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TEMPORARY PROTECTION, PERMANENT EFFECTS? THE LABOR MARKET IMPACT OF UKRAINIAN REFUGEES IN THE EUROPEAN UNION

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ABSTRACT

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JEL CLASSIFICATION: F22, J15, J21

KEYWORDS: Ukrainian refugees, Immigrants, Local labor market, Labor supply

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Abstract

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1 Introduction

The invasion of Ukraine by the Russian Federation in February 2022 caused one of the largest refugee movements since World War II. By April 2023, approximately 8 million Ukrainians were internally displaced and more than 8.2 million had sought refuge abroad (UNHCR, 2025b). Germany, Poland, and Czechia emerged as primary destinations, receiving an estimated 1.2 million, 1.0 million, and 0.34 million refugees, respectively, by March 2024 (Ministry of Digital Affairs, 2024; UNHCR, 2025b). In response, the European Commission activated the Temporary Protection Directive (TPD) on 4 March 2022 to offer rapid and effective assistance to those fleeing the conflict (European Commission, 2022). In line with this directive, European governments swiftly enacted legislation granting Ukrainian refugees temporary protection. This included immediate and unrestricted access to labor markets, education, health care, accommodation, and social benefits. This rapid integration contrasts with standard EU asylum procedures, which typically impose long waiting periods before similar rights are granted. Immediate and unrestricted labor market access effectively translated the mass influx of Ukrainian refugees into a substantial labor supply shock. By 2023, employment rates of working-age Ukrainian refugees reached 65% in Poland (the highest among OECD countries), 51% in Czechia, and 18% in Germany (Zyzik et al., 2023).

Using a regional approach that leverages variation in the Czech districts' exposure to Ukrainian employees, Postepska & Voloshyna (2025) (hereafter PV) investigate the short-term impacts of the sudden and forced inflow of Ukrainian refugees on labor market outcomes of locals in Czechia throughout 2022. Across multiple estimation strategies, they consistently find that the inflow had no economically meaningful impact on employment, unemployment, or inactivity rates of the local population, regardless of gender, education, or industry. These findings align with a broader empirical literature on large conflict-induced migration waves, which similarly finds minimal population-wide displacement effects of immigration (e.g., Card (1990); Hunt (1992); Friedberg (2001); Cohen-Goldner & Paserman (2011)).

When focusing on specific demographic groups, PV identify a small but positive effect on working hours of local women in districts with larger refugee inflows, particularly women with secondary education employed in the most affected sectors. They attribute this to the "dequalification" of Ukrainian refugees, who predominantly compete for positions held by lower-educated locals. Although this mechanism implies that lower-educated workers could face increased competition from incoming refugees, Czechia's exceptionally low unemployment rate and surplus of job vacancies likely mitigated such adverse effects. Moreover, the arrival of refugees may have stimulated demand for essential goods and services (Pogarska et al., 2023; Czech News Agency, 2025; Deloitte Poland, 2025), which explains the observed increase in working hours among secondary-educated women in the

most exposed sectors.

The interpretation is consistent with the theoretical framework of Michaillat (2024), which predicts that immigration shocks can increase native unemployment, but that such displacement effects weaken or disappear when labor demand is strong.[1] Consequently, the model predicts minimal adverse effects in a context as tight as the Czech labor market in early 2022. Beyond labor market conditions, various additional factors shape the labor market integration of incoming refugees, including the demographic composition of refugees, social infrastructure (e.g., childcare and social benefits), integration policies, pre-existing co-ethnic networks, and language barriers (Kosyakova et al., 2024). These factors, in turn, influence whether incoming refugees have the potential to act as substitutes for or complements to native workers.

Motivated by these context-specific implications, this study extends the analysis of PV to Germany and Poland, and replicates the case of Czechia, using quarterly individual-level microdata from the European Union Labor Force Survey (EU-LFS) between 2017 and 2023. Expanding to Germany and Poland allows us to evaluate whether the null displacement effects observed in Czechia persist in labor markets with different institutional contexts.[2] Replicating the Czech case serves as a robustness check for our approach and extends the analysis of labor market effects to two post-invasion years, 2022 and 2023, allowing us to move beyond the short-run impacts considered by PV.

Following PV, we calculate regional exposure to the labor supply shock in each of the three host countries. We employ pooled OLS regressions with region and time fixed effects to estimate the impact of this exposure on labor market outcomes of local workers. Our results indicate no population-wide effects on the probabilities of employment, unemployment, or inactivity, or on working hours. However, zooming in on demographic subgroups reveals heterogeneous effects across countries. In Germany, foreign-born men with lower educational attainment employed in manufacturing, transportation and storage, and hospitality showed improved employment outcomes along both the extensive and intensive margins. In Poland, by contrast, low-educated men in agriculture, construction, and manufacturing, showed adverse effects along both margins, possibly due to direct competition from incoming refugees. Consistent with PV, we find no significant effects in Czechia.

The opposing patterns for low-educated males in Germany and Poland suggest that

[1] Michaillat (2024) extends standard migration models that assume that native unemployment rates are unaffected by inflows of new workers (Diamond, 1982; Mortensen, 1982; Pissarides, 1985). As a result, these standard models cannot capture job competition between newly arrived and local workers, nor can they account for the short-run response of native unemployment to migration or identify the conditions under which such effects are likely to be severe or mild.

[2] Although unemployment rates were similarly low across these three host countries prior to the invasion (OECD, 2021), refugees' effective access to the labor markets differed substantially. As we elaborate on in Section 2, simplified administrative procedures in Czechia and Poland facilitated refugees' rapid labor market entry, whereas in Germany greater bureaucratic barriers delayed entry.

these groups faced different competitive pressure from incoming refugees. In Poland, low-educated men appear to be in direct competition with incoming refugees who predominantly enter low-skill jobs. In Germany, by contrast, it seems that secondary-educated men experienced greater competitive pressure, while low-educated men benefited from increased labor demand. This dynamic may reflect a two-tiered selection mechanism: empirical evidence indicates that Germany received a relatively more educated and resourceful refugee population (Kohlenberger et al., 2023; Van Tubergen et al., 2024), and bureaucratic barriers in Germany may have further constrained labor market entry for those lacking the necessary resources, information, or transferable skills to navigate these procedures (European Union Agency for Fundamental Rights, 2023; Thränhardt, 2023).

We make several contributions to the literature. Because refugees were granted immediate access to employment, our study contributes to the broader literature on immigration and host-country labor markets. With respect to the Ukrainian refugee crisis, this work is among the first to offer a comparative analysis of labor market effects across the most affected host countries. By comparing outcomes across three institutional contexts, we provide new evidence on how immigration-induced labor supply shocks interact with labor market tightness, administrative barriers, and other institutional factors. Depending on this institutional setting, our findings identify which groups of workers are most vulnerable to inflows of refugee workers. Cross-national differences in vulnerable profiles have important consequences for host societies in their pathways to accommodate and integrate refugees. Furthermore, in light of increasingly divided public opinion on refugee integration and support policies,[3] evidence-based assessment of the labor-market implications of refugee employment is urgently needed. Understanding the consequences of the unprecedented immediate access to employment is essential for guiding informed and effective policymaking.

The remainder of the paper is organized as follows. Section 2 gives contextual details on the refugee inflow and examines cross-country variation in factors shaping the labor market integration of Ukrainian refugees. Section 3 describes the data and presents descriptive statistics, and Section 4 outlines the identification strategy. Section 5 presents and discusses the results, and Section 6 concludes.

2 Cross-country contextual details

This study examines data from Czechia, Germany, and Poland to assess whether the absence of displacement effects documented in Czechia also appears in countries with dif-

[3]Recent surveys indicate declining support and growing opposition to accepting Ukrainian refugees and in Poland (Hryciuk-Ziółkowska et al., 2024; UNHCR, 2024a) and Czechia (STEM Institute for Empirical Research, 2022; The Public Opinion Research Centre, 2025), and growing political debate over social welfare payments (Bürgergeld) in Germany (Thränhardt, 2023).

ferent labor market conditions and institutional settings. Interpreting the results requires attention to factors that shape refugees' settlement patterns and labor market integration, both across and within host countries. These outcomes are jointly determined by conditions in host countries (such as labor demand, the skill and occupational composition of local labor markets, legal and institutional frameworks, education and training systems, childcare availability, and societal attitudes toward newcomers) and by the characteristics and resources of incoming refugees, including human capital, language skills, and social networks.

In this section, we first summarize the scale and demographic composition of refugee inflows to Czechia, Germany, and Poland. We then discuss cross-country variation in institutional determinants of workforce integration, drawing on a growing body of reports and empirical studies that document the characteristics and employment trajectories of Ukrainian refugees across Europe (European Migration Network, 2024; Kosyakova et al., 2024), as well as within Czechia (Kavanová et al., 2022; IOM, 2023), Germany (Brücker et al., 2023; Kosyakova et al., 2025), and Poland (Chmielewska-Kalińska et al., 2022; Duszczyk et al., 2023; Górny & Kaczmarczyk, 2023).

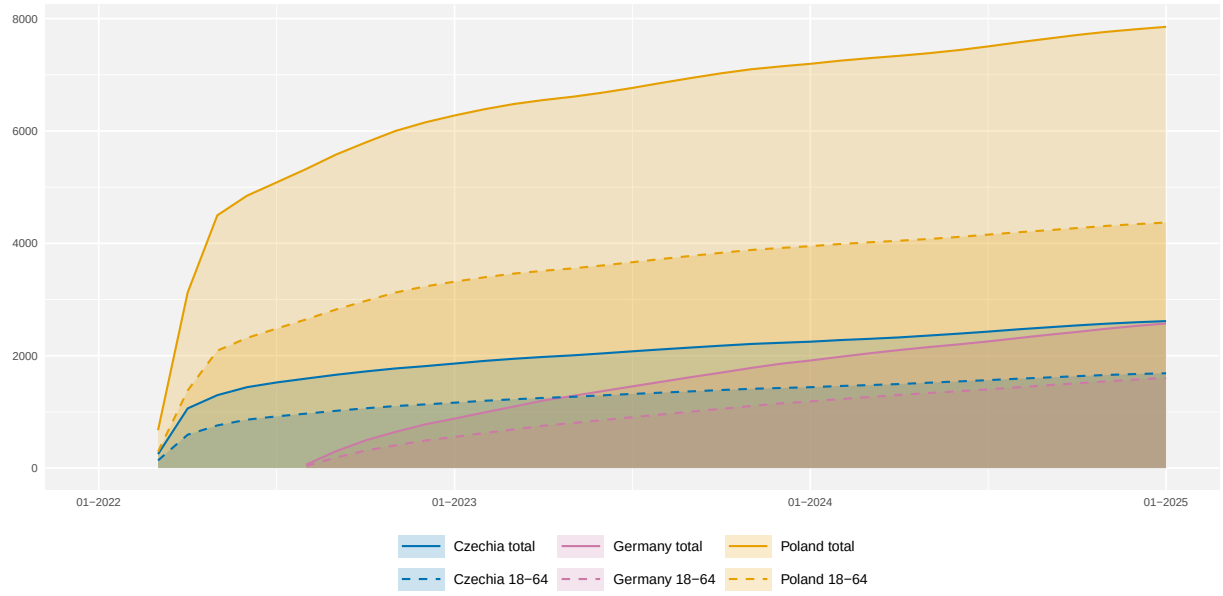
2.1 Refugee inflows, demographic profiles, and potential self-selection

By March 2024, Germany, Poland, and Czechia had received an estimated 1.2 million, 1.0 million and 0.34 million individuals fleeing the war, respectively–the largest absolute inflows among all host countries (Figure 1).[4] Relative to population size, inflows were particularly high in Czechia and Poland: beneficiaries of temporary protection made up more than 3% of Czechia's population and more than 2.5% of Poland's, placing them respectively first and third in Europe (Eurostat, 2025c).

Demographic characteristics play an important role in shaping refugees' integration trajectories (Kosyakova et al., 2024). Variation in these characteristics across host countries, or even across regions within the same country, may therefore contribute to regional differences in labor market outcomes. Self-selection may be a mechanism underlying such differences, since Ukrainian refugees under temporary protection are permitted to move freely within the EU and, conditional on securing private accommodation, choose their place of residence. As a result, they are less subject to administratively imposed refugee

[4]These figures are based on Eurostat (2025c) data on beneficiaries of temporary protection. Temporary protection registrations closely approximate the number of individuals seeking refuge abroad, though they may be slightly inflated (e.g., due to double-counting following secondary movements within the EU) or understated (e.g., when individuals enter via visas or residence permits). According to UNHCR (2022), 76% of refugees register for temporary protection, 16% obtain residence permits or visas, and 10% apply for asylum or refugee status. Registration for temporary protection is more common in countries neighboring Ukraine (77%) than in non-neighboring countries (69%).

Figure 1: Evolution of Ukrainian beneficiaries of temporary protection in Czechia, Germany and Poland (thousands)



Note: This figure displays end-of-month cumulative counts (in thousands) of Ukrainian beneficiaries of temporary protection, distinguishing between the total population and those of working age (18–64). Data are sourced from Eurostat (2025c). The initial values of the graphs reflect staggered implementation of the TPD: Czechia and Poland implemented it in March 2022, while Germany followed in May.

settlement schemes that determine the initial placement of other refugee groups (for example, the mandatory allocation of asylum seekers across Germany's federal states; Steinhauer et al. 2024).

Previous research on asylum seekers shows that individuals with higher levels of education are more likely to migrate from conflict zones and to travel longer distances (Bohra-Mishra & Massey, 2011; Guichard, 2020; Spörlein et al., 2020; Aksoy & Poutvaara, 2021). The theory explains that higher-educated refugees have stronger economic incentives to migrate to higher-income countries, which are typically further away, and greater knowledge and resources to escape armed conflict. Using cross-national survey data collected in the summer of 2022 on more than 24,000 Ukrainian women in nine European countries, Van Tubergen et al. (2024) find that refugees with tertiary education, greater financial resources, or higher English proficiency were more likely to migrate to more distant countries. Similarly, Kohlenberger et al. (2023) report that refugees who traveled greater distances were, on average, more educated, more likely to have been employed before displacement, more often from urban backgrounds, and had higher language proficiency. These findings highlight the need to consider potential self-selection into specific countries or regions when interpreting our results.

The labor market effects of large-scale migration depend not only on the characteris-

tics of arriving refugees but also on those of the host population. Prior studies document heterogeneous impacts across segments of the native workforce, particularly among groups with similar skill profiles to incoming migrants. Numerous studies report adverse effects for low-skilled local men and certain minority groups who face direct competition from migrant workers.[5] Conversely, inflows of female migrant labor providing affordable household services can complement the local workforce and increase labor force participation among high-skilled native women (Farré et al., 2009; Cortés & Tessada, 2011; Cortés & Pan, 2013). Given this evidence, assessing potential displacement effects requires comparing the demographic profiles of Ukrainian refugees with those of native populations.

Table 1: Gender and age of Ukrainian refugees compared to host populations

	Czechia		Germany		Poland	
	Refugees	Locals	Refugees	Locals	Refugees	Locals
(a) Gender						
Female	63%	51%	64%	51%	66%	52%
Male	37%	49%	36%	49%	34%	48%
(b) Age						
Less than 18 years	32%	19%	33%	17%	44%	18%
18–34 years	29%	18%	23%	20%	22%	20%
35–64 years	36%	42%	37%	41%	29%	43%
65 years or over	4%	21%	7%	22%	4%	19%

Note: This table shows the gender and age distributions of Ukrainian refugees in three host countries as of 31 December 2022, alongside those of the local populations in 2021. Refugee data come from Eurostat (2025c)'s monthly statistics on temporary protection for persons fleeing Ukraine. The total number of temporary protection beneficiaries at that time was 432,415 in Czechia, 967,715 in Germany, and 961,340 in Poland. Local population data are drawn from official statistics: Czech Statistical Office (2021), Destatis (2025b), and Statistics Poland (2025).

Table 1 shows that Ukrainian refugees in all three host countries are predominantly working-age women and children. This gender imbalance reflects Ukraine's general mobilization policy, which restricted the departure of most military-age males. The resulting demographic profile of Ukrainian refugees contrasts sharply with pre-war migration flows to these countries, which were largely male-dominated (Destatis, 2023; Kaczmarczyk, 2023; Ministry of the Interior, 2025). Working-age individuals (18–64) accounted for 65%, 60%, and 51% of refugees in Czechia, Germany, and Poland, respectively. Older refugees are

[5]See, for example, Hunt (1992); Carrington & De Lima (1996); Card (2001); Borjas (2003); Dustmann et al. (2005); Borjas & Katz (2007); Mansour (2010); Cohen-Goldner & Paserman (2011); Glitz (2012); Ottaviano & Peri (2012); Lemos & Portes (2014); Maystadt & Verwimp (2014); Nickell & Saleheen (2015); Aydemir & Kırdar (2017); Borjas (2017); Ceritoğlu et al. (2017).

slightly more common in Germany, but their share (4–7%) remains well below that of the local populations (19–22%). Poland received a relatively larger share of children under 18. Evidence from Germany indicates that children with a refugee background are significantly less likely to attend formal childcare than native children (Brücker et al., 2020), suggesting that differences in childcare availability might influence settlement patterns. However, we find no conclusive evidence that access to childcare or schools was easier in Poland than elsewhere, nor that families with children intentionally fled shorter distances (Van Tubergen et al., 2024).

Table 2: Educational attainment of Ukrainian refugees compared to host populations

	Refugees						Locals		
	(1) Mix	(2) Mix	(3) CZ	(4) DE	(5) PL	(6) PL	(7) CZ	(8) DE	(9) PL
Primary education	2%	1%	15%	.	.	15%	14%	22%	15%
Secondary education	28%	33%	35%	.	38%	35%	63%	51%	57%
Tertiary education	70%	66%	49%	72%	61%	50%	18%	27%	25%
Unknown	.	.	.	.	.	.	6%	.	2%

Note: This table shows the educational attainment distribution of Ukrainian refugees in three host countries, alongside that of the local populations in 2021. Data on Ukrainian refugees are drawn from five surveys: (1) UNHCR (2022), conducted May–September 2022 with 4,800 global responses; (2) European Union Agency for Fundamental Rights (2023), conducted 22 August–29 September 2022 with 14,361 responses across ten European countries; (3) IOM (2023), conducted June–December 2022 with 4,284 responses; (4) Brücker et al. (2023), conducted 24 August–4 October 2022 with 10,818 respondents; (5) EWL Migration Platform & Centre for East European Studies, University of Warsaw (2022a), conducted 23 March–2 April 2022 with 400 respondents; (6) Chmielewska-Kalińska et al. (2022), conducted 13 April–12 May 2022 with 3,165 respondents. Please refer to the original reports for detailed methodologies. Data on locals are sourced from 2021 population censuses: (7) Czech Statistical Office (2021); (8) Destatis (2021); and (9) Statistics Poland (2021). To harmonize educational attainment across sources, we merged some categories: "Primary education" includes no education, basic, primary, and lower secondary; "Secondary" includes secondary, post-secondary, vocational, and technical education; "Tertiary" includes bachelor's, master's, higher, tertiary and doctoral degrees.

