

THE UNIVERSITY OF CHICAGO

THE EFFECT OF HOUSEHOLD COMPOSITION ON SHORT-TERM LABOR MARKET
ENGAGEMENT AMONG FEMALE REFUGEES: EVIDENCE FROM THE RUSSO-
UKRAINIAN WAR

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ABSTRACT¹

This study evaluates the causal effect of household composition, measured by three proxies (the number of adults, the number of men and the child-adult ratio) on the likelihood of labor participation and employment among female refugees who were forcibly displaced following the Russian invasion of February 2022. I use the extent of damage in original Ukrainian dwelling as an instrumental variable to overcome the endogeneity of household structure. Two-stage least squares estimations show that the presence of another adult and or male adults decreases the likelihood of both labor participation and employment while greater share of child with respect to adults induces higher likelihoods. Such results confirm how the dynamics of the division of labor and the trade-off against dependent care are demonstrated in the context of forced displacement.

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1. INTRODUCTION

How does household composition determine people's decisions and outcomes on their labor supply? With household being a key unit of society, analyses of this question from different angles have contributed to uncovering the complex dynamics behind labor market. As livelihood and allocation of income are determined on household level, the way it is organized is deeply intertwined with its division of labor and individuals' economic behaviors that cannot be fully explained by personal factors nor the influence of firms and public policies.

Such deep tie not only identifies groups of people that face constraints and needs arising from household structure, but also provides a lens for evaluating the efficacy of social welfare programs. For instance, Eissa and Liebman (1996) explored how the expansion of the US' earned income tax credit program (a refundable tax credit for low- or moderate- income workers) differentially encouraged labor supply among female workers depending on their marital status, the number of children and their age; Alon et al. (2020), in analyzing COVID-19's economic implications on gender inequality, showed how the pandemic could disproportionately endanger working mothers' employment due to closures of daycare centers and schools, conditioned on availability of telecommuting and occupational sectors.

This paper investigates the relationship between household structure and labor market engagement soon after forced displacement due to military conflict, with focus on female Ukrainian refugees affected by the Russian invasion of 2022. Unlike immigration – for which income opportunities, original country's population, destination country's policies and the stock of previous immigrants are the key determinants of people's decision to emigrate (Karemera, Oguledo and Davis 2000; Clark, Hatton, and Williamson 2007; Mayda, 2010) – the decisive motivation for the Ukrainian refugees was their search for physical safety, a

migration pattern that is unplanned and involuntary in nature. The war also induces the paper's focus on women: the Ukrainian martial law, which took effect from the first day of the invasion, has prohibited all men of age 18-60 from exiting the country for mobilization and made those of age above 27 (later adjusted to 25) draft-eligible.

The confluence of these adversities – of abrupt and unforeseen departure from the existing living condition, displacement in foreign country, and separation from family members due to the martial law – puts the Ukrainian refugees to a precarious economic state. Most importantly, it imposes on many female refugees the pressing responsibility to be breadwinner for their household along with domestic labor and dependent care. This study's main insight is in revealing how household structure induces their labor participation and employment amidst these circumstances. In an era when geopolitical tensions and the refugee crisis is heightening, such attempt also contributes to confirming households that are relatively more vulnerable in access to labor income.

Based on three rounds of survey on the refugees by the Office of the United Nations High Commissioner for Refugees (UNHCR), I use various metrics as proxy of household composition (the number of adults and male adults and the ratio between children and adults) to show how household composition determines their labor participation and their probability of employment. To assess the metrics' causal effect, I utilize the variation in the extent of damage in refugees' original dwelling in Ukraine as an instrumental variable. I also control for individuals' characteristics, their household's war and displacement experiences, and fixed effects on time and host country to account for potential confounding.

Two-stage least squares estimations show that the presence of an additional adult and an additional male adult decreases the likelihood of labor participation approximately by 26-30% and 46-48% and the likelihood of employment by around 35-38% and 66% respectively

with statistical significance. For the child-adult ratio, its marginal effect on the likelihood of labor supply and employment is about 43-50% and 64% increase respectively, also with statistical significance.

The rest of the paper is organized as follows: Section 2 reviews existing literature related to this topic and positions this study's contribution. Section 3 describes the nature of forced displacement during the Russo-Ukrainian War and mentions other surrounding contexts. Section 4 explores in detail the data used for this study and provide various descriptive statistics. Section 5 elaborates on the empirical model and its qualifications in identifying the causal effect of household structure on labor market engagement outcomes. Finally, Section 6 summarizes the results of the model and discuss their implications.

2. LITERATURE REVIEW

There exists a large body of works in labor economics on how household dynamics shape labor market activities, with greater emphasis on women. Early works applied the classical tradeoff between income effect and substitution effect – on how their filial role, the spouse's earning, or the characteristics of household members incentivize or disincentivize their decision. Mincer (1962) showed how married women's labor participation had been incentivized by steady rises in real wages, their level of education and children's age while showing a negative correlation with income, their husband's level of education and the number of children; Blau and Robins (1988) explored the inverse relationship between child care cost and women's labor participation; Gronau (1988) empirically explained gender wage gap from the latter's lower job-related investment and training which are in turn a result of lower labor participation due to childbirth.

Efforts to reveal the causal relationship include Angrist and Evans (1996) which used sex

composition of the first two children as instrumental variable to assess the impact of childbirth on parents' labor supply, exploiting parents' preference of opposite-sex children; Bronars and Grogger (1994) instrumented whether the first birth was a twin to show the impact of unwed motherhood on socioeconomic outcomes such as earning, level of education, and poverty status. Kleven, Landais and Sogaard (2019) used panel data in Denmark to revisit how children induce gender pay gap via event study approach, in which the first childbirth is the event, and tracked parents' labor market outcomes before and after.

