production technologies directed to workers without college education. This is consistent with the idea, that firms make workers more productive by adapting technologies to their skill sets. It is also important that these positive effects for productivity have been achieved despite immigrant inflow comprised less educated workers.

Economists have advanced an array of factors that could be causing these macro-level effects. While macro-level regressions show a positive impact of immigration on productivity, they cannot show the exact channels through which these effects come about. It is thus uncertain which are dominant. Among them are:



Immigrants could possess complementary skills that make native workers more productive as they specialise.

These skills do not even need to be advanced to be complementary. Natives are likely to deal better with communications-intensive tasks and have better networking, all of which may be better paid and not easily transferable between countries. OECD (2016) gives an example of a native carpenter, who employs an immigrant to do his previous manual tasks and himself focuses on marketing and business development. Such occupational upgrading has been first shown in a seminal paper by Peri and Sparber (2009) in the USA data, but has been quickly extended to other countries. From this perspective Foged and Peri (2016) look at refugees in Denmark in the 1991-2008 period. They find that inflow of low-skill refugees caused less educated native workers to pursue less manual-intensive tasks - improving their wages, employment, and occupational mobility. These effects are causal, as the authors exploit the refugee dispersal system, which is orthogonal to economic opportunities.



Immigrants could enter childcare, elderly care, and housekeeping services, allowing highly educated and productive native women to increase their labour supply.

A caveat in the case of refugees from Ukraine is that this could mean working below their qualifications or in the informal sector, making the overall effect for productivity unclear. Nevertheless, as availability of care and housework services increases, it becomes easier for women mainly to combine family and professional lives and increase labour supply. Such effects may be stronger for countries with less accessible childcare. Furtado (2015) reviews this literature, finding evidence from Australia, Hong Kong, Italy, Singapore, Spain, Switzerland, Spain, United Kingdom, and the United States. Additionally, Furtado (2016) in the USA in the 1980-2000 period finds that married women and women with graduate degrees increase their fertility in response to low-skilled immigration. Results are causal, as the author exploits the role of ethnic network in immigrant location decisions.



Firms respond to immigrant inflows by introducing production technologies complementary to their skills, thus making their skill-group and potentially firms themselves more productive.

Firms adjust their production technologies to the skill-mix prevalent in the economy, e.g., to the growing number of labour force with tertiary education (Acemoglu, 2002). Similarly, when immigrants arrive and make certain skills more prevalent in the labour force, firms adjust thus making the whole skill-group more productive and countervailing downward pressure on its wages, and possibly increasing overall efficiency (Peri, 2016). This is the mechanism found by previously described seminal paper by Peri (2012), in which immigration caused low-skill-biased technical change and increased productivity. An inflow of low-skilled immigrants can cause firms to adapt labour-intensive technologies or postpone automation, while expanding research and development departments in case of high-skilled immigrants (Lewis and Peri, 2015; Lewis, 2013).



Immigrants tend to have higher rates of entrepreneurship than native workers.

There may be different reasons for this as perhaps immigrants have character traits that make them more inclined towards entrepreneurial activity (unclear in the case of refugees), or maybe it is a way to avoid occupational downgrading as immigrants find it difficult to prove their educational and professional credentials from home countries. Notwithstanding the reason, such effects are observed across the OECD countries (OECD, 2011). In a recent paper, Anelli, Basso, Ippedito, and Peri (2023) look at Italian data, finding that one standard deviation increase in emigration rate generates 4.8% decline of business formation in the municipality of origin. The authors use existing migration networks to ensure causality of the results. Nevertheless, it is unclear whether immigrant-created businesses are more successful from the native ones, but one could speculate that a higher rate of trying new business ideas spurs more successes.

Conclusions

The escalation of war 2022 in Ukraine caused a large inflow of refugees into Poland. While some refugees from Ukraine have since returned to Ukraine or gone further to Germany or other countries, in October 2023 close to 957 thousand remained in Poland (identified by active PESEL UKR numbers). They consist primarily of children and working aged women. Despite the forced nature of displacement, war trauma, and caregiving responsibilities, refugees from Ukraine very quickly entered the labour market as employees and entrepreneurs. The precise number of refugees from Ukraine working in Poland remains uncertain, with our estimates ranging from 225 to 350 thousand. The lower bound is the number of social security registrations and understates the actual figure, as some jobs may not require social contributions or remain in the informal sector. The higher bound is the product of employment rates from surveys of refugees from Ukraine, and their working age population from the active PESEL UKR database. By July-August 2023 Ukrainian refugee households supported themselves, with 80% of their incomes coming from work.⁴⁹

We find that refugees from Ukraine as workers, entrepreneurs, consumers, and taxpayers had a positive impact on economic output, which will increase in the long run.