While administrative data on temporary protection provide reliable counts of Ukrainian refugees across Europe, they offer limited information beyond age and gender. To investigate more detailed demographic sorting across countries and regions, we rely on several small-scale surveys conducted at border crossings, registration centers, railway stations, online platforms, and other locations. These surveys are non-representative and must be interpreted with caution. Nonetheless, they consistently indicate that Ukrainian refugees have substantially higher levels of educational attainment than host-country populations (Table 2). Across sources and destinations, 49%–72% of refugees hold a tertiary degree, compared to 18%–27% of locals, although this gap may partially reflect sample selection

bias, where higher-educated individuals are more likely to respond to the surveys. Europe-wide survey data confirm this pattern: among refugees who have arrived since 2022, 76% of women and 71% of men hold at least a bachelor's degree, and an additional 6–8% report incomplete higher education (Perelli-Harris et al., 2023). Although the surveys lack harmonization and representativeness to draw definitive cross-country comparisons, the higher share of tertiary-educated refugees in Germany aligns with evidence that more educated refugees tend to migrate further (Kohlenberger et al., 2023; Van Tubergen et al., 2024). Taken together, these findings indicate that most refugees are of working age and highly educated, suggesting strong potential for rapid labor market integration.

2.2 Workforce integration

The labor market integration of Ukrainian refugees varies substantially across host countries. Early 2022 surveys conducted across the EU indicated that only 28% of respondents were employed or self-employed, with some continuing to work remotely for employers in Ukraine (UNHCR, 2022). Reported figures, however, differ across sources, and cross-country comparisons are hindered by unharmonized data. To address this, Kosyakova et al. (2024) compiled a harmonized database applying consistent definitions of employment.[6] Employment rates the fourth quarter of 2022 were 21%, 20%, and 38% in Czechia, Germany, and Poland, respectively, and increased steadily through early 2024, reaching 27% in Germany and 48% in Poland. In Czechia employment more than doubled to 48% by mid-2023. Several factors contribute to these cross-country differences. This section focuses on the institutional factors most relevant for interpreting our results. For a comprehensive review of country-specific determinants of refugee labor market integration, see Kosyakova et al. (2024).

Administrative processes for labor market access

The TPD was activated on 4 March 2022, two weeks after the invasion. However, implementation of the directive–the procedures required to obtain work authorization, register legal status, or verify qualifications–varied substantially across countries.[7] Czechia and Poland were among the first to implement the directive in early March, whereas Germany followed by 23 May (Thränhardt, 2023). These differences mattered for subsequent integration, as registration was not only necessary for employment but also for acquiring other

[6] Employment rates are defined as the ratio of employed individuals with Ukrainian citizenship who arrived after 24 February 2022 to the total number of working-age individuals of the same group. For Germany, employment rates were 20.0%, 21.5%, 23.8%, 24.9%, 25.2%, and 26.5% from 2022-Q4 through 2024-Q1; for Poland, 38.1%, 44.4%, 45.2%, 48.1%, 48.5%, and 48.3%; and for Czechia, 21% in 2022-Q4 and 48% in 2023-Q2.

[7] See European Union Agency for Fundamental Rights (2023) for details on policy contexts.

rights that are crucial for labor market integration, such as social assistance, accommodation, and school enrollment.

Beyond timing, countries differed in the extent of bureaucratic obstacles. Poland and Czechia simplified digital procedures to facilitate rapid entry into the labor market (European Union Agency for Fundamental Rights, 2023; Thränhardt, 2023). In Poland, for example, employers only needed to notify the local labor office of a new hire within two weeks, rather than requiring a work permit or a PESEL number.[8] In contrast, Germany implemented admission procedures in accordance with the traditional asylum system, involving extensive documentation requirements and complex processes for verifying educational and professional qualifications, leading to significant delays (Thränhardt, 2023). Survey data confirm that higher proportions of displaced Ukrainians in Germany reported encountering barriers to finding employment (European Union Agency for Fundamental Rights, 2023).

Social assistance

Ukrainian refugees under temporary protection are entitled to social welfare benefits, but the generosity and composition of these benefits vary considerably across host countries. Germany provides comparatively high levels of support: war refugees receive the same level of benefits as locals, exceeding what other refugees and asylum seekers receive (Thränhardt, 2023). Single adults receive over €500 euros per month, with additional amounts depending on household composition. German states also cover accommodation and heating costs, health insurance, and provide further assistance for household furnishings and school supplies.

In contrast, Czechia and Poland offer less generous or only short-term support. In Poland, financial assistance is provided only during the first three months, after which refugees are expected to sustain themselves. Czechia similarly reduces benefits over time, providing about €130 per month after the first five months. Less generous social benefits reflect the expectation that refugees will find work, which aligns with high previous Ukrainian employment levels in both countries.

Differences in benefit levels may have created different labor supply incentives across skill groups. In Germany, higher-educated refugees may have had more to gain from employment, whereas for lower-skilled individuals, benefits may have been closer to their expected market wage, reducing their incentive to work. In Czechia and Poland, lower support can encourage refugees along the entire skill distribution to seek employment more actively.

[8] PESEL stands for Universal Electronic System for Registration of the Population (Powszechny Elektroniczny System Ewidencji Ludności, PESEL) and is a unique personal identifier issued to Polish residents.

Co-ethnic networks

Before the TPD was activated, Ukrainians required residence permits to live in the EU. At the end of 2021, 1.6 million Ukrainians held valid residence permits across EU member states, making them the third-largest group of non-EU nationals. Poland hosted 651,221 Ukrainian citizens, Czechia 193,547, and Germany 109,279, equivalent to 1.8%, 1.8%, and 0.13% of their respective populations (Eurostat, 2025a).[9]

Ukrainian communities expanded significantly after the 2014 conflict in eastern Ukraine. Between 2014 and 2018, Poland admitted an estimated 1–2 million immigrants (Strzelecki et al., 2022), and by 2019, Ukrainians were the country's largest foreign-born group (Statistics Poland, 2020), predominantly male and employed in low-skill, labor-intensive occupations (Strzelecki et al., 2022). Czechia experienced a similar trend between 2016 and 2021, with most new immigrants being Ukrainian men employed in manufacturing or semi-skilled administrative roles (Ministry of Labor and Social Affairs, 2025; Ministry of the Interior, 2025).

Pre-existing Ukrainian diasporas strongly influenced post-2022 settlement patterns, partly because Ukrainian refugees had the opportunity to select their place of residence, provided they could secure private accommodation, often with friends or family (Steinhauer et al., 2024). Surveys indicate that many refugees chose their destination based on family or friends residing there (EWL Migration Platform & Centre for East European Studies, University of Warsaw, 2022a; UNHCR, 2022). Empirical evidence confirms this pattern: Ukrainian refugees tend to settle in areas with larger existing Ukrainian populations (Sauer et al., 2023). Co-ethnic networks do not only influence location choice but also promote faster labor market integration by providing access to information, employment opportunities and housing (Edin et al., 2003; Damm, 2009; Martén et al., 2019; Battisti et al., 2022). Employers in labor markets familiar with Ukrainian workers were often more willing to hire new arrivals, reducing bureaucratic barriers.

Labor market tightness, demand for different types of labor, and dequalification

Labor market conditions in host countries strongly influence refugees' integration outcomes. PV attribute the absence of displacement effects in Czechia to the exceptionally tight labor market at the time of refugees' arrival, characterized by the lowest unemployment rate in the EU and a surplus of job vacancies. Conversely, high local unemployment can slow integration and increase concerns about job competition (Åslund & Rooth, 2007;

[9]These figures are lower bounds, as they exclude naturalized Ukrainians, seasonal workers, and undocumented residents. Other sources suggest that 1.3-1.5 million Ukrainians were in Poland immediately before the invasion (Duszczyk et al., 2023). In Germany, the Ukrainian population, including everyone with Ukrainian roots, reached about 308,000 at the end of 2021 (Sauer et al., 2023). Despite variation across sources, it is clear that the pre-war Ukrainian diasporas were particularly large in Poland and Czechia (CBS, 2025; UNHCR, 2025b).

Fleischmann & Dronkers, 2010; Godøy, 2017; Azlor et al., 2020; Schilling & Stillman, 2024). This aligns with the theoretical framework of Michaillat (2024), which predicts that immigration shocks can increase local unemployment, but that such displacement effects weaken when labor demand is strong. Poland, too, showed strong demand for labor, where robust economic growth had created conditions for large immigration inflows since 2014 (Lewandowski & Magda, 2023). In May 2021, unemployment rates were low across all three countries: 3.3% in Czechia, 3.7% in Germany, and 3.8% in Poland (OECD, 2021).

Integration outcomes also depend on the type of labor in demand. Countries with substantial demand for low-skilled labor can absorb migrants more smoothly, as these jobs typically require minimal formal qualifications (Kogan, 2006). Indeed, Ukrainian refugees often filled low-skilled positions requiring only basic education, where temporary or irregular contracts are common (European Union Agency for Fundamental Rights, 2023). Across the three host countries, refugee employment was concentrated in sectors with strong labor demand, including construction, retail trade, manufacturing, hospitality, transportation and storage, and public administration (Chmielewska-Kalińska et al., 2022; Pogarska et al., 2023; European Migration Network, 2024). These patterns reflect both strong demand for low-skilled labor in these sectors and difficulties in transferring prior work experience across borders, particularly in occupations requiring formal recognition of qualifications, such as in education or health care (Kosyakova et al., 2024). Consequently, many refugees experienced mismatches between their qualifications and the jobs they ended up in. Evidence of dequalification is documented across all host countries, including Czechia (Kavanová et al., 2022; IOM, 2023), Germany (Kosyakova et al., 2025), and Poland (EWL Migration Platform & Centre for East European Studies, University of Warsaw, 2022a; Górny & Kaczmarczyk, 2023; Lewandowski & Magda, 2023; Deloitte Poland, 2025).

Language barrier

Refugees across Europe most frequently report insufficient knowledge of the host-country language as a barrier to employment, while stronger proficiency in the local language improves their chances of finding work (Kavanová et al., 2022; UNHCR, 2022; European Union Agency for Fundamental Rights, 2023; IOM, 2023). Language barriers also contributed to mismatches in work-qualifications. In Czechia, refugees able to communicate in everyday Czech were significantly more likely to be employed and work in positions matching their qualifications (Kavanová et al., 2022). Similarly, in Poland, many refugees worked below their competence level until learning sufficient Polish (EWL Migration Platform & Centre for East European Studies, University of Warsaw, 2022a), and those with fluent proficiency earned substantially higher salaries (Deloitte Poland, 2025).

Language barriers are more pronounced in countries with greater geographical and linguistic distance from Ukraine (UNHCR, 2022). Slavic languages such as Polish or Czech

share similarities with Ukrainian (Grenoble, 2010), and large pre-war diasporas in these countries increased the share of refugees already familiar with the language. Survey evidence confirms that local language proficiency among Ukrainian refugees is highest in Poland and lowest in Germany.[10]

Host countries vary in their support for language acquisition (OECD, 2022). Germany offers publicly-funded language courses and provides generous social support that allows refugees to devote time to language learning. Czechia similarly offers free language courses for job seekers through labor offices. Poland, on the other hand, does not provide free language training. While targeted language training has been shown to improve both language skills and labor market integration (De Vroome & Van Tubergen, 2010), many participants in Germany struggle with the exams, and about one in seven leave the course before completing the test (Thränhardt, 2023)

Since language barriers appear substantially higher in Germany than in Poland or Czechia, refugees who enter the German labor market are likely positively selected on education and, thus, learning ability. At the same time, Germany ranks above Poland and Czechia in English proficiency (Education First, 2020). Such English proficiency among the host population may reduce language barriers, as English is the second most widely spoken language in the EU (Rubio & Lirola, 2010). Refugees' own English proficiency also increases their employment prospects across Europe (Gazzola & Mazzacani, 2019; Gazzola et al., 2019). Since English proficiency may also signal higher education and skill levels, this further reinforces the suggestion that refugees integrating into the German labor market are relatively more educated. Taken together, the segment of local workers facing the most competition from Ukrainian refugees in Germany is likely more educated than in Poland or Czechia.

3 Data and descriptive statistics

To measure labor market outcomes of locals in host countries, we use individual-level microdata from the European Union Labor Force Survey (EU-LFS) collected on a quarterly basis (release 2024; Eurostat (2024)). The EU-LFS is a large household sample survey conducted across all EU member states. The survey uses internationally agreed concepts and definitions and is carried out by national statistical institutes, which forward the data to Eurostat using a common coding scheme to ensure cross-country comparability. It

[10] European Union Agency for Fundamental Rights (2023) reports high proficiency of the local language among 14% of refugees in Poland, 9% in Czechia, and 3% in Germany. Within-country surveys show that in Poland, 35–54% of refugees speak Polish well or fluently (Chmielewska-Kalińska et al., 2022; UNHCR, 2022). In Czechia, 12% speak Czech according to IOM (2023), and in Germany, 86% have low or no knowledge of German, with only 4% reporting good German skills (Brücker et al., 2023; European Union Agency for Fundamental Rights, 2023).

provides detailed information on labor market participation for people aged 15 and older, including those outside the labor force, covering all industries and occupations. The survey uses a rotational sampling design, with a minimum of 20% sample overlap between the same quarters in consecutive years and at least 50% overlap between consecutive quarters, ignoring attrition. However, the data are anonymized, meaning unique identifiers are not available, which prevents the tracking of recurring individuals over time.

We employ separate datasets for Poland, Germany, and Czechia, using consecutive quarterly waves from the first quarter of 2017 to the fourth quarter of 2023. An exception is Germany, where quarterly EU-LFS data for 2020 are unavailable due to quality constraints. This allows us to analyze two post-invasion years, 2022 and 2023, whereas PV consider only the short-run effects in 2022. The sample is restricted to individuals aged 20 to 64. The lower bound of 20 excludes those likely still in high school, as current school enrollment is not observed in the data (this approximation is supported by high inactivity rates among individuals under 20). Our microdata lack the necessary detail to identify Ukrainian nationals.[11] To approximate this exclusion criterion, we exclude all individuals who have been in the host country for less than two years, effectively removing refugees who arrived after February 2022. This results in a loss of less than 0.5% of observations. The final samples include 696,824 cross-sectional observations for Czechia, 1,228,707 for Germany, and 903,538 for Poland.

The EU-LFS underrepresents certain populations, particularly individuals without national citizenship and short-term migrants (Eurostat, 2025b). Therefore, the survey may not fully reflect labor market outcomes for individuals in informal employment or certain migrant groups. Consequently, our findings are mainly relevant for national citizens in formal employment.

The EU-LFS organizes its variables into two categories: quarterly and yearly. To minimize the burden on respondents, only a subset of variables is collected quarterly, while all variables are collected annually. Consequently, the dataset is divided into two components: (i) quarterly datasets and (ii) yearly datasets containing quarterly variables and additional structural variables at the household level for long-term analysis. We use the quarterly datasets to maximize the number of observation points after the Russian invasion in February 2022 (the four quarters of 2022 and 2023). This implies that some yearly variables (such as partner status and presence of children) are not available for our analysis. Apart from this limitation, we select EU-LFS variables that align closely with PV, including labor market outcomes (employment status and hours worked) and individual and job characteristics (age, level of education, region of residence, and sector

[11] In the EU-LFS, citizenship within the EU is reported only as (i) national/native, (ii) EU country, or (iii) European country outside the EU. For Poland, all other nationalities are recoded as "no answer". For Germany and Czechia, citizenship outside Europe is reported at the continental level. As a result, Ukrainian nationals, whether diaspora or refugees, cannot be identified.

of employment). Detailed variable descriptions are provided in Appendix A.

Table 3: Annual averages of employment outcomes

		2017	2018	2019	2020	2021	2022	2023
(a) Females								
Employment rate	CZ	0.68	0.70	0.70	0.68	0.73	0.75	0.77
	DE	0.71	0.72	0.73	.	0.74	0.76	0.76
	PL	0.60	0.61	0.62	0.62	0.66	0.69	0.69
Unemployment rate	CZ	0.03	0.02	0.02	0.02	0.03	0.02	0.03
	DE	0.03	0.03	0.02	.	0.03	0.02	0.02
	PL	0.03	0.03	0.02	0.02	0.02	0.02	0.02
Inactivity rate	CZ	0.30	0.28	0.28	0.29	0.24	0.23	0.20
	DE	0.26	0.26	0.25	.	0.23	0.22	0.22
	PL	0.37	0.37	0.36	0.36	0.31	0.29	0.29
Weekly hours worked	CZ	38.6	38.6	38.6	38.8	38.5	38.4	38.3
	DE	30.6	30.8	30.8	.	31.0	30.9	30.9
	PL	38.8	38.8	38.8	38.8	39.1	39.2	39.1
(b) Males								
Employment rate	CZ	0.84	0.85	0.86	0.85	0.86	0.87	0.87
	DE	0.82	0.82	0.83	.	0.83	0.84	0.84
	PL	0.76	0.77	0.78	0.79	0.81	0.82	0.83
Unemployment rate	CZ	0.02	0.02	0.02	0.02	0.02	0.02	0.02
	DE	0.04	0.03	0.03	.	0.03	0.03	0.03
	PL	0.04	0.03	0.03	0.03	0.03	0.02	0.02
Inactivity rate	CZ	0.14	0.13	0.13	0.13	0.12	0.11	0.11
	DE	0.15	0.14	0.14	.	0.14	0.13	0.13
	PL	0.20	0.20	0.19	0.18	0.16	0.16	0.15
Weekly hours worked	CZ	42.0	41.9	41.8	41.5	40.8	41.1	40.8
	DE	39.9	39.8	39.6	.	39.4	39.3	38.9
	PL	42.1	42.0	41.9	41.6	41.6	41.5	41.4

Note: This table reports mean values of labor market outcomes for locals based on EU-LFS data. The sample includes individuals aged 20–64 who have resided in the country for at least two years. Annual means are averages of the four quarterly cross-sections. Data for Germany in 2020 are unavailable due to quality constraints. The total number of quarterly cross-sectional observations amounts to 350,833 (CZ), 587,902 (DE), and 460,687 (PL) for females, and 345,991 (CZ), 640,805 (DE) and 442,851 (PL) for males. Mean hours worked are computed only for employed individuals, so the effective sample size is smaller than the total number of observations.