A strand of this area of study that is relevant to my research is women's labor supply in absence of spouse or his economic activity. These include analyses on the impact of husband's unemployment on wife's labor supply, often termed added worker effect (Bingley and Walker 2001; Stephens 2002; Bredtmann, Otten, and Rulff 2018) or separation due to divorce or bereavement, although the works on the effect of such condition on labor supply are limited (Meyer and Rosenbaum 2001; Stevenson and Wolfers 2007; Fadlon and Nielsen 2019). While it is not possible to infer the female refugees' marital status nor spouse's employment status from the data, many of the households (i.e., the household with which she shares livelihood in host country) take form of extended family, an aspect to be further elaborated in Section 4. The paper's first contribution to the existing literature lies in the identification of the causal link between household structure and women's labor supply within context of forced foreign displacement and legal ban on emigration of working-age males.

My research also intersects with the literature of immigration and forced displacement. While the two modes of emigration are intrinsically different in terms of volition, studies on the former expand insights on how foreign settings and host place's features influence households and their division of labor. At the same time, there have been efforts to distinguish refugees from economic migrants and study their post-migration economic

outcomes. Dustmann et al. (2017) compared economic migration and forced displacement as ‘chosen match’ versus ‘forced marriage’ as host countries generally accept immigrants based on economic factors as opposed to refugees who are accepted due to humanitarian consideration and noted how such difference can shape economic outcomes, whether for the migrants or for the host community; Becker and Ferrara (2019) highlighted the need for distinction as forced displacement often entails loss of property and physical threats, leaving fundamental aftermaths on refugees’ economic behaviors.

The economics literature’s attention on forced displacement is relatively recent, with the Syrian refugee crisis of 2011 being a major turning point (Verme and Schuettler 2021). Empirical efforts on such distinction include Cortes (2004) which used data from the US to show that although refugees’ salary is initially lower than that of economic immigrants, its rate of increase is faster, and that refugees tend to invest more into human capital that holds importance in the host country. Brell, Dustmann, and Preston (2020) and Ruiz and Vargas-Silva (2018) found a similar trajectory in employment rate across high-income countries and the UK respectively although the latter found that refugees face a prolonged gap in wages and work hours, partially explained by worse health conditions and language barrier.

Since theoretical formulation of the self-selection into immigration in search for economic opportunities (Borjas 1987), related works in labor economics have mostly focused on determination of immigration, how influx of immigrants affects host place’s labor market condition or social welfare (Card 2001; Borjas 2003; Ottaviano and Peri 2012) and immigrants’ long-term economic assimilation (Baker and Benjamin 1994; Lubotsky 2007; Abramitzky, Boustan, and Eriksson 2014). A similar pattern characterizes studies on refugees (Card 1990; Bratsberg, Raaum, and Røed 2014; Calderón-Mejía and Ibáñez 2016; Aksu, Erzan, and Kırdar 2022). In contrast, causal studies on how the composition of cohabiting household members determine labor-related economic outcomes are limited for both

economic migrants and refugees, becoming another aspect of this paper’s contribution.

Yet it is noteworthy that many papers on forced displacement rely on instrumental variable for identification strategy (Becker and Ferrara 2019; Verme and Schuettler 2021). Examples of the instruments include the size of casualties during the Bosnian War for evaluating whether displacement (both internally and abroad) affected people’s post-return labor outcomes (Kondylis 2010); the amount of rainfall during a year before migration for assessing the impact of forced migration amidst civil conflict on their labor participation and bargaining power within household (Calderón-Mejía and Ibáñez 2016); the exploitation of host country’s spatial dispersal policy that randomly places refugees across different regions to identify the impact of ethnic enclave on refugees’ economic outcomes (Edin, Fredriksson, and Åslund 2003; Damm 2009)

Finally, this research joins a nascent literature on the economic consequences of the Russo-Ukrainian War. Due to recency of the war and hence lack of extensive data, quantitative analyses on its consequences are generally scarce, not to mention causal studies. Studies to this date have discussed the way in which refugees affect host communities, their migration pattern and their short-term labor market integration (Kohlenberger et al. 2023; Postepska and Voloshyna 2024; Van Tubergen et al. 2024).

3. CONTEXT

Russia’s full-scale invasion of Ukraine that began on February 24th 2022 has put approximately 12.7 million Ukrainians in need of humanitarian assistance and displaced nearly 3.6 million people internally and 6.8 million people abroad as of February 2025, the largest scale in Europe since World War II (UNHCR 2025a, 2025b). From the earliest phase of the war, southern and eastern parts of the country and the capital Kyiv were exposed to

heavy missile attacks; the Russian army increasingly targeted civilian facilities such as hospitals, schools and monuments, exacerbating the displacement crisis (Albrecht and Panchenko 2022).

Driven by geographical proximity and cultural affiliation, about 6.3 million of the refugees fled to European countries. In response, the European Union (EU) activated the Temporary Protection Directive, a series of protective measures, on March 4th 2022. The policy granted the Ukrainian refugees an immediate access to residence permit, employment, housing, medical care and education along with other rights and exempted them of the regular asylum application process that would take much longer time given mass arrival. Other countries also swiftly proceeded to create a new program or activate existing system for refugee protection, focusing on permission of entry and provision of basic socioeconomic rights.