Deloitte's D.Climate general equilibrium model finds that refugees from Ukraine contributed 0.7-1.1% to GDP cumulatively in 2023. In the long-term this effect will grow to 0.9-1.35% as the economy fully adjusts. The increases in government revenue from direct and indirect taxes due to wages and private consumption of refugees from Ukraine was likewise modelled. These increases amounted to 0.8-1.0% higher general government revenues in 2022, 1.3-1.6% in 2023, and 0.95-1.13% in the long term. This implies that, while there are no precise public data on the government support to refugees from Ukraine, while a government official quoted cost figures of 15-20 billion PLN in 2022 and around 5 billion in 2023⁵⁰ have been already offset by refugees via taxes of 12.3-15.2 billion PLN in 2022 and 18.2-22.5 billion PLN in 2023.

All the modelling results are conservative lower bound estimates, as econometric studies from other countries have found immigration to have additionally a positive impact on labour productivity that cannot be accounted for using the available data. These effects could stem from the growth in specialisation due to additional workers with different skillsets appearing on the labour market, e.g., occupational upgrading of native workers.

⁴⁹ Deloitte calculations based on Multi-Sector Needs Assessment Poland 2023 survey data provided by UNHCR.

⁵⁰ E.g. vice-president of Polish Development Found Bartosz Marczuk estimated it at around 16 billion PLN, but this estimation also included spending of NGOs which was combined with spendings of local governments [Polska pomoc dla Ukrainy 2022 - ile kosztowała? - Infor.pl](https://www.infor.pl/pl/analiza/polska-pomoc-dla-ukrainy-2022-ile-kosztowala?).

Appendix.

Model Calibration

D.Climate is CGE⁵¹ model developed by Deloitte Economic Institute based on GTAP model⁵². If source of data is not specified it means that shocks were calibrated to data from the model database.

It was assumed that impact of refugees on the Polish economy was felt as combined four different shocks: to population, labour supply, average propensity to save, and productivity, with shocks to population and labour supply being balanced by equivalent shocks in Eastern Europe⁵³.

Moreover, as part of assumed increase in spending by Ukrainians in Poland was financed by savings from Ukraine this was balanced by equivalent negative shock on investment in Eastern Europe.

Shock to population was calibrated to match data for residents of Poland from Statistics Poland and number of refugees based on PESEL UKR. Equivalent shock in Eastern Europe was calculated using data for population in this region from World Population Prospects UN.

Shock to labour supply was calibrated to match data of working Ukrainians presented in chapter 2. As we didn't have data of number of unemployed refugees, we calibrated it that an increase in the number of workers due to an increase in labour supply matched employment data in two variants: lower (around 225 thou.) and higher employment (around 350 thou.). Total increase in labour supply in Poland was balanced by equal decrease of labour supply in Eastern Europe.

Shock to propensity to save was calculated in two steps. First and foremost, it was assumed that due to their precarious life situation refugees won't save any income. As such shock was set to match shock for the population⁵⁴. Additionally, to account for spending of savings from Ukraine, data from the National Bank of Ukraine on cash withdrawals and retail transactions from Ukrainian bank cards in Poland was used⁵⁵ and then calibrated to data for private consumption in Poland. Additionally, the same data was used to calibrate the negative shock to investment in Eastern Europe.

For productivity two options were tested. Firstly, neutral impact: no shock to productivity. Secondly, lower productivity of workers from Ukraine negatively impacting total labour productivity. These shocks were calibrated to match the difference in data between refugees income from labour in UNHCR survey and average wage in Poland from Statistics Poland weighted by refugees share in total workforce.

As one period in the model is set to one year and refugees started coming to Poland by the end of February 2022 it was assumed that their impact on economy started being felt starting from II quarter of the year. As such shocks were set so that ¾ of shocks were calibrated to data from 2022 and ¼ to data for 2023⁵⁶.

51 Computational General Equilibrium.

52 Global Trade Analysis Project, [GTAP Models: Current GTAP Model \(purdue.edu\)](https://www.gtap-modeling.com/).

53 Region combined from: Russia, Belarus, Ukraine, Moldova, Czechia, Slovakia, Hungary, Romania, and Bulgaria.

54 All shocks are percent deviations.

55 [Oversight of financial market infrastructures \(bank.gov.ua\)](https://bank.gov.ua/en/press-releases/oversight-of-financial-market-infrastructure)

56 E.g. for total increase in number of workers of 350 thousand around 262.5 thou. was set to have happened in 2022 while rest in 2023.



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At the request of UNHCR, the UN Refugee Agency, Deloitte has conducted a study entitled "Analysis of the impact of refugees from Ukraine on the economy of Poland".