In 2021, the EU-LFS adopted a new legal framework that revised the measurements of labor force status. The main changes include: (i) Harmonized criteria for classifying

absences from work, whereby individuals on parental leave are considered employed if they receive job-related income or benefits or if their leave lasts three months or less, and seasonal workers are classified as employed during the off-season if they continue to perform regular tasks. In general, individuals temporarily absent from work but with a strong job attachment are considered employed. (ii) Individuals engaged in agricultural activities exclusively for self-consumption are no longer classified as employed. (iii) Only active job-search methods qualify non-employed individuals as unemployed, passive search methods are no longer considered.

These revisions created discontinuities in 2021: increases in employment rates and declines in inactivity. The parental-leave revision primarily affects low-educated women, and the seasonal work revision mainly affects low-educated men. The agricultural revision is more difficult to check, because we only observe sector of employment for employed individuals, so we cannot check who were previously labeled inactive while being in agriculture. However, this revision may be less relevant in Czechia and Germany, where 3.1% and 1.3% of employees, respectively, work in agriculture, but more important in Poland (9.8%). In particular, 29% of low-educated Polish men work in this sector. Section 4.2 explains how we address these measurement changes in the regression analysis.

Table 3 reports sample means of labor market outcomes in the EU-LFS samples (see Appendix A for complete EU-LFS descriptive statistics). In Poland, employment rates increased between 2017 and 2023, from 60% to 69% among women and from 76% to 83% among males, accompanied by declines in inactivity. While the jumps in 2021 reflect the EU-LFS measurement revisions, the broader upward trend is consistent with sustained labor market improvements. Between 2000 and 2021, employment among the working-age population rose by 15.1 percentage points, and unemployment fell to a historic low in 2021 (Lewandowski & Magda, 2023). Poland also shifted from a net emigration country to a major destination for temporary migrant workers (Duszczyk et al., 2023). This shift was initially triggered by the 2014 Russian invasion of Ukraine and was further reinforced by labor shortages in labor-intensive sectors (Matuszczyk, 2024). Since 2014, migrant inflows have eased shortages, especially in low-skilled occupations. Despite these improvements, Poland continues to record the lowest employment and highest inactivity rates among the three countries.

In Czechia, female employment rose sharply from 68% in 2020 to 77% in 2023, driven by higher labor force participation rather than changes in unemployment. Although the 2021 jump reflects the EU-LFS revision, the continued increase after 2021 is consistent with strong demand in a tight labor market, which has absorbed more women into employment (OECD, 2023a; Czech Statistical Office, 2025d).

Unemployment rates are similarly low across all countries (around 2–3%), consistent with the notion that all three host countries had comparably tight labor markets prior to the refugee influx. Among women, Germany records the highest employment rate until

2023, although average hours worked are lowest. For men, cross-country differences in hours worked are relatively small. In general, German employees show greater variation in working hours, whereas employment in Czechia and Poland is predominantly binary: individuals either work full-time or are not employed. This is also corroborated by the share of employees with part-time contracts reported Appendix A: about 27% in Germany versus 6% in Czechia and Poland. In 2023, the "new" post-invasion year added to extend the analysis of PV, local labor markets remain tight with low unemployment rates, and inactivity rates among Czech women decline relative to the previous year.

Several patterns from the complete EU-LFS descriptive statistics in Appendix A are worth noting. First, the distributions of educational attainment among local workers in our samples across the three host countries are broadly comparable to figures from national statistical institutions in Table 2. The Czech sample is, on average, less educated than the German and Polish samples. In Poland, the share of individuals with tertiary education increased markedly (from 28% in 2017 to 37% in 2023) reflecting, in part, the expansion of access to higher education through private providers. This trend is supported by official data showing an increase in total higher education enrollment in recent years (Statistics Poland, 2024).

Second, the samples for Czechia and Poland are highly homogeneous in terms of foreign-born status. Germany is more diverse in this respect, which allows for additional stratification in our analysis along this dimension, which is useful because certain minority groups, such as foreign-born individuals, may be more vulnerable to competition from incoming refugee workers.

Third, at the sectoral level, the dominant sectors employing refugees (manufacturing, construction, hospitality, transportation and storage, and retail trade; see Section 2) account for reasonably similar proportions of employment across the three host countries. In contrast, agriculture is more prominent in Poland than in Czechia or Germany. Indeed, agriculture accounts for a larger share of total employment in Poland (ILO, 2025), where it often relies on seasonal contracts, many of which are held by migrant workers from Central and Eastern Europe.

Our sample selection criteria and the resulting sample compositions differ from those of PV in two notable ways. PV use individual-level quarterly panel data from sixteen waves of the Czech Labor Force Sample Survey (LFSS) conducted between 2019 and 2022 by the Czech Statistical Office. First, the LFSS includes information on citizenship, enabling PV to exclude all individuals of Ukrainian nationality, both diaspora and refugees (just 0.76% of their sample). Second, PV select all Czech nationals and non-Ukrainian migrants aged 15 and older, while we limit the sample to ages 20–64. Their approach results in an older sample (mean age 53, compared with a median age category of 45–49 in our Czech sample) and a higher share of inactive individuals (47% compared to 20% in our Czech sample). Consequently, PVs estimates may be interpreted as a lower bound of potential

displacement effects, since the inclusion of a large proportion of inactive workers could dilute the measurable impact of incoming refugees on active labor market participants.

4 Empirical strategy

This study examines the impact of the Ukrainian refugee influx on local labor market outcomes in three European countries. We leverage regional variation in exposure to refugee inflows at the NUTS 2 level. These are the sixteen voivodeships in Poland, sixteen federal states in Germany, and eight cohesion regions in Czechia. The sudden and forced influx of Ukrainian refugees serves as a natural experiment, where regions that experience substantial increases in Ukrainian employment are classified as treated, while regions with minimal or no increase serve as controls.

Our empirical approach proceeds in two steps. First, we quantify each region's exposure to the labor supply shock by calculating a treatment dose, detailed in Section 4.1, that captures regional and temporal variation in exposure to Ukrainian refugee employment. Second, we implement pooled OLS regressions with region and time fixed effects, detailed in Section 4.2, to assess the impact of this exposure on employment, unemployment, inactivity, and working hours among the local population. Following our discussion in Section 3, locals are defined as citizens of the three host countries who have resided there for at least two years.

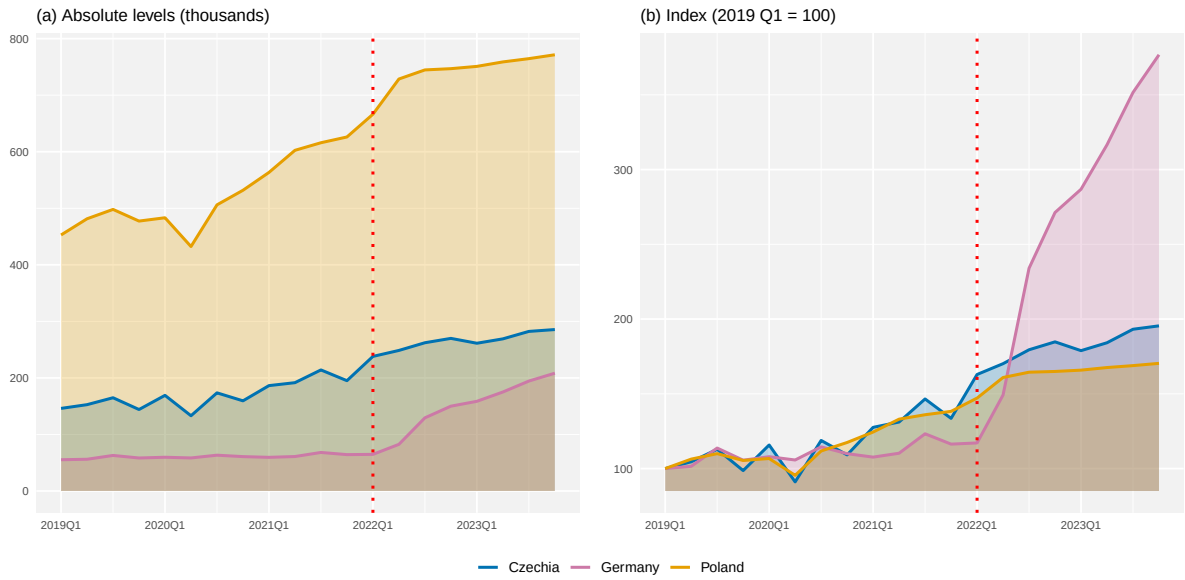
4.1 Treatment variables

Accurately measuring the employment of newly arrived Ukrainian refugees is challenging, as foreign employment in the three host countries is reported by citizenship without distinguishing between types of residence permits. To approximate the labor supply shock triggered by the Russian invasion in February 2022, we compare Ukrainian employment levels during 2022 and 2023 with pre-war baseline levels. Therefore, we assume that the sharp increases observed from February 2022 onward primarily reflect the labor market integration of newly arrived refugees.[12] To account for seasonal or cyclical fluctuations in foreign employment, we employ three alternative measures of pre-war baseline employment: (i) the 2021 annual average, (ii) the level in the fourth quarter of 2021, and (iii) the 2019 annual average, which reflects earlier pre-war and pre-pandemic immigration levels. Fig-

[12]This measure may overstate refugee employment if members of the pre-existing diaspora (re)entered the workforce. However, evidence from Czechia suggests this bias is limited, given the high pre-war employment rate (99%) among Ukrainians (Postepska & Voloshyna, 2025). Conversely, our estimates may understate refugee employment if previously employed Ukrainians left the country, relocated internally, or exited the workforce. For Czechia, however, PV find no evidence of substantial migration flows, supporting the robustness of our approach.

ure 2 illustrates trends in Ukrainian employment in the three host countries since 2019.[13] The graphs reflect differences in the pre-war Ukrainian diaspora across the three countries. Prior to 2022, Ukrainian employment was much lower in Germany, after which it increased sharply. In contrast, in Poland, Ukrainian employment had been rising steadily since 2020.

Figure 2: Employees with Ukrainian nationality



Note: This figure shows the number of employees with Ukrainian nationality in Czechia, Germany, and Poland in absolute terms (panel a) and indexed to the first quarter of 2019 (panel b). The first post-invasion observation (2022 Q1) is indicated by red vertical lines. Data are sourced from Ministry of Labor and Social Affairs (2025) (Czechia), Federal Employment Agency (2025a) (Germany), and ZUS Statistical Portal (2025) (Poland).

Since the impact of an influx of foreign employees likely depends on the size of the local labor market, the treatment dosage of each region is normalized by a measure of labor market size. Normalization depends on country-specific data availability. For Czechia, we use the size of the working-age population, for Germany, the size of the active labor force, and for Poland, the number of individuals paying social contributions. Following PV, each measure is anchored to pre-war 2021 levels to prevent the treatment variable from being influenced by subsequent changes in local labor market outcomes during 2022, which could otherwise create a feedback loop. Furthermore, each measure is taken at year-end, and we subtract the number of Ukrainian individuals to avoid double counting.

[13] Appendix B presents regional trends and provides information on the country-specific definitions of Ukrainian employment.

Accordingly, we define three treatment variables:

$$treat^{I}_{r,t} = \begin{cases} \frac{\text{employed Ukrainians}_{r,t} - \text{employed Ukrainians}_{r,\ 2021\ \text{average}}}{\text{local labor market size}_{r,2021}} \times 100\% & \text{if } t > 2021, \\ 0 & \text{if } t \leq 2021; \end{cases} \tag{1a}$$

$$treat^{II}_{r,t} = \begin{cases} \frac{\text{employed Ukrainians}_{r,t} - \text{employed Ukrainians}_{r,\ Q4\ 2021}}{\text{local labor market size}_{r,2021}} \times 100\% & \text{if } t > 2021, \\ 0 & \text{if } t \leq 2021; \end{cases} \tag{1b}$$

$$treat^{III}_{r,t} = \begin{cases} \frac{\text{employed Ukrainians}_{r,t} - \text{employed Ukrainians}_{r,\ 2019\ \text{average}}}{\text{local labor market size}_{r,2019}} \times 100\% & \text{if } t > 2019, \\ 0 & \text{if } t \leq 2019. \end{cases} \tag{1c}$$

The first two treatment variables assign a baseline dose of zero to all regions prior to 2022, consistent with the treatment specifications in PV. We extend their analysis by adding a third variable, which allows for non-zero values beginning in 2020 to capture earlier pre-war immigration patterns.

Table 4 presents descriptive statistics for the key demographic indicators used to calculate the treatment dosages, including the sizes of the local and Ukrainian working-age populations before and after the outbreak of the war. The figures highlight that the inflow of refugees relative to the host population size was particularly high in Czechia and Poland. For example, in 2022, the number of employed Ukrainians corresponds to 6.0%, 0.25%, and 4.6% of the employed locals in Czechia, Germany, and Poland, respectively. In Czechia, prior to 2021 the number of employed Ukrainians exceeded the number of Ukrainians officially registered as residents. In 2022, we see a sharp increase in the Ukrainian population which declined slightly (by roughly 10%) in 2023. In contrast, employment among Ukrainians continued to rise in 2023. The decline in the registered Ukrainian population in Czechia likely reflects a combination of return migration to Ukraine and onward migration to other countries. Evidence from UNHCR shows that return flows increased in late 2022 and throughout 2023, although the total number of Ukrainians residing abroad remained well above pre-war levels. According to UNHCR (2024b), nearly 324,600 refugees returned to Ukraine in 2023, primarily from Germany (75,200), Poland (65,500) and Czechia (25,600). By contrast, the Ukrainian population in Germany does not decrease in 2023, which may be due to secondary migration toward Germany. While Czechia experienced rapid inflows in 2022 and relatively fast labor market absorption, Germany became increasingly attractive over time due to more generous social benefits and more favorable long-term residence prospects. Several countries, including Czechia and Poland, saw secondary migration toward Germany in 2022 and 2023 (EWL Migration Platform & Centre for East European Studies, University of Warsaw, 2022a; Thränhardt, 2023). For Poland, data on the Ukrainian resident population are not available. Available data cover only temporary protection registrations which exclude pre-war diasporas.

We observe substantial cross-country differences in treatment intensity (see Table B1

Table 4: Descriptive statistics

	2019	2020	2021	Q4 2021	2022	2023
(a) Czechia						
Employed Ukrainians	152.0	158.8	196.8	195.1	254.7	274.5
Ukrainians in host country	145.2	165.4	196.6	196.6	635.9	574.0
Ukrainians of working age (15–64)	125.5	143.9	171.8	171.8	480.6	455.1
Employed locals	4,226.7	4,173.3	4,186.2	4,223.3	4,224.5	4,238.2
Locals of working-age (15–64)	6,852.1	6,823.7	6,654.2	6,654.2	6,868.9	6,935.5
(b) Germany						
Employed Ukrainians	58.4	60.5	63.4	64.8	114.6	189.1
Ukrainians in host country	133.3	135.0	138.2	138.2	863.3	974.3
Ukrainians of working age (18–65)	97.4	98.7	101.2	101.2	530.1	616.3
Employed locals	45,291.0	44,966.0	45,053.0	45,053.0	45,675.0	46,011.0
Locals of working-age (18–65)	55,801.2	55,478.4	55,416.6	55,416.6	55,988.7	56,333.2
(c) Poland						
Employed Ukrainians	477.4	488.4	602.0	626.1	721.6	761.5
Ukrainians in host country	.	.	.	.	.	.
Ukrainians of working age	.	.	.	.	.	.
Employed locals	15,588.8	15,509.3	15,574.5	15,717.9	15,839.0	15,936.8
Locals of working-age (18–59/64)	23,025.9	22,631.3	22,385.4	22,385.4	22,169.3	21,985.5

Note: All variables are reported in thousands of persons. "Q4 2021" reports values as of December 31, 2021. Annual figures are annual averages where possible and replaced by the Q4 value if no other values are available. Data sources are as follows. Czechia: employed Ukrainians from Ministry of Labor and Social Affairs (2025), (working-age) Ukrainian population from Czech Statistical Office (2025c), employed locals from Czech Statistical Office (2025b), and working-age local population from Czech Statistical Office (2025a); Germany: employed Ukrainians from Federal Employment Agency (2025a), employed locals from Destatis (2025a), and (working-age) Ukrainian and local populations from Destatis (2025c); Poland: employed Ukrainians and employed locals from ZUS Statistical Portal (2025), and (working-age) local population from Statistics Poland (2025).

in Appendix B for summary statistics). Consistent with Czechia recording the highest per capita inflow of Ukrainian refugees in the EU, treatment intensity across Czech regions ranges from 0.3% to 3.7% when 2021 is used as the baseline, and up to 5.9% when 2019 is the reference year. In Poland, treatment relative to 2021 ranges from −0.3% to 3.7%. Treatment intensity is lower than in Czechia because of the absence of a sharp increase in Ukrainian employment in 2022. Instead, Ukrainian employment had been rising steadily since 2020 (see Figure 2). By contrast, Germany experienced much smaller shocks, no larger than 0.5%, reflecting its comparatively low per capita refugee inflow.

Within countries, treatment trajectories differ across regions (see Figure B6 in Appendix B). Czechia shows the greatest regional differences, with treatment doses exceeding 5% in Střední Čechy and Jihozápad, and close to 1% in Moravskoslezsko and Střední Morava. In Poland, large values ($> 3\%$) occur in Mazowieckie and Dolnośląskie, two populous, high-income voivodeships, and small values ($< 1\%$) are observed in Podkarpackie, Świętokrzyskie, and Lubelskie, three low-income voivodeships close to the Ukrainian border. In Germany, dispersion is far smaller: most regions cluster around 0.2%, with only Berlin and Mecklenburg-Vorpommern standing out. In the latter, treatment intensity is likely amplified by the region's reliance on sectors with high seasonal labor demand, causing recurring third-quarter peaks.