Another important context in the refugees' foreign displacement is that most of them are women. In multiple surveys conducted across various European countries during the first year of the invasion, the proportion of female respondents ranged from 84% to 90% (Andrews et al. 2023). One origin of the phenomenon is, as previously mentioned, Ukraine's martial law which prohibits all men of age 18-60 from exiting the country. It also aligns with a historical trend often referred to as the feminization of migration, in which an increasing proportion of migrant stocks is women who travel without male companions (Houstoun, Kramer, and Barrett 1984; Donato et al. 2011). In forced displacement settings, such characteristic connotes more complex implications, as women are one of the most vulnerable subpopulations with respect to physical and sexual violence and livelihood crisis (Vu et al. 2014; Klugman 2021), inducing foreign displacement in a greater scale.

4. DATA

Microdata and Restrictions

The microdata I use for this study are three rounds of UNHCR's survey on the Ukrainian refugees conducted in September 2022, February 2023 and June 2023 across 11 EU members (Belgium, Bulgaria, Czechia, France, Germany, Italy, Lithuania, Poland, Romania, Slovakia and Spain) and 3 non-EU European countries (Georgia, Moldova and Turkey) and anonymized countries that consist of other European countries, Canada and the US. While the focus of the data is on the refugees' intentions and perspectives about the current situation and the near future, it also contains information on their demographic profile, socioeconomic circumstances and household members. Because the survey only pertains to those who left Ukraine after the Russian invasion, it is strongly the case that the conflict is the decisive factor which incurred their migration. The sample consists of both cross-sectional and longitudinal data, but due to the relative scarcity of the latter and variations in questionnaires across rounds, I restrict attention on the cross-sectional data.

Response collection relied on a combination of phone-based and web-based surveys, except for first round which additionally utilized face-to-face surveys in Czechia and Spain for the integrity of sampling frames (UNHCR 2022; 2023a; 2023b). The sampling universe consists of those who enrolled in UNHCR's cash assistance program and online panels for market research purposes. Then within pooled sample, population-relative weights were assigned based on the respondents' location at the time of interview to reflect the relative distribution of refugees across countries. I used these weights in fitting forthcoming regressions. The identification of host countries differs across rounds: those that appear in all rounds are Czechia, Germany, Italy, Moldova, Poland, Slovakia, Romania and Spain; Belgium, Bulgaria, France, Georgia, Lithuania and Turkey appear only on certain rounds.

To accurately assess the impact of household structure on labor-related decisions, the following data restrictions were applied. I excluded respondents who either i) did not provide information on household members' gender and age, ii) did not provide information on household members although her household is not of single size, iii) provided any inconsistent information on household, iv) not of Ukrainian nationality, or v) provided no information or did not specify on employment status, level of education, condition of original dwelling and the time of displacement.

ACLED's Ukraine Conflict Monitor

Ukraine Conflict Monitor curated by Armed Conflict Location and Event Data (ACLED) records various types of war-related events (including armed clash, missile and drone attacks, bombings, and various types of violence against civilians) and tracks its date and geographical location. I aggregate this data to gather cumulative number of violence events for each month at every oblast as a proxy for intensity of war experience that the refugees faced while in Ukraine.

Description of Key Variables

A respondent is considered a labor force participant if she is either employed (whether formal or informal), unemployed or looking for a job, self-employed, or supporting family business. Those in apprenticeship, internship or volunteering and professional training were not classified as labor participants. Their age is expressed only in terms of three age groups: age 18-34, 35-59 and 60 or older. Responses on condition of original dwelling are either "intact", "partially damaged but inhabitable", "partially damaged but uninhabitable" or "fully

damaged” and reflects the condition at the time of displacement. In the survey, household members refer to people who left Ukraine after the beginning of the invasion and with whom respondent is living together and sharing expenses. Available information on household members is age group gender. Covariates on displacement includes “displaced month” which, setting the first month of the Russian invasion (February 2022) as the zeroth month, measures the number of months that elapsed until the month of respondent’s exit from Ukraine

Descriptive Statistics

Figure 1 shows time series for socioeconomic characteristics including household composition over the survey rounds. In the current context temporal analysis holds importance as the invasion was a rupture for the refugees and incurred sudden and unplanned migration especially during the first few months. As time passes, not only additional refugees with disparate characteristics and conditions migrate, but also existing refugees assimilate in the host place and possibly demonstrate changes in economic behaviors.

With respect to labor market engagement, we see that participation rate, albeit showing a cusp, fluctuates around 55-65%, while employment rate consistently rises and demonstrates a noticeable increase in the third round from 32.8% to 43.3%. This trend reflects both a steady proportion of refugees is willing to engage in labor and their labor market assimilation possibly through professional training, improved language proficiency or accumulation of job-searching efforts. In terms of respondents’ educational attainment, we observe a stable proportion of those with a vocational degree or a high school degree or less across survey rounds within 15-20%.

The magnitude of change across time is small in all variables related to household composition. We confirm that most of the refugees are women – while the mean number of

female adults is around 1.4, that of male adults is about 0.25. There are roughly 2.76 people in each household, in which there is a single child and about 1.68 adults, 0.33 of which are elders. The proportion of one-person household ranged within 15-20%; the proportion of households in which there are two or more same-sex adults was 6-9%. As the data do not specify each household member's filial relationship to the respondent, this proportion does not fully capture that of non-nuclear households.

Figure 2 and Figure 3 explore variations across host countries that are in the EU in terms of GDP per capita and the density of Ukrainian refugees respectively based on Eurostat data. Table 1 presents summary statistics across these countries. We find that host country's GDP per capita, a proxy for residents' income level, is negatively associated with employment rate, household size, number of children and marginally weak association with labor participation. These illustrate how the share of refugees who are participating in labor does not have a strong connection with host country's living standards but those in developed countries face lower chance of employment potentially due to higher living cost and competitiveness in job search, features that often characterize developed countries (Katz and Murphy 1992; Tica and Družić 2006). Such factors could also be a source of explanation for smaller household size and the number of children for refugees in Western European countries.

Furthermore, countries that are geographically closer to and have consequently deeper ethnocultural ties with Ukraine (Poland, Slovakia, Romania or Moldova, although not an EU member state) have relatively lower GDP, which shows a negative association with density of Ukrainian refugees. Although the density does not demonstrate a strong relationship with household structure, we observe a positive correlation with employment rate, contrary to a contending expectation that higher density might be associated with greater difficulty in finding employment due to competition.

Table 2 compares labor market engagement of female refugees across different types of households and age groups. Among household types, we see that refugees who are by herself show the highest labor participation rate, followed by those who have one or more adults in her household. Those who have a child in her household is almost as likely to participate in labor than the previous two groups, but those with multiple children show a distinctively lower figure. In contrast, gap in employment rate is relatively smaller with most of the aggregated values within 31-37% range. These dynamics strongly suggest the way and the direction in which the division of labor among adults and the presence of dependents influence women's labor-related outcomes. In terms of age, we observe the typical life cycle model of labor supply: those of age 35-59 showing higher labor participation and employment rate than those of age 18-34, and then dramatically declining for age 60 or older.

In connection with my model's instrumental variable, Figure 4 visualizes the oblast-level distribution of respondents whose original dwelling experienced damage from war. The representation is consistent with the fact that Russia's attacks concentrated on regions close to the border and around Kyiv: most of the respondents who experienced residence destruction came from eastern, northern or southern oblasts. This pattern confirms how the nature of displacement for refugees from those regions tend to be more urgent and involuntary, in search of physical safety.

5. MODEL

Consider linear model below (1) that represents the relationship between refugees' labor market engagement and their household composition after controlling for observed potential confounders where Y_{icr} refers to labor participation or employment of refugee i in host country c surveyed at round r , X_{icr} to measures of household members, W_{icr} to vector of

her pre-determined characteristics, γ_c to country fixed effects (on the grounds that country-specific characteristics influence both refugees' household dynamics and her labor market engagement), τ_r to survey round fixed effects (as the timing of the survey may be related to labor market trends and reunion or separation of family members) and ϵ_{icr} to the error term:

$$Y_{icr} = \beta_0 + X_{icr}\beta_1 + W_{icr}'\beta_2 + \gamma_c + \tau_r + \epsilon_{icr} \quad (1)$$

Since both outcomes are binary, (1) becomes a linear probability model and conditioned on zero covariance of the error term with the covariates and fixed effects, β_1 captures the marginal effect of household composition on the probability of labor participation or employment holding other variables fixed. However, since household composition is very likely to be correlated with unobserved individual characteristics, the current setting would face omitted variable bias and the conventional ordinary least squares (OLS) estimate of β_1 would be inconsistent and biased.

To address such endogeneity, I implement the instrumental variable (IV) estimation, leveraging extent of damage in original dwelling as the instrumental variable. Under a single instrumental variable and a single endogenous variable β_1 is just-identified and can be estimated by two-stage least squares (2SLS). This is done with two steps: first by regressing the endogenous variable (X) on the instrument (Z) and then regressing outcome variable on fitted X from the first stage, summarized below (u_{icr} is error term in the first stage):

$$\mathbf{First Stage:} \quad X_{icr} = \alpha_0 + Z_i\alpha_1 + W_{icr}'\alpha_2 + \gamma_c + \tau_r + u_{icr} \quad (2)$$

$$\mathbf{Second Stage:} \quad Y_{icr} = \beta_0 + \beta_1\hat{X}_{icr} + W_{icr}'\beta_2 + \gamma_c + \tau_r + \epsilon_{icr} \quad ,$$

$$\text{where } \hat{X}_{icr} = \hat{\alpha}_0 + Z_i\hat{\alpha}_1 + W_{icr}'\hat{\alpha}_2 + \hat{\gamma}_c + \hat{\tau}_r \quad (3)$$

Consistent estimation in the IV method hinges on satisfying two critical assumptions, that the instrument must be i) correlated with the endogenous independent variable (the

relevance assumption) and ii) uncorrelated with the error term in (1) (the exclusion restriction assumption). I discuss how my framework performs in meeting these criteria for the remainder of the section.

Relevance of the Instrument

Tables 3-5 present the results of first-stage estimation by regressing three proxies of household structure (the number of adults, the number of men and the child-adult ratio) on the extent of damage in original dwelling. For all regression tables henceforth, the first column does not consider any covariates; the second column includes individual characteristics comprised of their educational attainment and information on displacement; the third column additionally includes fixed effects on host countries and survey round; the fourth column adds the cumulative number of attacks respondent's oblast of origin endured up to the month of her displacement.

We find a statistically significant relationship with the instrument for all variables related to household composition, robust with respect to other covariates. Another pattern is that the coefficient on the instrument shrinks towards zero when the intensity of attacks on oblast of origin was controlled. The estimation results show that a refugee's household whose original dwelling experienced damage tend to have more adults and men while the share of children with respect to adults is smaller.

The Exclusion Restriction Condition

Unlike the relevance condition, it is not possible to empirically verify whether the exclusion restriction condition is met as the researcher must consider unobservable factors

that are potentially correlated with both the instrument and the outcome. For this reason, here I mention some avenues through which original dwelling's condition could affect labor market engagement other than via household dynamics and then discuss to what extent my model is sufficient in addressing these issues.