4.2 Regression analysis

To assess the impact of legally employed Ukrainians on the labor market outcomes of local workers, we estimate the following model using pooled OLS:

$$\begin{aligned} y_{irt} = \alpha + \beta \cdot treat_{rt}^{\text{I, II, or III}} + \gamma_r + \gamma_t + \delta_{2r} \cdot \text{2nd quarter}_t + \delta_{3r} \cdot \text{3rd quarter}_t \\ + \delta_{4r} \cdot \text{4th quarter}_t + \theta' \boldsymbol{X}_{irt} + \varepsilon_{irt}, \end{aligned} \tag{2}$$

where i, r, and t index the individual, region, and time (the four quarters of each year from 2017 to 2023). The outcome variable y_{irt} represents a local labor market outcome, either the extensive margin (employment, unemployment, or inactivity) or the intensive margin (weekly hours worked). The coefficients of primary interest are those on the treatment variables (either $treat_{rt}^{\text{I}}$, $treat_{rt}^{\text{II}}$, or $treat_{rt}^{\text{III}}$). The model includes region fixed effects (FE) (γ_r) to control for time-invariant unobserved regional factors, and time FE (γ_t) to absorb shocks common to all regions. To account for recurring seasonal patterns in labor demand, we include region-specific quarter dummies (δ_{2r}, δ_{3r}, and δ_{4r}). We control for a range of individual-level characteristics ($\boldsymbol{X}$): age group (20–24, 25–29, ..., 60–64), a dummy for being foreign-born, and level of education (in ISCED categories). When weekly hours worked is the dependent variable, we additionally control for part-time status and sector (using NACE Rev. 2 classification). All models are estimated separately by gender and host country.

The aggregate breaks in outcome variables in 2021 due to the revised measurements of labor force status in EU-LFS data (see Section 3) are absorbed by the time FE. Because the revision differentially affects education groups (low-educated individuals are more often in seasonal work, agriculture, or parental leave), we also estimate the model separately by educational level, allowing the time FE to precisely capture post-2021 breaks within each group. One remaining concern relates to the analysis of working hours. Weekly hours are observed only for individuals classified as employed. The 2021 revision expanded the employed population to include certain seasonal and agricultural workers, and those on

parental leave, thereby altering the composition of the sample used for the working-hours analysis. We account for this potential selection issue when interpreting the results.

Because many individuals in the EU-LFS appear in multiple periods, employment outcomes are likely to be correlated within individuals over time. However, as EU-LFS data are anonymized and lack unique identifiers that would allow individuals to be tracked across survey waves, we cannot explicitly model within-person dependence. Instead, we allow for within-region correlation by using cluster-robust standard errors. Specifically, we use the leverage-adjusted heteroskedasticity-consistent variance estimator, which is unbiased under homoskedasticity (often labeled HC2; see for example Hansen (2022)). This adjustment mitigates the downward bias in standard errors that can arise when a small number of clusters dominate the sample. This concern is particularly relevant for the German microdata, given the small size of certain regions (see Table A3).

Due to data constraints, our approach differs from PV in three respects. First, because the EU-LFS does not provide unique identifiers, we cannot include individual FE and instead control for region and time FE. Second, the data are available only at the NUTS 2 level (Czechia's eight cohesion regions), which prevents us from exploiting more granular regional variation at the NUTS 3 level (77 districts). Third, partner status and the presence of children are not observed at a quarterly frequency (see Section 3) and therefore cannot be included as controls. To assess whether PV's richer data affects the comparability of their results and ours, we use their data[14] to replicate their analysis with several adjustments to mimic our design: (i) replacing individual FE with region FE; (ii) aggregating treatment intensity and regional identifiers from NUTS 3 to NUTS 2; (iii) applying both adjustments jointly; and (iv) omitting partner status and presence of children from the controls. Across all specifications, their main findings (no effects on employment, unemployment, or inactivity among locals, and some evidence of increased weekly working hours, especially among local females) remain qualitatively unchanged (see Tables C1 and C2 in Appendix C). These results indicate that, despite our data limitations, our findings for Czechia can be meaningfully compared to those of PV.

5 Results

This section presents the results of the pooled OLS regressions in Equation (2), estimated separately for local females and males in each of the three host countries over the period 2017–2023. Since the coefficients on the three treatment variables are of primary interest,

[14]PV use individual-level quarterly panel data from sixteen waves of the Czech Labor Force Sample Survey (LFSS) conducted between 2019 and 2022 by the Czech Statistical Office. The LFSS also feeds into the EU-LFS, which is a harmonized dataset compiled by Eurostat that applies standardized definitions across EU countries to enable cross-country comparisons. Because of this harmonization, some variables become unavailable or less detailed.

Table 5 summarizes these estimates. Within an estimation sample, the estimated treatment coefficients in the employment, unemployment, and inactivity models sum to zero (aside from minor rounding differences), as these three indicators are mutually exclusive for each individual. Including all three specifications of the treatment variable serves as a robustness check. The estimated coefficients are generally consistent in sign, show only minor differences in statistical significance, and are comparable in magnitude. Since treatment intensity is much smaller in Germany (maximum 0.5%) than in Czechia and Poland (up to 5.9% and 3.7%, respectively), the estimated treatment effects in Germany are consistently larger in magnitude across all models. In addition, estimated effects on weekly hours worked are further amplified in Germany due to greater heterogeneity in working hours. In Germany, average weekly hours are 35.6 and 27% of employees work part-time. By contrast, in Czechia and Poland only 6% of employees work part-time, and average weekly hours exceed 40.

The literature indicates that refugee inflows can have heterogeneous impacts on the local labor force. Certain workers might be more vulnerable, particularly those whose demographic profiles resemble those of incoming refugees or those working in sectors with high refugee employment. We therefore examine heterogeneity across subgroups defined by educational attainment and foreign-born status. Czechia and Poland are highly homogeneous in terms of nativity: foreign-born individuals account for only 3.9% and 0.3% of the respective samples. Germany is considerably more diverse, with 18.5% foreign-born individuals. Consequently, the German sample allows for more precise estimation of heterogeneous effects, whereas estimates for Czechia and Poland should be interpreted with caution due to small sample sizes.[15] We additionally estimate treatment effects on hours worked within sectors. Due to small sample sizes in several sectors, we also estimate effects for an aggregate sample combining the sectors most exposed to the refugee inflow.[16] Table 6 presents key findings from the subgroup analysis. The full set of results is reported in Appendix D.

[15]PV also encounter this limitation, as foreign-born individuals represent only 0.04% of their dataset. Although they estimate their models for foreign-born workers only and report slight declines in employment probabilities and increases in unemployment probabilities among foreign-born individuals in Czechia, they emphasize that small sample sizes restrict the strength of this conclusion.

[16]In Czechia, sectors showing the highest shares of Ukrainian refugee employment are manufacturing, construction, wholesale and retail trade, transportation and storage, hospitality, and administrative and support services (Czech Statistical Office, 2023). In Germany, refugees are concentrated in manufacturing, construction, hospitality, and health care (EWL Migration Platform & Centre for East European Studies, University of Warsaw, 2022b; UNHCR, 2025a). In Poland, the largest increases in Ukrainian employment between December 2021 and December 2023 occurred in manufacturing, hospitality, wholesale and retail trade, public administration, education, other services, health care, and administrative and support services (Deloitte Poland, 2025; ZUS Statistical Portal, 2025).

Table 5: Treatment effects on labor market outcomes, by country and gender

	Females			Males		
	CZ	DE	PL	CZ	DE	PL
(a) Probability of employment						
I	0.006	-0.089	-0.001	0.003**	-0.078	-0.005
	(0.005)	(0.062)	(0.003)	(0.001)	(0.056)	(0.005)
II	0.005	-0.076	-0.000	0.004	-0.064	-0.006
	(0.005)	(0.057)	(0.003)	(0.002)	(0.048)	(0.006)
III	0.003	-0.077	-0.001	0.002**	-0.049	-0.004
	(0.005)	(0.056)	(0.004)	(0.001)	(0.049)	(0.004)
Mean dep. var.	0.71	0.73	0.64	0.86	0.83	0.79
N	350,833	587,902	460,687	345,991	640,805	442,851
(b) Probability of unemployment						
I	-0.002	-0.032	0.001	-0.002	-0.004	-0.000
	(0.003)	(0.019)	(0.002)	(0.002)	(0.044)	(0.002)
II	-0.001	-0.031*	0.001	-0.001	0.002	-0.000
	(0.002)	(0.017)	(0.002)	(0.002)	(0.036)	(0.002)
III	-0.001	-0.033*	0.002	-0.000	-0.028	0.001
	(0.001)	(0.017)	(0.001)	(0.000)	(0.029)	(0.002)
Mean dep. var.	0.02	0.03	0.02	0.02	0.03	0.03
N	350,833	587,902	460,687	345,991	640,805	442,851
(c) Probability of inactivity						
I	-0.004	0.122**	-0.001	-0.002	0.081**	0.005
	(0.007)	(0.055)	(0.003)	(0.002)	(0.037)	(0.005)
II	-0.004	0.107*	-0.001	-0.003	0.061	0.006
	(0.006)	(0.055)	(0.003)	(0.002)	(0.045)	(0.005)
III	-0.002	0.110**	-0.000	-0.002**	0.077**	0.003
	(0.005)	(0.047)	(0.005)	(0.001)	(0.027)	(0.004)
Mean dep. var.	0.26	0.24	0.34	0.13	0.14	0.18
N	350,833	587,902	460,687	345,991	640,805	442,851
(d) Weekly hours worked						
I	0.051	-1.547	0.054	0.070	1.421	-0.163**
	(0.110)	(0.915)	(0.061)	(0.109)	(0.937)	(0.069)
II	0.103	-1.507	0.062	0.003	1.767*	-0.182**
	(0.076)	(1.134)	(0.065)	(0.110)	(0.982)	(0.080)
III	0.018	-1.375	0.041	-0.047	1.145*	-0.130*
	(0.049)	(0.885)	(0.036)	(0.078)	(0.546)	(0.073)
Mean dep. var.	38.5	30.8	38.9	41.4	39.5	41.8
N	248,732	429,960	286,079	293,437	530,107	338,139

Note: This table reports full-sample treatment effects on labor market outcomes using EU-LFS 2017–2023 data. Models control for region FE, time FE, region-specific quarter-of-year dummies, age, educational attainment, and foreign-born status. When hours worked is the dependent variable, additional controls are sector fixed effects and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: Heterogeneous treatment effects on labor market outcomes for selected subgroups

(a) Czech males		
Subgroup	Primary education	
Dep. var.	Employment	Unempl.
I	0.029**	-0.014**
	(0.012)	(0.005)
II	0.031**	-0.012*
	(0.013)	(0.006)
III	0.011	-0.006**
	(0.008)	(0.002)
Mean dep. var.	0.60	0.07
N	19,580	19,580

(b) German males			
Subgroup	Age 62–64		Tertiary edu.
Dep. var.	Employment	Inactivity	Hours
I	-0.499***	0.549***	2.914**
	(0.111)	(0.111)	(1.336)
II	-0.392**	0.434***	3.401**
	(0.150)	(0.160)	(1.475)
III	-0.354***	0.403***	2.722***
	(0.160)	(0.160)	(0.823)
Mean dep. var.	0.53	0.44	41.4
N	321,363	321,363	199,336

(c) German females						
Subgroup	Primary education		Age 35–44		Age 50–59	
Dep. var.	Employment	Inactivity	Employment	Inactivity	Unempl.	Inactivity
I	-0.315**	0.418**	-0.245***	0.232***	-0.067**	0.140**
	(0.132)	(0.145)	(0.050)	(0.051)	(0.025)	(0.065)
II	-0.263*	0.357*	-0.214***	0.203***	-0.058***	0.143**
	(0.148)	(0.174)	(0.066)	(0.068)	(0.019)	(0.065)
III	-0.261**	0.384***	-0.260***	0.253***	-0.063**	0.082
	(0.099)	(0.116)	(0.078)	(0.063)	(0.025)	(0.072)
Mean dep. var.	0.53	0.43	0.79	0.18	0.02	0.20
N	108,297	108,297	114,412	114,412	170,946	170,946

(d) Polish males						
Subgroup	Primary education			Age 45–54; prim. edu.		Sector C
Dep. var.	Employment	Inactivity	Hours	Employment	Inactivity	Hours
I	-0.036**	0.038***	-0.337**	-0.049**	0.050**	-0.368***
	(0.013)	(0.012)	(0.137)	(0.019)	(0.018)	(0.095)
II	-0.040***	0.044***	-0.353**	-0.053***	0.053***	-0.413***
	(0.013)	(0.014)	(0.145)	(0.018)	(0.016)	(0.110)
III	-0.031***	0.028***	-0.379**	-0.035*	0.037**	-0.260***
	(0.010)	(0.008)	(0.142)	(0.018)	(0.016)	(0.055)
Mean dep. var.	0.54	0.41	41.9	0.65	0.30	40.9
N	34,634	34,634	17,699	7,317	7,317	43,382

Note: This table reports key results from subgroup analyses. Complete results are presented in Appendix D. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector fixed effects and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

For Czechia, we find no statistically significant treatment effects on employment outcomes of females. Among males, we estimate an increase in employment probabilities (0.01–0.03) and a decrease in unemployment probabilities of (−0.01). However, panel (a) of Table 6 reveals that these small effects in the male sample are entirely driven by primary-educated individuals. This group is often employed in manufacturing, construction, and transportation, which include many manual and low-skill positions. Given that male Ukrainian refugees were also concentrated in these sectors, precisely these low-educated local workers were expected to be vulnerable to adverse displacement effects. However, the exceptionally low unemployment rate and surplus of job vacancies in the Czech labor market likely mitigated such effects. Moreover, refugee inflows may have stimulated labor demand in these sectors through increased consumption of housing, goods, and services, potentially offsetting adverse supply-side effects and even boosting employment among low-educated local males.[17] The absence of similar positive effects in PV is likely because their analysis includes the entire population aged 15 and older, nearly half of whom are inactive, which could dilute positive effects among the active workforce. PV do report small but statistically significant positive treatment effects on working hours of locals in exposed sectors, which they also contribute to increased demand. Overall, our findings closely mirror those reported by PV using their static TWFE model, suggesting that the results of our slightly modified empirical approach can be meaningfully compared to theirs. Extending the analysis to Germany and Poland allows us to evaluate whether the absence of displacement effects estimated in Czechia persists across different institutional settings.

Among German males, we estimate negative treatment effects on employment probabilities and positive treatment effects on inactivity, driven entirely by individuals aged 62–64. Panel (b) of Table 6 shows that both effects are similar in magnitude, around 0.4 to 0.5. While these magnitudes appear large, they are plausible given the scale of the treatment variable in Germany (average 0.2%, maximum 0.5%). For all other male age groups, the estimated effects are statistically insignificant and inconsistent in sign. A likely explanation is early retirement behavior. While the statutory retirement age in Germany in 2022 was 65, workers could retire early under certain conditions (OECD, 2023b). In 2022, take-up of this option exceeded government expectations and previous years' counts.[18] Our results

[17]Evidence from countries with large inflows relative to their population size indicates that refugee arrivals can increase retail trade and private consumption (Pogarska et al., 2023; Czech News Agency, 2025; Deloitte Poland, 2025).

[18]Under the "Rente mit 63" scheme introduced in 2014, workers with 45 years of pension contributions could retire from age 63 without deductions. Those with fewer than 45 years (but at least 35 years) of contributions could retire under an alternative scheme but with permanent deductions. Early retirees accounted for 26.3% of all new state pensions in 2022. In January 2023, the scheme was adjusted in response to the shortage of skilled labor and to strengthen work incentives. The German government abolished the additional earnings limit for early old-age pensions, allowing retirees to earn income without

suggest that the refugee influx accelerated transitions into early retirement among male workers. This interpretation is consistent with similar, though smaller, effects we estimate for secondary-educated males, reflecting that incentives to retire early are more modest for lower-income groups. In contrast, turning to the intensive margin, we find positive treatment effects on weekly hours worked of tertiary-educated males (2.7 to 3.4). These workers are overrepresented in scientific and technical professions, public administration and defense, education, and IT, sectors with some of the highest vacancy rates in Germany in 2022. This is consistent with ongoing structural growth and high demand for skilled labor (EURES, 2025a; Federal Employment Agency, 2025c).

For German females, like German males, higher exposure to legally employed Ukrainians is associated with decreased employment and increased inactivity. However, unlike men, the effect is not directly linked to early retirees but driven by primary-educated women and those aged 35–44 (see panel (c) of Table 6). For primary-educated women, we estimate symmetric negative and positive effects of about 0.3 to 0.4 on respective employment and inactivity probabilities, and slightly smaller effect sizes for women aged 35–44. The observed shift toward inactivity rather than unemployment is not consistent with a standard displacement effect. Since primary-educated women in the 35–44 age group are already more likely to leave the labor force for family reasons, these results suggest that the inflow of refugee workers has accelerated family-related exits. A possible explanation for this finding are childcare constraints. Survey evidence indicates that lack of childcare is one of the main barriers to employment for refugees in Germany, most of whom are women (OECD, 2023c; Kosyakova et al., 2024, 2025). Although these findings concern refugees rather than locals, they suggest that higher demand for childcare may also affect local parents. Given the small effect sizes, this mechanism could partly explain higher labor force withdrawal among primary-educated German women aged 35 to 44, who may take on additional care tasks when external childcare options are limited. For secondary-educated German females, we estimate small negative treatment effects on unemployment but there is no corresponding statistically significant increase in either employment or inactivity, making it unclear where these individuals move. Table 6 reveals that this effect (-0.06) is driven by women aged 50–59, who show positive treatment effects on inactivity (0.14).

In Poland, treatment effects are concentrated among primary-educated males. Higher exposure to refugee employment is associated with lower employment probabilities (-0.03 to -0.04), higher inactivity probabilities (0.03 to 0.04), and, conditional on employment, lower working hours (see panel (d) of Table 6). The estimated effect on working hours ranges from -0.3 to -0.4, implying that a 1% rise in officially employed Ukrainian refugees reduced weekly hours worked by approximately 18–24 minutes (-0.7 to -1% relative to

reductions to their pension. Previously, strict limits applied to how much early retirees could earn while claiming a pension.

their 2021 average of 41.6 hours). For secondary-educated males, the negative effects on hours are about half as large. For tertiary-educated males, estimates turn positive and statistically insignificant. Within-sector results reinforce this pattern: we find negative effects on working hours of males in manufacturing, the main employer of low-educated males.