The most concerning source of violation is the war's psychological aftermath inflicted upon refugees. Countless studies have discovered how the experience of life-threatening violence, not to mention large-scale military conflict, negatively affects victims' mental health (Steel et al. 2009). Empirical evidence also show that resulting symptoms could hamper cognitive abilities required for employment and discourage job-searching efforts (Henkel 2011; Krueger et al. 2011).

In this regard, experience of the original dwelling being damaged could be associated with refugee's psychological condition which in turn affects the likelihood of labor participation and employment. The UNHCR survey does not involve questions or tests focused on assessing refugees' mental health. Even if it provides, whether such information could be used to control for psychological effect of the war is dubious as situations in host country are likely to contribute as well. Despite these technical challenges, controlling for the intensity of attacks refugees experienced before displacement could partially account for psychological determinants of labor market engagement given their deep connection with the overall psychological burden imposed by the war.

The control also contributes to addressing another pathway that may violate the exclusion restriction: systematic heterogeneity in respondents' characteristics across different levels of damage. Attacks on civilian residences are rather quasi-random and thus exogenous to most of socioeconomic characteristics. Yet there remains room for violation of the exclusion restriction – for instance, the implication of dwellings constructed with weaker

materials or the loss of assets because of the damage. These possibilities could undermine the validity of household composition's causal effect because we do not have access to refugees' information on assets nor their pre-war economic, but they are partially offset by controls on educational attainment and war experience that bespeak individual and regional characteristics respectively.

6. RESULTS AND CONCLUSION

Tables 6-8 summarize 2SLS estimation results for the effect of the number of adults, the number of men and the child-adult ratio respectively on the likelihood of labor participation. We observe that an additional adult member in household reduces female refugees' likelihood to participate in labor by around 26-30%, while an additional male adult member reduces by 46-48%, holding other variables fixed. Both effects were statistically significant across specifications but lost strength when the intensity of attacks was controlled. In contrast, a marginal increase in the child-adult ratio would increase the likelihood of labor supply by nearly 43-50%, although the effect lost precision and inflated to 77.6% when war experience was controlled.

According to Tables 9-11, the effect on employment likelihood aligned with that on labor participation, though with varying magnitudes: the presence of an additional adult member reduces female refugees' likelihood of being employed by 35-38%; an additional male member reduces it by approximately 66%, while a marginal increase in the child-adult ratio increases employment likelihood by about 64%. The effect was statistically significant for the adult number and male adult number with differing specifications. However, as we saw in labor participation, the child-adult ratio's effect lost precision and became noticeably inflated when control for war experiences was introduced.

These results suggest that conventional dynamics of division of labor and the trade-off between labor supply and dependent care persist even under the extraordinary context of forced displacement. Female refugees confirmed the tendency to choose labor participation and, if conditions permit, employment in stronger presence of dependents but non-participation in the presence of other working-age members. Statistically significant and robust results support this pattern and underscore how household composition is a key determinant of refugees' labor market engagement. Furthermore, such findings identify a group of refugees who are more vulnerable in terms of sustaining livelihood in foreign country. Those in households that have a large share of dependents or a small number of adults who can participate in labor are likely to face a systematic barrier in entering the labor force; some of them could face a daunting responsibility of breadwinning and fulfilling domestic work at the same time.

Despite these insights, the study has some limitations and concerns. Due to data constraints, we only observe outcomes shortly after the invasion and therefore cannot discuss the long-term effect of household composition. In addition, although labor participation and employment were the only available outcomes, they are not sufficient in capturing the full picture of labor market engagement. With the availability of additional information such as wage, hours worked and job quality, we would be able to provide a more comprehensible perspective on how household structure determines refugees' labor market engagement.

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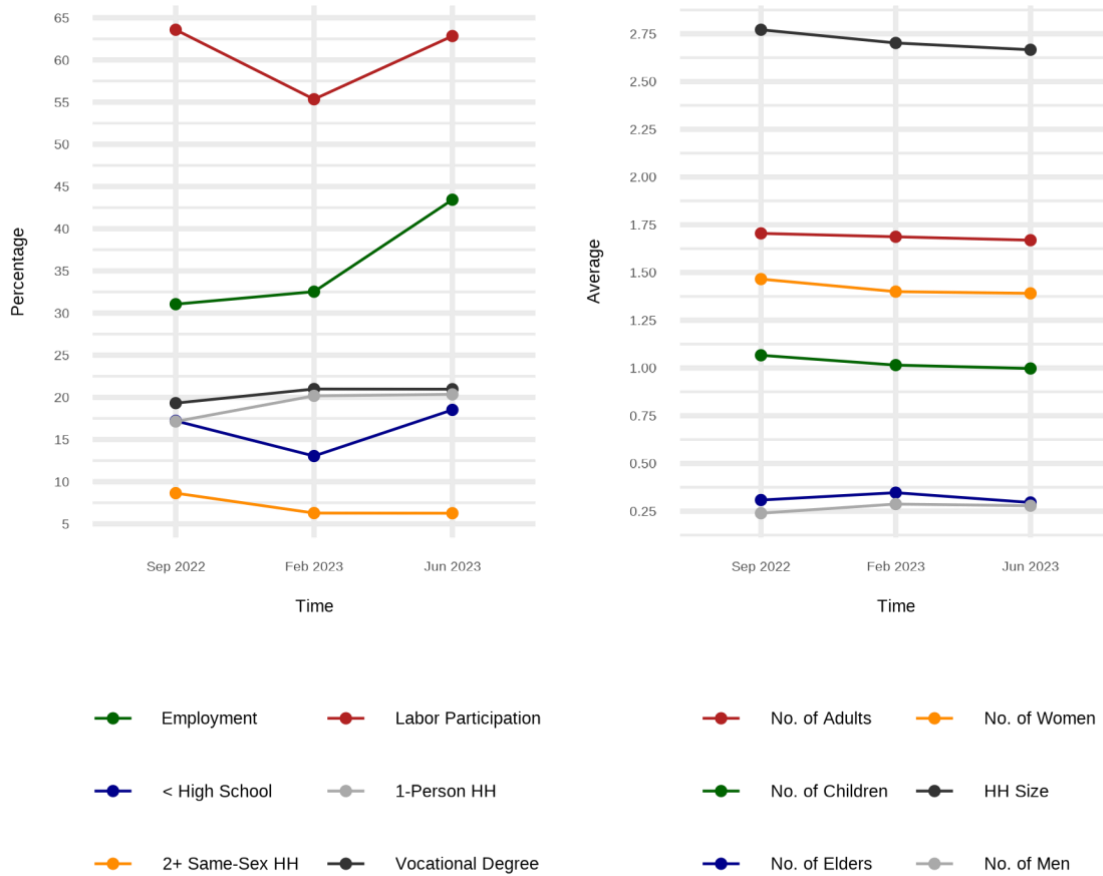
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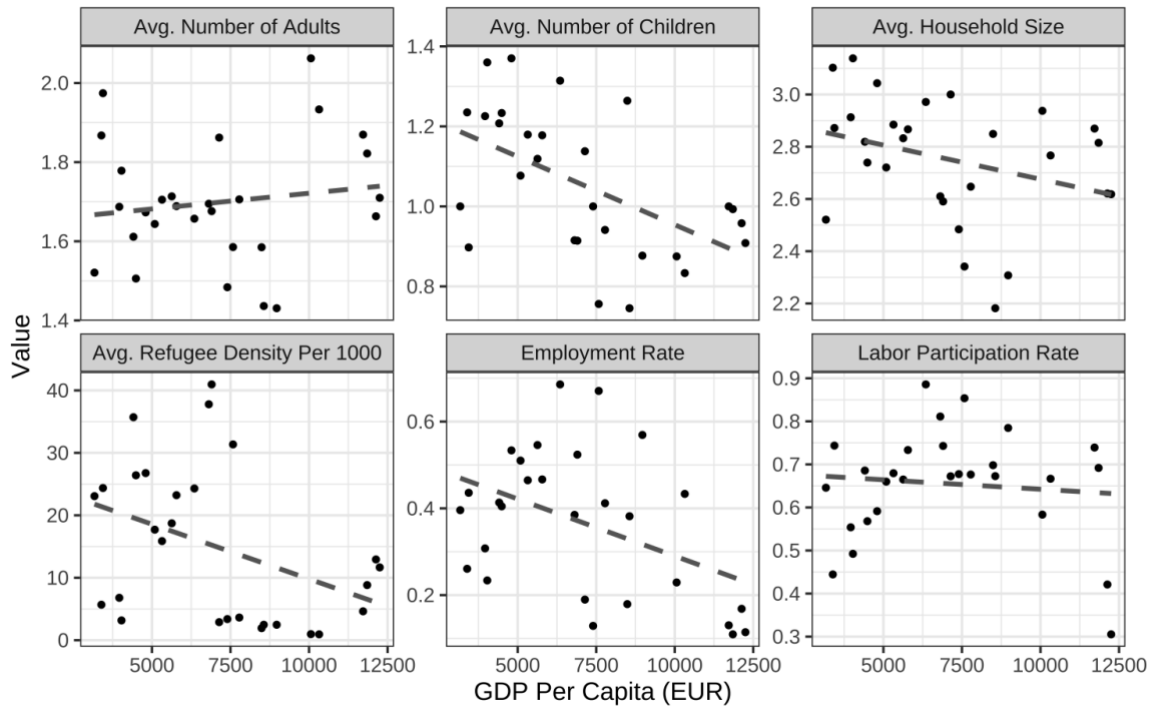
APPENDIX

Figure 1: Time Series of Socioeconomic Characteristics



Note: A respondent is considered a labor force participant if she is either employed (formal or informal), looking for a job, self-employed, or helping family business.

Figure 2: Cross-Country Analysis Among EU Countries by GDP



Note for Figure 2-3: The analysis is relevant to host countries in the EU. Each point represents country-level average value among refugees at a survey round. GDP per capita data is neither seasonally- nor calendar-adjusted and measured in current prices. The data on density of refugees pertains to those who were granted temporary protection.