In contrast to Germany, the shift from employment to inactivity in Poland is concentrated among primary-educated males aged 45–54. Estimates for other age and education groups are inconsistent in direction and statistical significance. Since these men are far from the statutory retirement age of 65, the pattern cannot be attributed to early retirement. Early retirement is also less attractive in Poland due to a relatively less generous pension system and substantial reductions for early exit. Furthermore, the estimated shift toward inactivity rather than unemployment is inconsistent with standard displacement effects. Instead, this pattern may partially reflect the prevalence of fixed-term or seasonal contracts in low-skilled jobs and how such contracts are classified in the EU-LFS.[19] Even though the models control for seasonality and include time FE that should capture seasonal inactivity and post-2021 revisions regarding the coding of labor force status in EU-LFS, it remains unclear to what extent the estimated effects for low-educated Polish males represent true displacement.

Nevertheless, adverse effects in Germany are concentrated among secondary-educated men, while in Poland they are concentrated among primary-educated men. Several factors may explain why secondary-educated males in Germany faced relatively more competition from refugees than lower-educated males. First, Germany has a history of employing foreign workers in skilled occupations, creating established pathways (Federal Employment Agency, 2025b). In Poland, on the other hand, foreign workers are primarily concentrated in lower-skill manual roles (EURES, 2025b). Second, refugees who settle farther from the armed conflict tend to be higher educated, have more financial resources, and possess better English proficiency (Kohlenberger et al., 2023; Van Tubergen et al., 2024), resulting in a relatively higher-skilled inflow into Germany compared with Poland, where refugees primarily competed for low-skill jobs. Third, labor market access in Germany was complex and bureaucratic, while Poland and Czechia introduced legislation that reduced administrative barriers. Germany's demanding procedures may have disproportionally deterred lower-educated refugees, while higher-educated refugees, likely better equipped with resources, language skills, or transferable qualifications, were able to navigate these procedures and enter the labor market more successfully. Fourth, Germany's generous social benefits may have created different labor supply incentives across skill groups: higher-educated refugees had more to gain from employment, whereas for lower-educated refugees, benefits were

[19]For instance, during the off-season, seasonal workers are classified as employed if they declare being absent from work but still regularly perform job-related tasks. Otherwise, they are classified as unemployed if they actively search for work, and as inactive if they do not actively search.

closer to expected market wages, reducing their incentives to work. In Poland and Czechia, less generous benefits strengthened incentives for all refugees to seek employment.

This interpretation of varying substitution versus complementary effects depending on locals' and refugees' characteristics aligns with the mechanisms proposed by PV. They explain that incoming refugees in Czechia are concentrated in jobs requiring lower educational attainment. This is because refugees facing language barriers and limited familiarity with the local labor market often accept jobs requiring lower educational attainment. Indeed, Kosyakova et al. (2024) notes that transferring prior work experience across borders is particularly difficult in occupations that require formal recognition of qualifications. Instead, more skilled local workers tend to hold complementary roles, benefiting from increased demand or newly created collaborative opportunities rather than competing for the same jobs. This explains the positive effects, higher working hours among secondary-educated local women in treated districts, documented by PV.

6 Conclusion

Following the Russian invasion of Ukraine on 24 February 2022, over a quarter of the Ukrainian population became displaced. This paper studies the impact of legally employed Ukrainian refugees on local labor markets in Czechia, Germany and Poland between 2017 and 2023. We quantify each region's exposure to this labor supply shock and exploit variation across regions and over time. Using quarterly individual-level data from the European Union Labor Force Survey (EU-LFS), we estimate the effects on local employment outcomes through pooled OLS regressions with region and time fixed effects.

Our study builds on Postepska & Voloshyna (2025) (PV), whose analysis is limited to Czechia and finds no economically meaningful impact on employment, unemployment, or inactivity rates among the local population, irrespective of gender, education, or industry. PV attribute the absence of displacement effects to Czechia's tight labor market, which allowed smooth absorption of the refugee workforce. We extend their analysis to Poland and Germany to assess whether these findings hold in other contexts, and we replicate the Czech case as a robustness check of our methodology. Germany differs because refugee employment rates were substantially lower, which is often linked to complex procedures for obtaining work permits, in contrast to the simplified procedures in Czechia and Poland. Furthermore, our analysis spans two post-invasion years, 2022 and 2023, allowing us to move beyond the short-run effects in 2022 studied by PV.

Our analysis reveals heterogeneous treatment effects across countries and education levels. In Czechia, for low-educated males, we find positive effects on employment and negative effects on unemployment. We find no evidence of adverse effects among potentially vulnerable groups, such as workers in highly-exposed industries or foreign-born individuals. PV similarly identify no displacement effect, attributing this to an exceptionally tight labor

market with a large surplus of job vacancies that mitigated potential disruptions from the influx of refugees. Low bureaucratic barriers to employment allowed refugees to alleviate labor shortages in sectors like retail trade, construction, and public administration, which offer many low-skill jobs.

In Germany, the refugee inflow appears to have specifically triggered early retirement among men, particularly those with secondary-education. This response may be specific to the German context given the country's relatively generous and secure pension system. Incentives for early retirement are likely stronger for the secondary-educated than for the primary-educated, since low-income groups face lower pension benefits. Among women, the response was concentrated among primary-educated individuals and those aged 45–54. We estimate that higher concentrations of Ukrainian refugee employment increased inactivity and decreased employment in this group, which is already more prone to (temporarily) exiting the labor force for family reasons.

In Poland, we find adverse effects for low-educated males along both the extensive and intensive margins, particularly among those aged 45–54, possibly reflecting direct competition from incoming refugees. However, the estimated shift from employment to inactivity rather than to unemployment is not consistent with standard displacement effects. Part of the increase in inactivity may instead reflect irregular contracts, parental leave, and other (temporary) absences from work and the way these are classified in the EU-LFS, warranting caution in interpreting the estimates.

These heterogeneous patterns in Germany and Poland suggest that different segments of the local workforce faced competitive pressures from incoming workers. In Poland, low-educated males likely faced direct competition from incoming refugees. In Germany, competitive pressure was strongest for secondary-educated males, possibly due to Germany receiving on average more-educated and resourceful refugees compared to Poland, but also institutional factors in Germany that acted as another selection mechanism: demanding admission procedures and higher language barriers meant that more skilled refugees were more likely to secure jobs. At the same time, increased consumption of goods and services triggered by refugee arrivals may have offset adverse effects for low-educated males.

From an economic perspective, it is increasingly recognized that the influx of Ukrainian refugees has generated net positive effects in several host countries.[20] In Poland, Deloitte Poland (2025) find that the influx of Ukrainian workers did not lead to higher unemployment or lower real wages. Instead, it improved overall productivity and allowed native

[20] In Czechia and Poland, refugees have made significant contributions to society by filling labor shortages in key sectors and generating substantial tax revenues. According to Czechia's Minister of Labor and Social Affairs, state income from employed refugees has exceeded the cost of aid since the third quarter of 2023 (Czech News Agency, 2025). Projections by Pogarska et al. (2023) estimate that the contribution of Ukrainian refugees will increase output in 2026–compared to the baseline scenario with no migration–by 2.2%–2.3% in Poland and Czechia, and by 0.6%–0.65% in Germany, where the economic impact is smaller due to the relatively small inflow compared to the host population.

workers to shift into complementary, better-paid roles. In light of these benefits to aggregate economies, our findings highlight the importance of considering potentially more vulnerable segments of the local workforce. While aggregate employment in Poland shows no adverse effects, low-educated males may lack the qualifications needed to move into complementary, higher-paid jobs, and consequently experienced negative labor market impacts.

Furthermore, our empirical evidence is valuable because we are the first to compare labor-market effects across multiple host countries. The results show that impacts depend on characteristics of both local and refugee workers, as well as on the complexity of administrative procedures governing legal access to labor markets. Low-educated males are particularly affected, but the direction of the effect varies by context. These results provide insights for designing policies that facilitate refugees' entry into the workforce while protecting vulnerable local workers. The complementary effects observed in the Czech labor market illustrate that humanitarian and economic objectives in policymaking are not mutually exclusive. Finally, our study contributes to an objective and data-driven understanding of how the labor market integration of refugees affects employment outcomes of host-populations.

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Appendices

A EU-LFS microdata

Table A1: Description of EU-LFS variables

(a) Outcome variables	
Employed status	1 if employed (including self-employment), 0 otherwise.
Unemployed status	1 if without work but actively seeking employment or has a job starting within 3 months, 0 otherwise.
Inactive status	1 if neither employed nor actively seeking employment, 0 otherwise.
Hours worked	Total hours usually worked per week. Includes regular hours and overtime. Respondents estimate based on agreements or recent weeks if hours vary.
(b) Control variables	
Female	1 if female, 0 if male.
Foreign-born status	1 if born outside the country of study, 0 otherwise.
Age	Age in 5-year bands: 20–24, 25–29,. . . , 60–64.
Region	Region of usual residence at the NUTS 2 level (e.g., voivodeship in Poland, federal state in Germany).
Educational attainment	Categorized as: no/basic education (ISCED 0-2), secondary education (ISCED 3), tertiary education (ISCED 5-8).
Part-time employment	1 if working part-time, 0 if full-time.
Industry of employment	Industry sector based on NACE Rev. 2, classified into 21 categories (A-U).

Table A2: Sample means for EU-LFS dataset for Czechia

	2017	2018	2019	2020	2021	2022	2023
Employed	0.76	0.77	0.78	0.76	0.79	0.81	0.82
Unemployed	0.02	0.02	0.02	0.02	0.02	0.02	0.02
Inactive	0.22	0.21	0.21	0.21	0.18	0.17	0.16
Hours worked	40.4	40.4	40.3	40.2	39.7	39.9	39.6
Female	0.51	0.51	0.51	0.51	0.50	0.50	0.49
Foreign born	0.03	0.03	0.04	0.04	0.04	0.05	0.05
Age							
20–24	0.08	0.08	0.08	0.08	0.08	0.08	0.08
25–29	0.09	0.09	0.09	0.08	0.07	0.07	0.07
30–34	0.09	0.09	0.10	0.09	0.09	0.09	0.08
35–39	0.11	0.11	0.11	0.10	0.10	0.10	0.10
40–44	0.13	0.14	0.13	0.13	0.13	0.12	0.12
45–49	0.12	0.12	0.13	0.14	0.15	0.15	0.15
50–54	0.12	0.12	0.12	0.12	0.12	0.13	0.13
55–59	0.11	0.11	0.12	0.12	0.13	0.13	0.13
60–64	0.14	0.14	0.14	0.14	0.14	0.13	0.13
Region							
Praha	0.07	0.07	0.07	0.07	0.08	0.08	0.08
Střední Čechy	0.13	0.13	0.13	0.13	0.13	0.12	0.12
Jihozápad	0.15	0.14	0.15	0.15	0.14	0.14	0.14
Severozápad	0.10	0.10	0.10	0.10	0.11	0.11	0.11
Severovýchod	0.16	0.16	0.15	0.15	0.15	0.15	0.15
Jihovýchod	0.17	0.18	0.18	0.17	0.17	0.18	0.17
Střední Morava	0.12	0.11	0.11	0.11	0.11	0.11	0.11
Moravskoslezsko	0.12	0.12	0.11	0.11	0.11	0.11	0.12
Education							
No/basic education	0.07	0.07	0.07	0.07	0.07	0.06	0.07
Secondary education	0.72	0.72	0.72	0.72	0.72	0.71	0.71
Tertiary education	0.20	0.21	0.21	0.21	0.22	0.22	0.22
N	112,044	107,525	104,067	95,634	95,523	92,496	89,535

Table A2: Sample means for EU-LFS dataset for Czechia (continued)

	2017	2018	2019	2020	2021	2022	2023
Part-time employed	0.06	0.06	0.06	0.05	0.05	0.06	0.07
Sector							
A Agriculture	0.03	0.03	0.03	0.03	0.03	0.03	0.03
B Mining	0.01	0.01	0.01	0.01	0.01	0.00	0.00
C Manufacturing	0.29	0.29	0.29	0.28	0.27	0.27	0.27
D Energy	0.01	0.01	0.01	0.01	0.01	0.01	0.01
E Water	0.01	0.01	0.01	0.01	0.01	0.01	0.01
F Construction	0.08	0.07	0.07	0.08	0.08	0.08	0.08
G Trade	0.11	0.11	0.11	0.11	0.11	0.11	0.11
H Transport	0.06	0.06	0.07	0.06	0.06	0.06	0.06
I Hospitality	0.03	0.03	0.03	0.03	0.03	0.03	0.03
J IT	0.02	0.03	0.03	0.03	0.03	0.03	0.03
K Finance	0.02	0.02	0.02	0.02	0.02	0.02	0.02
L Real estate	0.01	0.01	0.01	0.01	0.01	0.01	0.01
M Science	0.04	0.04	0.04	0.04	0.04	0.04	0.05
N Admin	0.02	0.02	0.02	0.02	0.02	0.02	0.02
O Public	0.07	0.07	0.06	0.07	0.07	0.07	0.07
P Education	0.06	0.06	0.07	0.06	0.07	0.07	0.07
Q Health	0.07	0.07	0.08	0.08	0.08	0.08	0.08
R Arts	0.02	0.02	0.02	0.01	0.01	0.02	0.02
S Services	0.02	0.02	0.02	0.02	0.02	0.02	0.02
T Households	0.01	0.01	0.01	0.01	0.01	0.01	0.01
U Extraterritorial	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	112,044	107,525	104,067	95,634	95,523	92,496	89,535

Note: This table reports sample means based on EU-LFS data. The sample includes individuals aged 20–64 who have resided in the country for at least two years. Annual means are averages of the four quarterly cross-sections. Means for hours worked, part-time employment status, and sector of employment are computed only for employed individuals, resulting in smaller sample sizes for these variables compared with the full sample.

Table A3: Sample means for EU-LFS dataset for Germany

	2017	2018	2019	2020	2021	2022	2023
Employed	0.77	0.77	0.78	.	0.79	0.80	0.80
Unemployed	0.03	0.03	0.03	.	0.03	0.03	0.03
Inactive	0.20	0.20	0.19	.	0.18	0.17	0.17
Hours worked	35.7	35.8	35.7	.	35.6	35.5	35.3
Female	0.48	0.48	0.48	.	0.47	0.48	0.47
Foreign born	0.19	0.19	0.20	.	0.19	0.20	0.21
Age							
20–24	0.09	0.09	0.09	.	0.09	0.09	0.09
25–29	0.09	0.09	0.09	.	0.08	0.09	0.09
30–34	0.09	0.10	0.10	.	0.10	0.10	0.10
35–39	0.10	0.10	0.10	.	0.10	0.10	0.10
40–44	0.09	0.09	0.10	.	0.10	0.10	0.11
45–49	0.13	0.12	0.11	.	0.10	0.10	0.10
50–54	0.15	0.15	0.15	.	0.14	0.13	0.13
55–59	0.14	0.14	0.15	.	0.15	0.15	0.15
60–64	0.12	0.12	0.13	.	0.14	0.14	0.15
Region							
Baden-Württemberg	0.14	0.14	0.13	.	0.14	0.13	0.13
Bayern	0.17	0.17	0.17	.	0.15	0.17	0.18
Berlin	0.05	0.05	0.04	.	0.03	0.03	0.04
Brandenburg	0.03	0.03	0.03	.	0.02	0.02	0.02
Bremen	0.01	0.01	0.01	.	0.02	0.02	0.01
Hamburg	0.02	0.02	0.02	.	0.02	0.02	0.02
Hessen	0.07	0.08	0.08	.	0.09	0.09	0.08
Mecklenburg-Vorpommern	0.02	0.02	0.02	.	0.02	0.02	0.02
Niedersachsen	0.10	0.10	0.10	.	0.10	0.10	0.09
Nordrhein-Westfalen	0.21	0.21	0.20	.	0.19	0.20	0.19
Rheinland-Pfalz	0.05	0.05	0.05	.	0.06	0.06	0.05
Saarland	0.01	0.01	0.01	.	0.02	0.02	0.02
Sachsen	0.05	0.05	0.05	.	0.06	0.05	0.06
Sachsen-Anhalt	0.03	0.03	0.03	.	0.03	0.02	0.02
Schleswig-Holstein	0.03	0.03	0.03	.	0.03	0.03	0.03
Thüringen	0.03	0.03	0.03	.	0.03	0.02	0.02
Education							
No/basic education	0.16	0.16	0.16	.	0.18	0.19	0.20
Secondary education	0.54	0.53	0.53	.	0.48	0.46	0.45
Tertiary education	0.30	0.31	0.32	.	0.34	0.34	0.35
N	250,391	246,461	246,248	.	160,697	165,979	158,931

Table A3: Sample means for EU-LFS dataset for Germany (continued)

	2017	2018	2019	2020	2021	2022	2023
Part-time employment	0.26	0.26	0.26	.	0.27	0.27	0.28
Sector							
A Agriculture	0.01	0.01	0.01	.	0.01	0.01	0.01
B Mining	0.00	0.00	0.00	.	0.00	0.00	0.00
C Manufacturing	0.20	0.20	0.20	.	0.22	0.20	0.20
D Energy	0.01	0.01	0.01	.	0.01	0.01	0.01
E Water	0.01	0.01	0.01	.	0.01	0.01	0.01
F Construction	0.07	0.07	0.07	.	0.06	0.07	0.07
G Retail trade	0.14	0.14	0.14	.	0.13	0.13	0.13
H Transportation	0.05	0.05	0.05	.	0.05	0.05	0.05
I Hospitality	0.04	0.04	0.04	.	0.03	0.03	0.03
J IT	0.03	0.03	0.03	.	0.04	0.04	0.04
K Finance	0.03	0.03	0.03	.	0.03	0.03	0.03
L Real estate	0.00	0.00	0.00	.	0.01	0.01	0.01
M Science	0.06	0.06	0.06	.	0.05	0.05	0.06
N Admin	0.05	0.05	0.05	.	0.04	0.05	0.05
O Public	0.07	0.07	0.07	.	0.08	0.08	0.08
P Education	0.07	0.07	0.07	.	0.07	0.07	0.07
Q Health	0.11	0.11	0.11	.	0.12	0.11	0.12
R Arts	0.01	0.01	0.01	.	0.01	0.01	0.01
S Services	0.03	0.03	0.03	.	0.04	0.04	0.03
T Households	0.01	0.01	0.01	.	0.00	0.00	0.00
U Extraterritorial	0.00	0.00	0.00	.	0.00	0.00	0.00
N	250,391	246,461	246,248	.	160,697	165,979	158,931

Note: This table reports sample means based on EU-LFS data. The sample includes individuals aged 20–64 who have resided in the country for at least two years. Annual means are averages of the four quarterly cross-sections. Means for hours worked, part-time employment status, and sector of employment are computed only for employed individuals, resulting in smaller sample sizes for these variables compared with the full sample.