Figure 3: Cross-Country Analysis Among EU Countries by Refugee Density

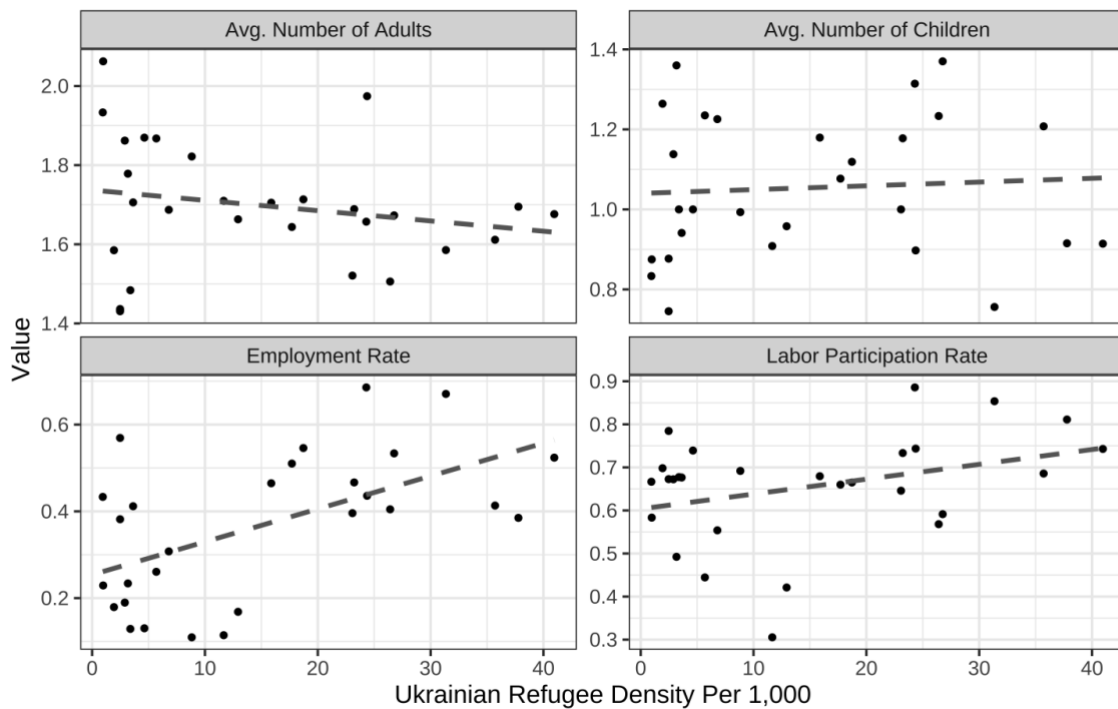


Table 1: Summary Statistics Across EU Countries

Country	Labor Participation Rate	Employment Rate	Avg. Household Size	Avg. Number of Children	Ukrainian Refugee Density per 1000	GDP Per Capita	N
Belgium	0.74 (0.45)	0.13 (0.34)	2.87 (1.60)	1.00 (1.00)	4.63	11720.00	23
Bulgaria	0.69 (0.47)	0.41 (0.50)	2.68 (1.47)	0.95 (1.01)	23.65	3291.03	87
Czech Republic	0.80 (0.40)	0.45 (0.50)	2.57 (1.37)	0.89 (1.03)	37.46	6930.98	600
France	0.62 (0.49)	0.31 (0.46)	2.87 (1.58)	0.86 (1.10)	0.96	10160.00	78
Germany	0.49 (0.50)	0.13 (0.33)	2.70 (1.33)	0.95 (0.95)	10.87	12062.37	372
Italy	0.72 (0.45)	0.34 (0.47)	2.53 (1.34)	1.03 (1.00)	2.22	8645.09	226
Lithuania	0.80 (0.40)	0.56 (0.50)	2.91 (1.44)	1.24 (1.05)	23.69	6029.38	80
Poland	0.64 (0.48)	0.44 (0.50)	2.85 (1.31)	1.25 (0.96)	31.42	4512.71	990
Romania	0.49 (0.50)	0.26 (0.44)	3.07 (1.27)	1.29 (0.94)	4.89	3813.28	754
Slovakia	0.67 (0.47)	0.50 (0.50)	2.82 (1.32)	1.13 (0.98)	17.19	5320.73	744
Spain	0.67 (0.47)	0.24 (0.43)	2.77 (1.54)	1.05 (1.00)	3.22	7382.44	123

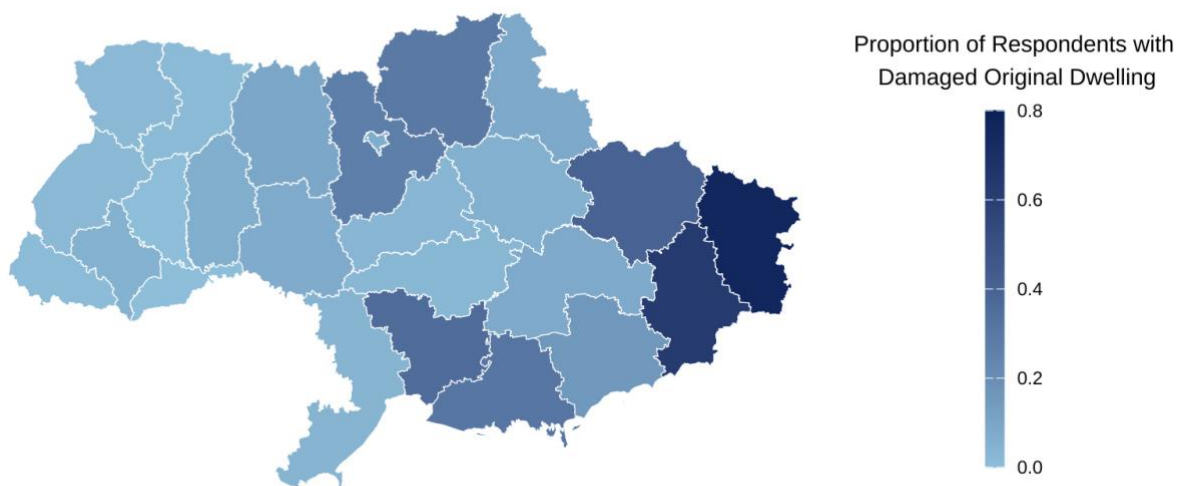
Note: Standard deviation in parenthesis. Belgium, Bulgaria, France, Georgia, Lithuania and Turkey do not appear on all survey rounds. GDP per capita data is neither seasonally- nor calendar-adjusted and measured in current prices. The data on density of refugees pertains to those who were granted temporary protection.