Table A4: Sample means for EU-LFS dataset for Poland

	2017	2018	2019	2020	2021	2022	2023
Employed	0.67	0.69	0.70	0.71	0.74	0.75	0.76
Unemployed	0.04	0.03	0.02	0.02	0.02	0.02	0.02
Inactive	0.29	0.28	0.28	0.27	0.24	0.23	0.22
Hours worked	40.6	40.5	40.5	40.4	40.4	40.4	40.3
Female	0.51	0.51	0.51	0.51	0.51	0.51	0.51
Foreign born	0.00	0.00	0.00	0.00	0.01	0.01	0.01
Age							
20–24	0.09	0.08	0.08	0.07	0.06	0.06	0.06
25–29	0.09	0.09	0.09	0.08	0.06	0.06	0.06
30–34	0.11	0.11	0.10	0.10	0.09	0.09	0.09
35–39	0.11	0.12	0.12	0.12	0.12	0.12	0.12
40–44	0.11	0.12	0.12	0.12	0.13	0.13	0.13
45–49	0.10	0.11	0.11	0.11	0.13	0.13	0.14
50–54	0.11	0.10	0.11	0.11	0.12	0.13	0.13
55–59	0.13	0.13	0.12	0.12	0.12	0.12	0.12
60–64	0.15	0.15	0.16	0.16	0.16	0.16	0.15
Region							
Dolnośląskie	0.04	0.04	0.04	0.04	0.04	0.04	0.04
Kujawsko-Pomorskie	0.08	0.09	0.08	0.07	0.06	0.06	0.06
Lubelskie	0.06	0.06	0.06	0.06	0.06	0.06	0.07
Lubuskie	0.07	0.07	0.07	0.07	0.07	0.06	0.06
Łódzkie	0.05	0.04	0.04	0.04	0.04	0.04	0.04
Małopolskie	0.05	0.04	0.04	0.05	0.05	0.06	0.06
Mazowieckie	0.09	0.09	0.10	0.12	0.12	0.12	0.12
Opolskie	0.06	0.06	0.06	0.06	0.05	0.05	0.05
Podkarpackie	0.08	0.08	0.08	0.07	0.07	0.07	0.07
Podlaskie	0.06	0.06	0.07	0.07	0.08	0.08	0.08
Pomorskie	0.06	0.06	0.06	0.05	0.05	0.04	0.05
Śląskie	0.08	0.08	0.08	0.08	0.09	0.09	0.09
Świętokrzyskie	0.06	0.07	0.07	0.07	0.07	0.07	0.07
Warmińsko-Mazurskie	0.05	0.05	0.05	0.06	0.05	0.05	0.05
Wielkopolskie	0.05	0.05	0.05	0.06	0.06	0.05	0.05
Zachodnio-Pomorskie	0.05	0.05	0.05	0.05	0.04	0.04	0.04
Education							
No/basic education	0.09	0.09	0.08	0.07	0.06	0.06	0.06
Secondary education	0.63	0.62	0.62	0.60	0.59	0.58	0.57
Tertiary education	0.28	0.29	0.30	0.32	0.35	0.36	0.37
N	152,487	137,792	123,648	132,704	134,101	128,734	94,072

Table A4: Sample means for EU-LFS dataset for Poland (continued)

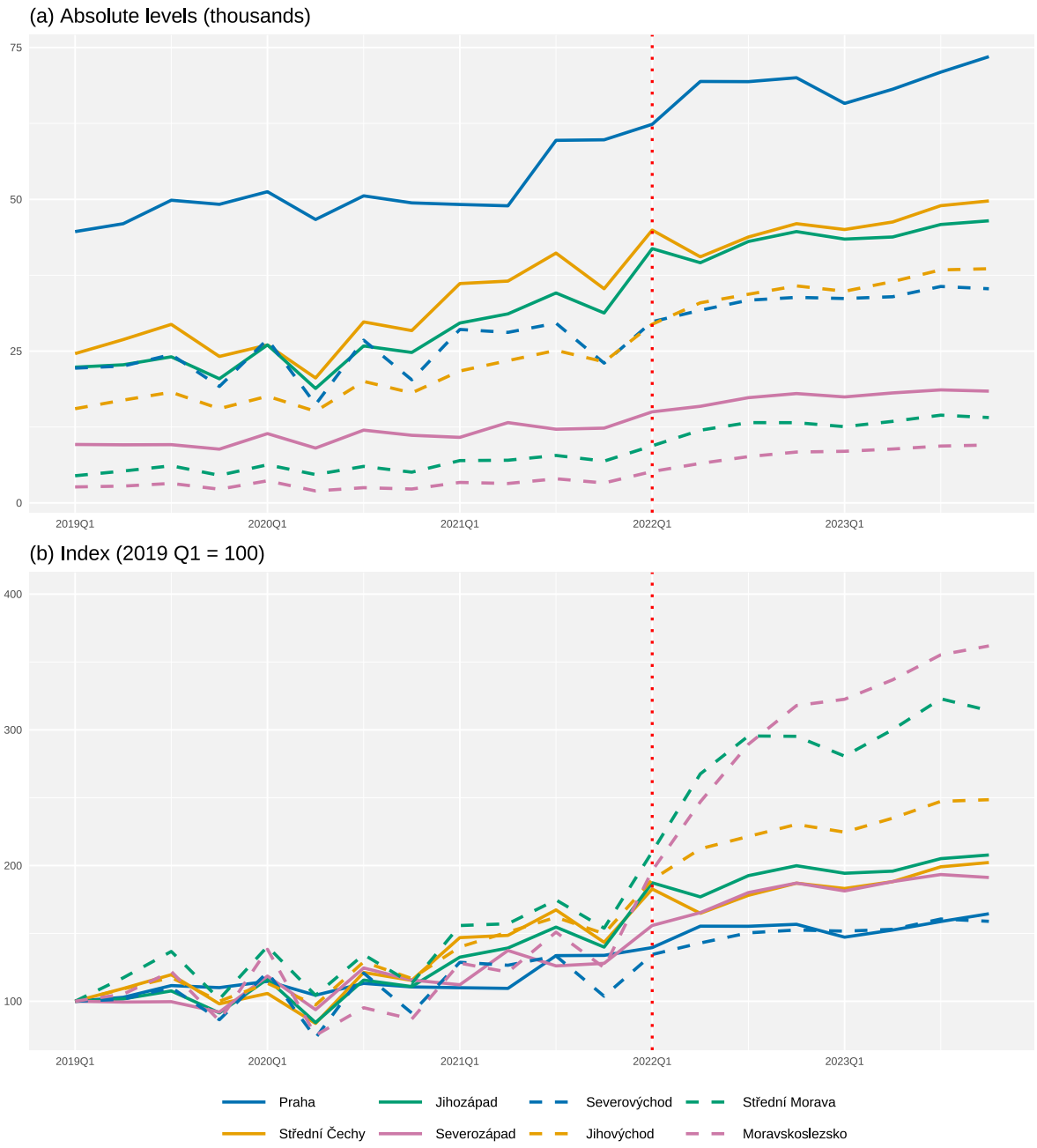
	2017	2018	2019	2020	2021	2022	2023
Part-time employment	0.06	0.06	0.06	0.05	0.05	0.05	0.05
Sector							
A Agriculture	0.11	0.10	0.10	0.11	0.09	0.09	0.09
B Mining	0.01	0.01	0.01	0.01	0.01	0.01	0.01
C Manufacturing	0.20	0.21	0.20	0.19	0.18	0.18	0.18
D Energy	0.01	0.01	0.01	0.01	0.01	0.01	0.01
E Water	0.01	0.01	0.01	0.01	0.01	0.01	0.01
F Construction	0.07	0.07	0.08	0.08	0.08	0.08	0.07
G Retail trade	0.14	0.14	0.14	0.13	0.13	0.13	0.13
H Transportation	0.06	0.06	0.06	0.07	0.07	0.07	0.06
I Hospitality	0.02	0.02	0.02	0.02	0.02	0.02	0.02
J IT	0.02	0.02	0.02	0.03	0.03	0.03	0.03
K Finance	0.02	0.02	0.02	0.02	0.02	0.02	0.03
L Real estate	0.01	0.01	0.01	0.01	0.01	0.01	0.01
M Science	0.03	0.03	0.04	0.04	0.04	0.04	0.04
N Admin	0.03	0.03	0.03	0.03	0.03	0.03	0.03
O Public	0.07	0.07	0.07	0.07	0.08	0.08	0.08
P Education	0.08	0.08	0.08	0.08	0.09	0.09	0.08
Q Health	0.06	0.06	0.06	0.06	0.07	0.07	0.07
R Arts	0.01	0.01	0.01	0.01	0.01	0.01	0.01
S Services	0.02	0.02	0.02	0.02	0.02	0.02	0.02
T Households	0.00	0.00	0.00	0.00	0.00	0.01	0.01
U Extraterritorial	0.00	0.00	0.00	0.00	0.00	0.00	0.00
N	152,487	137,792	123,648	132,704	134,101	128,734	94,072

Note: This table reports sample means based on EU-LFS data. The sample includes individuals aged 20–64 who have resided in the country for at least two years. Annual means are averages of the four quarterly cross-sections. Means for hours worked, part-time employment status, and sector of employment are computed only for employed individuals, resulting in smaller sample sizes for these variables compared with the full sample.

B Descriptive statistics and Ukrainian employment trends

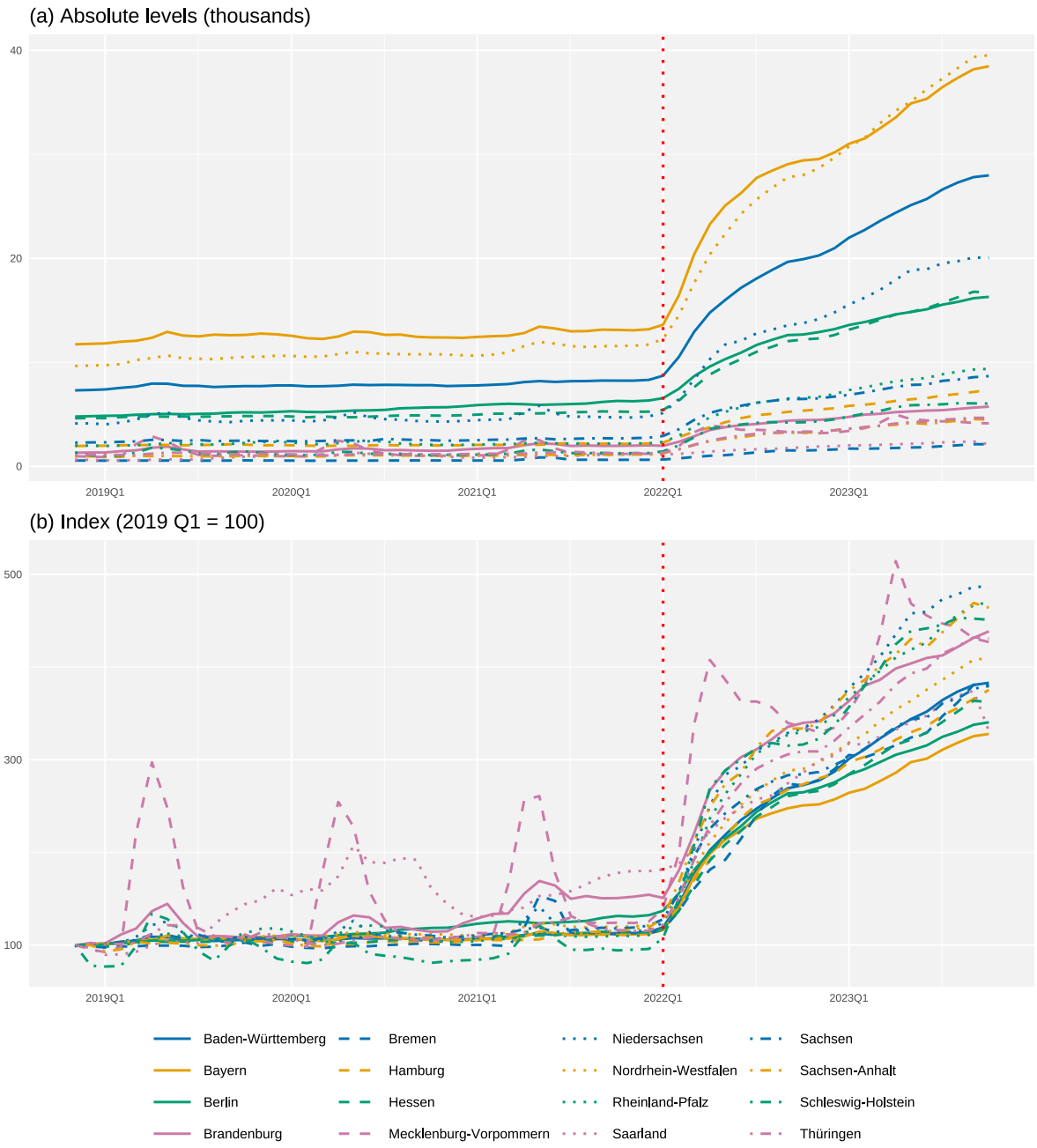
Figures B3–B5 below show trends in Ukrainian employment by NUTS 2 region. Czech data cover all types of permits, including intra-corporate transfers, blue cards, and other employment permits. German data cover employees subject to social security contributions and those in marginal employment, excluding self-employed, civil servants, and soldiers. For Poland, figures are sourced from the Social Insurance Institution (Zakład Ubezpieczeń Społecznych, ZUS), which records foreign nationals registered for pension and disability insurance (ZUS Statistical Portal, 2025). Polish data may underestimate employment by excluding *umowa o dzieło* contracts (a work arrangement typically associated with low employment costs and exemption from most social security contributions), informal workers, and farmers insured under the separate agricultural system (KRUS), and may overestimate employment by including insured individuals not actively working, such as those on long-term leave or early retirees.

Figure B3: Employees with Ukrainian nationality in Czechia



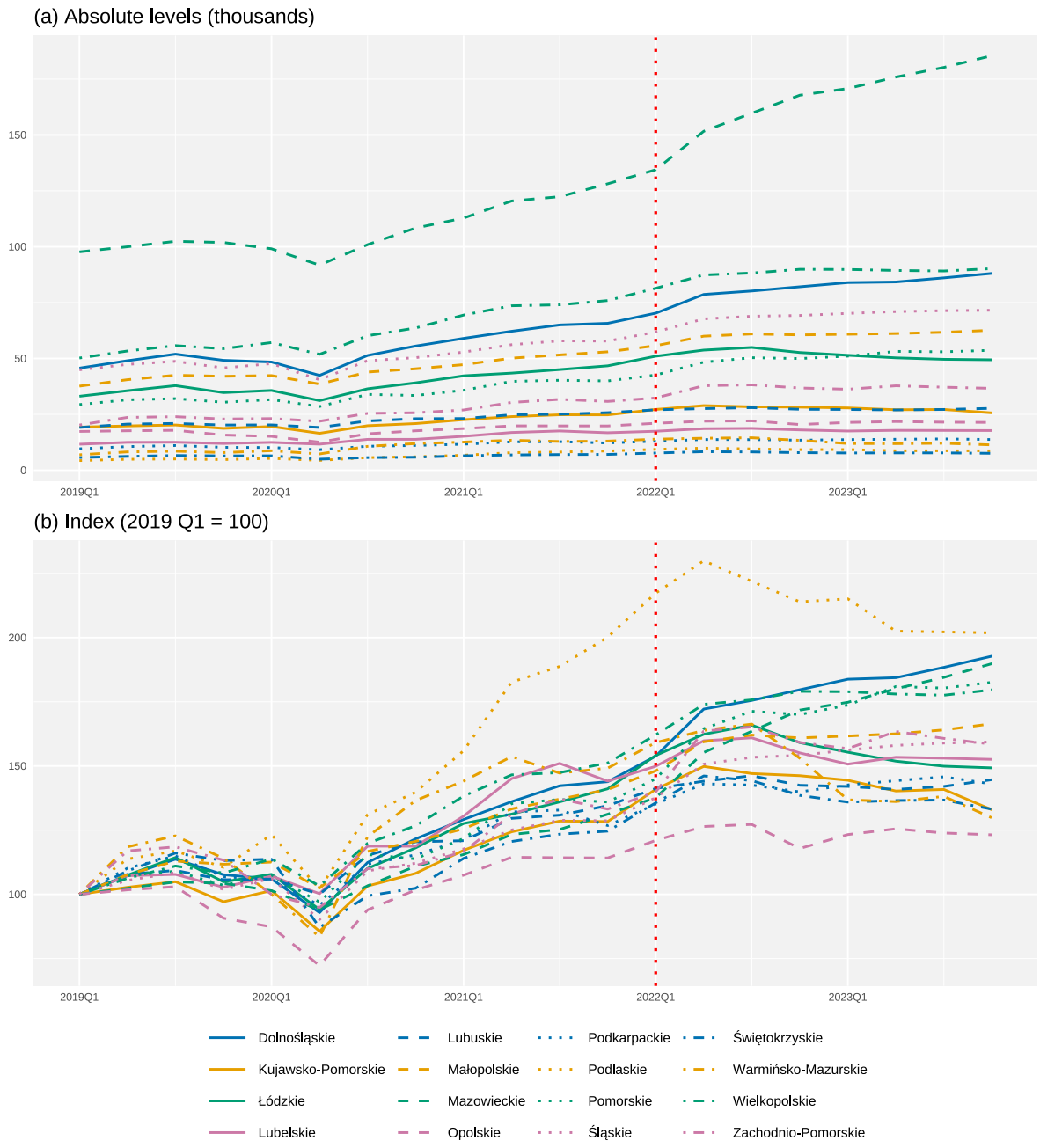
Note: This figure shows the number of employees with Ukrainian nationality in Czechia in absolute terms (panel a) and indexed to the first quarter of 2019 (panel b). Quarterly data are sourced from Ministry of Labor and Social Affairs (2025). The red vertical line marks the first post-invasion observation.

Figure B4: Employees with Ukrainian nationality in Germany



Note: This figure shows the number of employees with Ukrainian nationality in Germany in absolute terms (panel a) and indexed to the first quarter of 2019 (panel b). Monthly data are sourced from Federal Employment Agency (2025a). The red vertical line marks the first post-invasion observation.

Figure B5: Employees with Ukrainian nationality in Poland



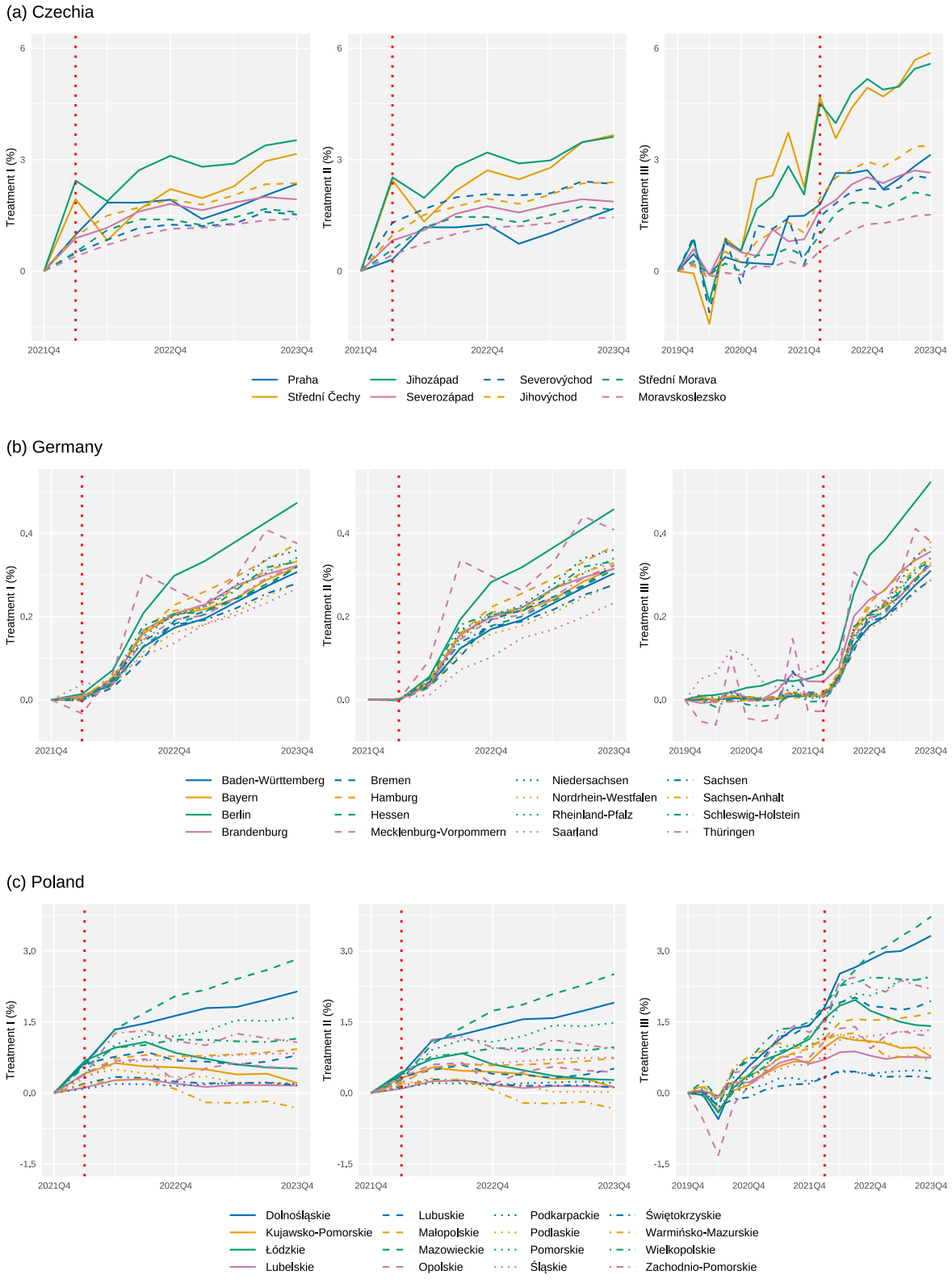
Note: This figure shows the number of employees with Ukrainian nationality in Poland in absolute terms (panel a) and indexed to the first quarter of 2019 (panel b). Quarterly data are sourced from ZUS Statistical Portal (2025). The red vertical line marks the first post-invasion observation.

Table B1: Descriptive statistics of treatment variables

	Treatment I			Treatment II			Treatment III			
	Min.	Mean	Max.	Min.	Mean	Max.	Min.	Mean	Max.	*N*
(a) Czechia										
2020	.	.	.	.	.	.	-1.4	0.2	0.9	95,634
2021	.	.	.	.	.	.	0.1	1.2	3.7	95,523
2021 Q4	.	.	.	.	.	.	0.1	1.0	2.3	23,705
2022	0.4	1.4	3.1	0.3	1.6	3.2	0.5	2.6	5.2	92,496
2022 Q4	1.1	1.9	3.1	1.2	2.0	3.2	1.3	3.0	5.2	22,861
2023	1.2	2.0	3.5	0.7	2.2	3.7	1.3	3.2	5.9	89,535
2023 Q4	1.4	2.3	3.5	1.4	2.4	3.7	1.5	3.4	5.9	22,331
(b) Germany										
2020	.	.	.	.	.	.	.	.	.	
2021	.	.	.	.	.	.	-0.1	0.0	0.1	160,697
2021 Q4	.	.	.	.	.	.	-0.0	0.0	0.1	40,427
2022	-0.0	0.1	0.3	-0.0	0.1	0.3	-0.0	0.1	0.3	165,979
2022 Q4	0.1	0.2	0.3	0.1	0.2	0.3	0.2	0.2	0.3	38,803
2023	0.2	0.3	0.5	0.1	0.3	0.5	0.2	0.3	0.5	158,931
2023 Q4	0.3	0.3	0.5	0.2	0.3	0.5	0.3	0.3	0.5	36,572
(c) Poland										
2020	.	.	.	.	.	.	-1.3	0.1	0.8	132,704
2021	.	.	.	.	.	.	0.1	0.8	1.5	134,101
2021 Q4	.	.	.	.	.	.	0.2	0.9	1.5	31,726
2022	0.1	0.7	2.1	0.1	0.5	1.7	0.3	1.4	2.9	128,734
2022 Q4	0.1	0.8	2.1	0.1	0.6	1.7	0.4	1.5	2.9	32,035
2023	-0.3	0.8	2.8	-0.3	0.7	2.5	0.3	1.6	3.7	94,072
2023 Q4	-0.3	0.9	2.8	-0.3	0.7	2.5	0.3	1.6	3.7	23,486

Note: This table presents the minimum, mean, and maximum values of treatment variables I, II, and III (defined in Equations (1a)–(1c)) received by individuals in the sample. That means that averages are weighted by the regional distribution of individuals in the sample.

Figure B6: Treatment intensity



Note: This figure shows the trajectories of Treatments I, II, and III for each region within the three countries. The first post-invasion observation (2022 Q1) is indicated by red vertical lines.

C Ensuring comparability with Postepska & Voloshyna (2025)

Table C1: Treatment effects for Czech females using data from PV, across different adjustments to their empirical approach

	(a) Employment				(b) Unemployment			
Treatment	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
I	0.001	-0.001	-0.001	-0.003	-0.000	0.000	0.000	-0.001
	(0.001)	(0.002)	(0.002)	(0.005)	(0.000)	(0.001)	(0.001)	(0.002)
II	0.000	-0.002	-0.002	-0.008	-0.000	0.000	0.002	-0.001
	(0.001)	(0.002)	(0.002)	(0.005)	(0.001)	(0.001)	(0.001)	(0.002)
III	0.003	0.001	0.001	-0.000	-0.001	-0.001	-0.001	-0.000
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
N	225,487	225,487	225,487	225,487	225,487	225,487	225,487	225,487
	(c) Inactivity				(d) Hours worked			
Treatment	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
I	-0.001	0.001	0.001	0.004	0.052***	0.071	0.071	2.294**
	(0.001)	(0.002)	(0.002)	(0.005)	(0.014)	(0.047)	(0.047)	(1.108)
II	-0.000	0.002	0.002	0.008	0.046***	0.026	0.027	2.071**
	(0.001)	(0.002)	(0.002)	(0.006)	(0.012)	(0.048)	(0.048)	(1.000)
III	-0.002	-0.000	-0.000	0.001	0.092***	0.039	0.039	0.834**
	(0.002)	(0.001)	(0.001)	(0.002)	(0.030)	(0.030)	(0.030)	(0.403)
N	225,487	225,487	225,487	225,487	148,153	148,153	148,153	148,153

Note: This table reports treatment effects on labor market outcomes for local Czech females, estimated using the data from PV. Each column shows results from a modified version of their empirical specification, adjusted to align with our research design. The modifications are: (1) replacing individual FE with regional FE; (2) aggregating both treatment intensity and regional identifiers from the NUTS 3 to the NUTS 2 level; (3) excluding partner status and the presence of children from the control variables; and (4) applying adjustments (1) and (2) jointly. All models control for age, foreign-born status, and education. When hours worked is the dependent variable, the models additionally control for sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table C2: Treatment effects for Czech males using data from PV, across different adjustments to their empirical approach

	(a) Employment				(b) Unemployment			
Treatment	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
I	0.000	-0.000	-0.000	0.001	-0.000	-0.001	-0.001	-0.001
	(0.001)	(0.002)	(0.002)	(0.004)	(0.000)	(0.001)	(0.001)	(0.002)
II	-0.000	-0.001	-0.001	-0.000	0.000	-0.001	-0.001	-0.000
	(0.001)	(0.002)	(0.002)	(0.004)	(0.000)	(0.001)	(0.001)	(0.002)
III	-0.001	0.001	0.001	-0.001	0.001	-0.000	-0.000	0.001
	(0.002)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
N	214,964	214,964	214,964	214,964	214,964	214,964	214,964	214,964
	(c) Inactivity				(d) Hours worked			
Treatment	(1)	(2)	(3)	(4)	(1)	(2)	(3)	(4)
I	-0.000	0.001	0.001	-0.000	0.050***	-0.021	-0.021	0.099
	(0.000)	(0.002)	(0.002)	(0.003)	(0.017)	(0.060)	(0.060)	(0.102)
II	0.000	0.001	0.001	0.000	0.043**	-0.079	-0.078	0.055
	(0.001)	(0.002)	(0.002)	(0.004)	(0.017)	(0.081)	(0.081)	(0.131)
III	0.000	-0.001	-0.001	0.000	0.054	-0.044	-0.044	-0.096
	(0.001)	(0.001)	(0.001)	(0.002)	(0.055)	(0.044)	(0.044)	(0.069)
N	214,964	214,964	214,964	214,964	168,503	168,503	168,503	168,503

Note: This table reports treatment effects on labor market outcomes for local Czech males, estimated using the data from PV. Each column shows results from a modified version of their empirical specification, adjusted to align with our research design. The modifications are: (1) replacing individual FE with regional FE; (2) aggregating both treatment intensity and regional identifiers from the NUTS 3 to the NUTS 2 level; (3) excluding partner status and the presence of children from the control variables; and (4) applying adjustments (1) and (2) jointly. All models control for age, foreign-born status, and education. When hours worked is the dependent variable, the models additionally control for sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

D Heterogeneity by subgroup

Table D1: Treatment effects on labor market outcomes for Czech females

(a) Probability of employment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.006	-0.005	0.007	-0.003	0.005	0.004
	(0.005)	(0.025)	(0.005)	(0.006)	(0.004)	(0.017)
II	0.005	0.015	0.006	-0.004	0.004	0.008
	(0.005)	(0.019)	(0.005)	(0.004)	(0.004)	(0.016)
III	0.003	0.001	0.004	-0.002	0.002	0.013
	(0.005)	(0.011)	(0.004)	(0.003)	(0.004)	(0.011)
Mean dep. var.	0.71	0.42	0.72	0.80	0.71	0.72
N	350,833	27,719	242,075	81,039	336,827	14,006
(b) Probability of unemployment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.002	-0.001	-0.002	0.000	-0.001	-0.011**
	(0.003)	(0.009)	(0.003)	(0.001)	(0.003)	(0.004)
II	-0.001	-0.008	-0.001	0.000	-0.001	-0.003
	(0.002)	(0.011)	(0.002)	(0.001)	(0.003)	(0.008)
III	-0.001	-0.002	-0.001	0.001**	-0.001	-0.003
	(0.001)	(0.003)	(0.001)	(0.000)	(0.001)	(0.004)
Mean dep. var.	0.02	0.07	0.02	0.01	0.02	0.03
N	350,833	27,719	242,075	81,039	336,827	14,006
(c) Probability of inactivity						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.004	0.006	-0.005	0.003	-0.004	0.008
	(0.007)	(0.024)	(0.008)	(0.005)	(0.006)	(0.015)
II	-0.004	-0.007	-0.005	0.004	-0.003	-0.004
	(0.006)	(0.018)	(0.007)	(0.004)	(0.006)	(0.010)
III	-0.002	0.001	-0.003	0.001	-0.002	-0.010
	(0.005)	(0.012)	(0.005)	(0.003)	(0.005)	(0.008)
Mean dep. var.	0.26	0.51	0.26	0.19	0.26	0.25
N	350,833	27,719	242,075	81,039	336,827	14,006
(d) Weekly hours worked						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.051	0.101	0.078	-0.008	0.034	0.238
	(0.110)	(0.132)	(0.108)	(0.231)	(0.100)	(0.314)
II	0.103	0.066	0.147	0.004	0.085	0.229
	(0.076)	(0.207)	(0.084)	(0.171)	(0.068)	(0.256)
III	0.018	0.025	0.042	-0.046	0.012	0.023
	(0.049)	(0.085)	(0.037)	(0.122)	(0.040)	(0.268)
Mean dep. var.	38.5	37.6	38.7	38.3	38.5	38.9
N	248,732	11,542	172,766	64,424	238,798	9,934

Note: This table reports treatment effects on labor market outcomes for Czech females using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with no or primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), and native-born ("Native") or foreign-born ("Foreign") individuals. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D2: Treatment effects on labor market outcomes for Czech males

(a) Probability of employment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.003**	0.029**	-0.000	0.007	0.003	-0.005
	(0.001)	(0.012)	(0.005)	(0.013)	(0.002)	(0.005)
II	0.004	0.031**	0.000	0.009	0.003	0.005
	(0.002)	(0.013)	(0.004)	(0.010)	(0.002)	(0.006)
III	0.002**	0.011	0.001	0.003	0.002**	-0.001
	(0.001)	(0.008)	(0.002)	(0.006)	(0.001)	(0.003)
Mean dep. var.	0.86	0.60	0.86	0.92	0.85	0.89
N	345,991	19,580	258,918	67,493	331,822	14,169
(b) Probability of unemployment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.002	-0.014**	0.000	-0.004	-0.002	0.003
	(0.002)	(0.005)	(0.002)	(0.003)	(0.002)	(0.004)
II	-0.001	-0.012*	0.000	-0.004	-0.001	-0.002
	(0.002)	(0.006)	(0.002)	(0.003)	(0.002)	(0.004)
III	-0.000	-0.006**	0.000	-0.001	-0.000	0.000
	(0.000)	(0.002)	(0.001)	(0.001)	(0.001)	(0.003)
Mean dep. var.	0.02	0.07	0.02	0.01	0.02	0.02
N	345,991	19,580	258,918	67,493	331,822	14,169
(c) Probability of inactivity						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.002	-0.015	-0.000	-0.003	-0.001	0.002
	(0.002)	(0.013)	(0.005)	(0.010)	(0.001)	(0.007)
II	-0.003	-0.019	-0.001	-0.005	-0.002	-0.003
	(0.002)	(0.011)	(0.004)	(0.008)	(0.002)	(0.006)
III	-0.002**	-0.005	-0.002	-0.002	-0.002**	0.001
	(0.001)	(0.008)	(0.002)	(0.005)	(0.001)	(0.004)
Mean dep. var.	0.13	0.32	0.13	0.07	0.13	0.09
N	345,991	19,580	258,918	67,493	331,822	14,169
(d) Weekly hours worked						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.070	-0.297	0.086	0.117	0.061	0.421
	(0.109)	(0.300)	(0.113)	(0.122)	(0.102)	(0.381)
II	0.003	0.011	-0.025	0.064	-0.002	0.225
	(0.110)	(0.302)	(0.124)	(0.110)	(0.102)	(0.409)
III	-0.047	-0.230	-0.053	0.017	-0.049	0.127
	(0.078)	(0.142)	(0.079)	(0.095)	(0.075)	(0.203)
Mean dep. var.	41.4	40.5	41.5	41.5	41.4	42.5
N	293,437	11,720	219,828	61,889	280,940	12,497

Note: This table reports treatment effects on labor market outcomes for Czech males using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with no or primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), and native-born ("Native") or foreign-born ("Foreign") individuals. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D3: Treatment effects on labor market outcomes for German females

(a) Probability of employment								
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	35–44	50–59
I	-0.089	-0.315**	0.012	-0.049*	-0.091*	-0.047	-0.245***	-0.074
	(0.062)	(0.132)	(0.058)	(0.027)	(0.047)	(0.192)	(0.050)	(0.072)
II	-0.076	-0.263*	0.003	-0.030	-0.081*	-0.028	-0.214***	-0.084
	(0.057)	(0.148)	(0.055)	(0.033)	(0.045)	(0.158)	(0.066)	(0.068)
III	-0.077	-0.261**	0.026	-0.079	-0.090**	0.004	-0.260***	-0.020
	(0.056)	(0.099)	(0.044)	(0.049)	(0.040)	(0.209)	(0.078)	(0.088)
Mean d.v.	0.73	0.53	0.74	0.85	0.76	0.60	0.79	0.78
N	587,902	108,297	300,410	179,195	469,475	118,427	114,412	170,946
(b) Probability of unemployment								
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	35–44	50–59
I	-0.032	-0.103	-0.053*	0.008	-0.018	-0.088	0.013	-0.067**
	(0.019)	(0.106)	(0.025)	(0.015)	(0.013)	(0.105)	(0.027)	(0.025)
II	-0.031*	-0.094	-0.045*	0.004	-0.017	-0.089	0.011	-0.058***
	(0.017)	(0.094)	(0.023)	(0.017)	(0.012)	(0.096)	(0.031)	(0.019)
III	-0.033*	-0.123	-0.058***	0.018*	-0.017	-0.095	0.007	-0.063**
	(0.017)	(0.098)	(0.019)	(0.009)	(0.014)	(0.096)	(0.032)	(0.025)
Mean d.v.	0.03	0.04	0.02	0.02	0.02	0.04	0.03	0.02
N	587,902	108,297	300,410	179,195	469,475	118,427	114,412	170,946
(c) Probability of inactivity								
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	35–44	50–59
I	0.122**	0.418**	0.041	0.041	0.109*	0.134	0.232***	0.140**
	(0.055)	(0.145)	(0.050)	(0.029)	(0.051)	(0.095)	(0.051)	(0.065)
II	0.107*	0.357*	0.042	0.025	0.097*	0.116	0.203***	0.143**
	(0.055)	(0.174)	(0.051)	(0.031)	(0.048)	(0.091)	(0.068)	(0.065)
III	0.110**	0.384***	0.032	0.061	0.107**	0.091	0.253***	0.082
	(0.047)	(0.116)	(0.041)	(0.044)	(0.042)	(0.116)	(0.063)	(0.072)
Mean d.v.	0.24	0.43	0.24	0.13	0.21	0.36	0.18	0.20
N	587,902	108,297	300,410	179,195	469,475	118,427	114,412	170,946
(d) Weekly hours worked								
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	35–44	50–59
I	-1.547	-2.747	-1.101	-0.987	-0.796	-5.409**	-1.113	-2.488
	(0.915)	(1.814)	(1.507)	(2.431)	(1.222)	(2.046)	(2.150)	(2.241)
II	-1.507	-1.922	-0.918	-1.278	-1.050	-4.328	-1.018	-2.413
	(1.134)	(2.056)	(1.528)	(2.132)	(1.437)	(3.097)	(2.097)	(1.652)
III	-1.375	-3.106**	-1.880	-0.055	-0.689	-4.698***	-1.447	-1.893
	(0.885)	(1.113)	(1.280)	(2.033)	(1.219)	(1.248)	(1.424)	(2.302)
Mean d.v.	30.8	27.6	29.6	33.7	31.2	28.8	30.0	30.6
N	429,960	57,026	221,185	151,749	358,446	71,514	90,379	133,178

Note: This table reports treatment effects on labor market outcomes for German females using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), native-born ("Native") or foreign-born ("Foreign") individuals, as well as the subsamples aged 35–44 and 50–59. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D4: Treatment effects on labor market outcomes for German males

(a) Probability of employment							
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	Age 62–64
I	-0.078	-0.021	-0.161**	0.040	-0.119**	0.105	-0.499***
	(0.056)	(0.124)	(0.065)	(0.033)	(0.047)	(0.080)	(0.111)
II	-0.064	-0.012	-0.112	0.031	-0.099*	0.133	-0.392**
	(0.048)	(0.121)	(0.073)	(0.037)	(0.047)	(0.087)	(0.150)
III	-0.049	0.004	-0.121*	0.039*	-0.084*	0.105*	-0.354**
	(0.049)	(0.094)	(0.063)	(0.020)	(0.044)	(0.059)	(0.160)
Mean dep. var.	0.83	0.69	0.81	0.91	0.84	0.79	0.53
N	640,805	100,881	321,363	218,561	519,981	120,824	45,916
(b) Probability of unemployment							
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	Age 62–64
I	-0.004	-0.036	0.008	-0.017	0.032	-0.152**	-0.050*
	(0.044)	(0.119)	(0.026)	(0.027)	(0.030)	(0.061)	(0.027)
II	0.002	-0.013	0.003	-0.008	0.034	-0.151**	-0.041
	(0.036)	(0.106)	(0.020)	(0.029)	(0.022)	(0.062)	(0.030)
III	-0.028	-0.123*	-0.004	-0.021	0.005	-0.159***	-0.049**
	(0.029)	(0.069)	(0.027)	(0.013)	(0.024)	(0.022)	(0.022)
Mean dep. var.	0.03	0.03	0.03	0.02	0.03	0.05	0.02
N	640,805	100,881	321,363	218,561	519,981	120,824	45,916
(c) Probability of inactivity							
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	Age 62–64
I	0.081**	0.057	0.153**	-0.023	0.087**	0.047	0.549***
	(0.037)	(0.130)	(0.052)	(0.024)	(0.038)	(0.061)	(0.111)
II	0.061	0.025	0.109	-0.023	0.066	0.018	0.434**
	(0.045)	(0.142)	(0.065)	(0.027)	(0.046)	(0.080)	(0.160)
III	0.077**	0.119*	0.125**	-0.018	0.080**	0.054	0.403**
	(0.027)	(0.064)	(0.043)	(0.017)	(0.028)	(0.041)	(0.160)
Mean dep. var.	0.14	0.24	0.15	0.07	0.13	0.16	0.44
N	640,805	100,881	321,363	218,561	519,981	120,824	45,916
(d) Weekly hours worked							
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign	Age 62–64
I	1.421	0.127	0.569	2.914**	0.799	3.424*	2.545
	(0.937)	(3.574)	(0.964)	(1.336)	(0.958)	(1.900)	(4.792)
II	1.767*	0.492	0.871	3.401**	1.254	3.611*	3.116
	(0.982)	(3.229)	(0.974)	(1.475)	(1.040)	(1.973)	(4.339)
III	1.145*	-0.203	0.224	2.722***	0.704	2.429*	1.560
	(0.546)	(3.429)	(0.738)	(0.823)	(0.573)	(1.214)	(4.207)
Mean dep. var.	39.5	37.7	38.8	41.1	39.8	38.5	37.7
N	530,107	69,279	261,492	199,336	435,071	95,036	24,486

Note: This table reports treatment effects on labor market outcomes for German males using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), native-born ("Native") or foreign-born ("Foreign") individuals, as well as the subsample aged 62–64. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D5: Treatment effects on labor market outcomes for Polish females

(a) Probability of employment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.001	0.018	0.003	-0.003	0.000	-0.075
	(0.003)	(0.027)	(0.004)	(0.004)	(0.003)	(0.058)
II	-0.000	0.018	0.003	-0.003	0.001	-0.073
	(0.003)	(0.030)	(0.004)	(0.004)	(0.003)	(0.061)
III	-0.001	0.010	0.003	-0.005	-0.001	-0.070
	(0.004)	(0.021)	(0.006)	(0.004)	(0.004)	(0.053)
Mean dep. var.	0.64	0.30	0.54	0.84	0.64	0.69
N	460,687	32,915	253,270	174,502	459,151	1,536
(b) Probability of unemployment						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.001	-0.001	0.001	0.002*	0.001	0.029*
	(0.002)	(0.005)	(0.003)	(0.001)	(0.002)	(0.016)
II	0.001	-0.002	0.001	0.002*	0.001	0.027
	(0.002)	(0.006)	(0.003)	(0.001)	(0.002)	(0.019)
III	0.002	0.001	0.001	0.003**	0.001	0.039**
	(0.001)	(0.004)	(0.002)	(0.001)	(0.001)	(0.016)
Mean dep. var.	0.02	0.03	0.03	0.02	0.02	0.06
N	460,687	32,915	253,270	174,502	459,151	1,536
(c) Probability of inactivity						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	-0.001	-0.017	-0.004	0.001	-0.002	0.046
	(0.003)	(0.024)	(0.005)	(0.003)	(0.003)	(0.064)
II	-0.001	-0.016	-0.004	0.000	-0.002	0.047
	(0.003)	(0.027)	(0.005)	(0.003)	(0.003)	(0.070)
III	-0.000	-0.011	-0.003	0.002	-0.001	0.031
	(0.005)	(0.019)	(0.007)	(0.004)	(0.005)	(0.052)
Mean dep. var.	0.34	0.67	0.43	0.15	0.34	0.26
N	460,687	32,915	253,270	174,502	459,151	1,536
(d) Weekly hours worked						
Treatment	All	Prim.	Secon.	Tert.	Native	Foreign
I	0.054	-0.198	0.035	0.086	0.047	0.628*
	(0.061)	(0.312)	(0.052)	(0.100)	(0.064)	(0.321)
II	0.062	-0.212	0.047	0.087	0.054	0.656*
	(0.065)	(0.359)	(0.061)	(0.098)	(0.068)	(0.359)
III	0.041	-0.223	0.007	0.103	0.038	0.617*
	(0.036)	(0.235)	(0.047)	(0.080)	(0.037)	(0.306)
Mean dep. var.	38.9	38.0	39.0	38.9	38.9	38.4
N	286,079	9,567	133,700	142,812	285,095	984

Note: This table reports treatment effects on labor market outcomes for Polish females using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with no or primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), and native-born ("Native") or foreign-born ("Foreign") individuals. Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D6: Treatment effects on labor market outcomes for Polish males

(a) Probability of employment							
Treatment	All	Prim.	Prim. 45–54	Secon.	Tert.	Native	Foreign
I	-0.005	-0.036**	-0.049**	-0.001	-0.002	-0.005	-0.015
	(0.005)	(0.013)	(0.019)	(0.007)	(0.005)	(0.005)	(0.025)
II	-0.006	-0.040***	-0.053***	-0.002	-0.003	-0.006	-0.023
	(0.006)	(0.013)	(0.018)	(0.008)	(0.006)	(0.006)	(0.029)
III	-0.004	-0.031***	-0.035*	0.000	-0.005	-0.004	-0.003
	(0.004)	(0.010)	(0.018)	(0.006)	(0.004)	(0.004)	(0.024)
Mean dep. var.	0.79	0.54	0.65	0.77	0.92	0.79	0.89
N	442,851	34,634	7,317	291,023	117,194	441,272	1,579
(b) Probability of unemployment							
Treatment	All	Prim.	Prim. 45–54	Secon.	Tert.	Native	Foreign
I	-0.000	-0.002	-0.001	-0.001	0.001	-0.000	-0.001
	(0.002)	(0.004)	(0.007)	(0.002)	(0.003)	(0.003)	(0.008)
II	-0.000	-0.004	0.000	-0.001	0.001	-0.001	-0.000
	(0.002)	(0.005)	(0.006)	(0.002)	(0.003)	(0.002)	(0.010)
III	0.001	0.003	-0.002	0.000	0.002	0.001	-0.004
	(0.002)	(0.006)	(0.006)	(0.002)	(0.002)	(0.002)	(0.007)
Mean dep. var.	0.03	0.05	0.05	0.03	0.02	0.03	0.04
N	442,851	34,634	7,317	291,023	117,194	441,272	1,579
(c) Probability of inactivity							
Treatment	All	Prim.	Prim. 45–54	Secon.	Tert.	Native	Foreign
I	0.005	0.038***	0.050**	0.001	0.001	0.005	0.017
	(0.005)	(0.012)	(0.018)	(0.007)	(0.002)	(0.005)	(0.022)
II	0.006	0.044***	0.053***	0.003	0.001	0.006	0.023
	(0.005)	(0.014)	(0.016)	(0.007)	(0.003)	(0.005)	(0.025)
III	0.003	0.028***	0.037**	-0.001	0.003	0.003	0.007
	(0.004)	(0.008)	(0.016)	(0.007)	(0.003)	(0.004)	(0.022)
Mean dep. var.	0.18	0.41	0.30	0.20	0.06	0.18	0.07
N	442,851	34,634	7,317	291,023	117,194	441,272	1,579
(d) Weekly hours worked							
Treatment	All	Prim.	Prim. 45–54	Secon.	Tert.	Native	Foreign
I	-0.163**	-0.337**	-0.061	-0.252***	0.045	-0.157**	-0.288
	(0.069)	(0.137)	(0.197)	(0.075)	(0.080)	(0.069)	(0.453)
II	-0.182**	-0.353**	-0.044	-0.282***	0.045	-0.176**	-0.244
	(0.080)	(0.145)	(0.253)	(0.090)	(0.090)	(0.078)	(0.499)
III	-0.130*	-0.379**	-0.184	-0.179**	0.034	-0.126	-0.291
	(0.073)	(0.142)	(0.223)	(0.068)	(0.093)	(0.074)	(0.462)
Mean dep. var.	41.8	41.9	42.5	42.1	41.1	41.8	41.1
N	338,139	17,699	4,472	216,273	104,167	336,819	1,320

Note: This table reports treatment effects on labor market outcomes for Polish males using EU-LFS 2017–2023 data, estimated for the full sample ("All") and for the following subgroups: individuals with no or primary education ("Prim."), secondary education ("Secon."), or tertiary education ("Tert."), native-born ("Native") or foreign-born ("Foreign") individuals, as well as the subsample of primary-educated males aged 45–54 ("Prim. 45–54"). Models control for region FE, time FE, region-specific quarter-of-year dummies, and age. When the estimation sample is not stratified by educational attainment or foreign-born status, these variables are included as controls. When hours worked is the dependent variable, additional controls are sector FE and part-time employment status. Robust standard errors, clustered at the regional level, are reported in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table D7: Treatment effects on weekly hours worked by sector

(a) Czech females									
Treatment	Affected	C	G	H	I	M	O	P	Q
I	0.005	0.019	0.081	0.275*	-0.376	-0.243	0.074	0.184	-0.068
	(0.118)	(0.104)	(0.220)	(0.122)	(0.276)	(0.397)	(0.090)	(0.168)	(0.104)
II	0.105	0.043	0.160	0.306*	0.066	-0.096	0.041	0.259*	-0.070
	(0.075)	(0.078)	(0.183)	(0.138)	(0.345)	(0.225)	(0.102)	(0.118)	(0.112)
III	0.002	0.007	0.037	0.151***	-0.201	-0.173	0.015	0.119	-0.048
	(0.046)	(0.046)	(0.095)	(0.038)	(0.114)	(0.141)	(0.051)	(0.071)	(0.033)
Mean dep. var.									
N	117,420	53,783	34,515	9,132	10,133	12,707	18,649	29,809	34,387
(b) Czech males									
Treatment	Affected	A	C	F	G	H	J	M	O
I	0.033	0.042	-0.033	0.179	0.507*	-0.034	0.015	0.935	-0.070
	(0.136)	(0.400)	(0.144)	(0.256)	(0.217)	(0.139)	(0.347)	(0.507)	(0.099)
II	-0.036	-0.281	-0.097	0.016	0.215	-0.124	-0.017	0.430	0.022
	(0.133)	(0.374)	(0.145)	(0.333)	(0.291)	(0.090)	(0.258)	(0.655)	(0.145)
III	-0.089	-0.168	-0.084	-0.022	0.087	-0.166*	-0.088	0.597**	-0.016
	(0.094)	(0.221)	(0.080)	(0.147)	(0.239)	(0.072)	(0.142)	(0.224)	(0.067)
Mean dep. var.									
N	199,953	11,862	98,783	37,389	26,519	24,443	11,821	11,522	17,348
(c) German females									
Treatment	Affected	C	G	I	M	N	O	P	Q
I	-3.184*	-3.449	-4.706**	-2.699	-0.314	2.743	-0.959	-0.173	-3.283*
	(1.784)	(4.550)	(2.086)	(4.909)	(4.287)	(2.590)	(1.428)	(1.282)	(1.826)
II	-2.729	-1.847	-3.888*	-0.809	-2.055	3.209	-0.725	-0.541	-3.120
	(2.061)	(4.471)	(2.052)	(5.199)	(4.880)	(2.318)	(1.336)	(1.263)	(1.927)
III	-2.923**	-4.222	-5.206***	-1.479	0.853	0.969	-0.972	0.593	-3.553**
	(1.334)	(4.077)	(1.672)	(4.920)	(3.446)	(2.603)	(1.269)	(1.785)	(1.560)
Mean dep. var.									
N	175,778	50,251	64,953	17,440	25,976	22,698	36,760	48,583	80,105
(d) German males									
Treatment	Affected	C	F	G	H	J	M	N	O
I	0.189	-0.549	-1.248	-0.778	3.721	1.697*	3.652	8.187***	0.770
	(0.995)	(0.811)	(2.488)	(1.658)	(2.727)	(0.885)	(4.528)	(2.478)	(2.827)
II	0.790	-0.196	0.079	-0.472	4.176	1.667	4.067	7.478**	1.550
	(1.218)	(0.856)	(2.715)	(1.646)	(2.637)	(1.110)	(4.040)	(3.354)	(2.730)
III	-0.238	-1.194	-1.923	-1.400	3.081*	2.334	3.412	7.046***	-0.478
	(0.748)	(1.078)	(1.657)	(1.081)	(1.475)	(1.441)	(5.021)	(1.938)	(1.386)
Mean dep. var.									
N	255,213	146,173	57,673	64,157	36,747	22,428	28,058	23,771	35,317
(e) Polish females									
Treatment	Affected	A	C	G	M	O	P	Q	
I	0.116	0.278	0.021	0.130	-0.165	-0.001	0.464**	-0.074	
	(0.069)	(0.269)	(0.060)	(0.099)	(0.223)	(0.048)	(0.184)	(0.113)	
II	0.129	0.343	0.026	0.154	-0.179	-0.017	0.494**	-0.077	
	(0.074)	(0.296)	(0.062)	(0.105)	(0.245)	(0.059)	(0.184)	(0.135)	
III	0.098**	0.302*	0.021	0.056	-0.199	0.032	0.458**	-0.065	
	(0.044)	(0.160)	(0.057)	(0.096)	(0.144)	(0.036)	(0.170)	(0.093)	
Mean dep. var.									
N	210,289	23,075	39,735	46,668	13,053	26,005	41,460	33,198	
(f) Polish males									
Treatment	Affected	A	C	F	G	H	O		
I	-0.156	-0.121	-0.368***	-0.118	-0.097	-0.204	0.048		
	(0.102)	(0.350)	(0.095)	(0.148)	(0.193)	(0.203)	(0.072)		
II	-0.185	-0.048	-0.413***	-0.151	-0.128	-0.211	0.061		
	(0.120)	(0.429)	(0.110)	(0.168)	(0.219)	(0.253)	(0.076)		
III	-0.140*	0.051	-0.260***	-0.116	-0.165	-0.137	0.039		
	(0.073)	(0.417)	(0.055)	(0.158)	(0.180)	(0.170)	(0.080)		
Mean dep. var.									
N	177,954	34,499	82,662	43,382	38,382	31,537	22,288		

Note: This table presents treatment effects on weekly hours worked using EU-LFS 2017–2023 data, estimated separately by sector of employment for the sectors with sufficient representation in our sample. Economic activity is classified according to the NACE Rev. 2 categories: A = Agriculture, forestry, and fishing; C = Manufacturing; F = Construction; G = Wholesale and retail trade; H = Transportation and storage; I = Hospitality; J = IT; M = Professional, scientific and technical activities; N = Administrative and support services; O = Public administration; P = Education; Q = Healthcare; S = Services. "Affected" corresponds to an aggregate sample combining the most affected sectors (for Czechia, these are: C, F, G, H, I and N; for Germany: C, F, I, Q and S; and for Poland: C, G, I, N, O, P, Q and S). Models control for region FE, time FE, region-specific quarter-of-year dummies, age, education level, and part-time status. Robust standard errors, clustered at the regional level, in parentheses. Significance levels: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.