Table 2: Labor Market Engagement of Refugees by Household Types and Age Groups

Group	N	Labor Participation Rate	Employment Rate
One-Person Households	1147	0.67 (0.47)	0.37 (0.48)
Households with 1 Child	2153	0.62 (0.48)	0.36 (0.48)
Households with 2+ Children	1805	0.53 (0.50)	0.31 (0.46)
Households with 2+ Adults	981	0.64 (0.48)	0.34 (0.47)
Age 18-34	1630	0.62 (0.49)	0.36 (0.48)
Age 35-59	3758	0.68 (0.47)	0.39 (0.49)
Age 60+	698	0.20 (0.40)	0.10 (0.30)

Note: Standard deviation in parenthesis.

Figure 4: Spatial Variation in Share of Respondents with Damaged Original Dwelling



Note: The map is in oblast level. Respondents' original dwelling is considered damaged if it is partially damaged or fully destroyed. Data on the Crimean oblast is not available.

Table 3: First-Stage Estimates on the Number of Adults in Household

	<i>Dependent variable:</i>			
	Number of Adults in Household			
	(1)	(2)	(3)	(4)
Damage in Dwelling	0.122*** (0.023)	0.124*** (0.023)	0.120*** (0.023)	0.081*** (0.025)
< High School		0.079* (0.043)	0.098** (0.045)	0.116*** (0.045)
Vocational Degree		-0.012 (0.036)	0.001 (0.036)	0.002 (0.036)
Displaced Month		-0.0003 (0.008)	0.009 (0.012)	0.001 (0.012)
No. of Months at Host		-0.006* (0.004)	0.008 (0.009)	0.008 (0.009)
Log Cumulative Attacks				0.041*** (0.008)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parenthesis. Cross-national population-relative weights were applied. Columns (3) and (4) include fixed effects on host countries and survey rounds.*

Table 4: First-Stage Estimates on the Number of Male Adults in Household

	<i>Dependent variable:</i>			
	Number of Men in Household			
	(1)	(2)	(3)	(4)
Damage in Dwelling	0.070*** (0.013)	0.070*** (0.013)	0.065*** (0.013)	0.052*** (0.014)
< High School		-0.041* (0.023)	-0.021 (0.023)	-0.015 (0.024)
Vocational Degree		-0.064*** (0.019)	-0.052*** (0.019)	-0.052*** (0.019)
Displaced Month		0.011** (0.005)	0.005 (0.007)	0.002 (0.007)
No. of Months at Host		-0.002 (0.002)	-0.002 (0.005)	-0.002 (0.005)
Log Cumulative Attacks				0.014*** (0.005)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

Table 5: First-Stage Estimates on the Child-Adult Ratio in Household

	<i>Dependent variable:</i>			
	Child-Adult Ratio			
	(1)	(2)	(3)	(4)
Damage in Dwelling	-0.076*** (0.016)	-0.075*** (0.016)	-0.063*** (0.016)	-0.032* (0.017)
< High School		0.052 (0.040)	0.006 (0.041)	-0.009 (0.041)
Vocational Degree		-0.025 (0.032)	-0.055* (0.032)	-0.055* (0.031)
Displaced Month		-0.028*** (0.007)	-0.006 (0.011)	0.001 (0.011)
No. of Months at Host		0.008** (0.003)	0.017* (0.009)	0.017* (0.009)
Log Cumulative Attacks				-0.033*** (0.008)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parenthesis. Cross-national population-relative weights were applied. Columns (3) and (4) include fixed effects on host countries and survey rounds.*

**Table 6: 2SLS Estimates on Labor Participation –
Number of Adults in Household**

	<i>Dependent variable:</i>			
	Labor Participation			
	(1)	(2)	(3)	(4)
Number of Adults	-0.267** (0.107)	-0.256** (0.102)	-0.264** (0.107)	-0.305* (0.175)
< High School		0.003 (0.027)	-0.011 (0.028)	-0.004 (0.034)
Vocational Degree		-0.032 (0.022)	-0.037* (0.022)	-0.037* (0.023)
Displaced Month		-0.009* (0.005)	-0.001 (0.007)	-0.002 (0.008)
No. of Months at Host		-0.009*** (0.002)	-0.003 (0.005)	-0.003 (0.006)
Log Cumulative Attacks				0.005 (0.010)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

**Table 7: 2SLS Estimates on Labor Participation –
Number of Male Adults in Household**

	<i>Dependent variable:</i>			
	Labor Participation			
	(1)	(2)	(3)	(4)
Number of Male Adults	−0.465** (0.196)	−0.453** (0.192)	−0.487** (0.211)	−0.471* (0.279)
< High School		−0.036 (0.027)	−0.047* (0.027)	−0.047* (0.027)
Vocational Degree		−0.058** (0.025)	−0.063** (0.025)	−0.062** (0.026)
Displaced Month		−0.004 (0.006)	−0.001 (0.008)	−0.001 (0.007)
No. of Months at Host		−0.009*** (0.002)	−0.006 (0.005)	−0.006 (0.005)
Log Cumulative Attacks				−0.001 (0.007)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parenthesis. Cross-national population-relative weights were applied. Columns (3) and (4) include fixed effects on host countries and survey rounds.*

Table 8: 2SLS Estimates on Labor Participation – Child-Adult Ratio

	<i>Dependent variable:</i>			
	Labor Participation			
	(1)	(2)	(3)	(4)
Child-Adult Ratio	0.430** (0.197)	0.424** (0.196)	0.501** (0.246)	0.776 (0.643)
< High School		−0.040 (0.032)	−0.039 (0.034)	−0.033 (0.043)
Vocational Degree		−0.018 (0.026)	−0.010 (0.030)	0.005 (0.049)
Displaced Month		0.003 (0.008)	−0.001 (0.010)	−0.002 (0.012)
No. of Months at Host		−0.011*** (0.003)	−0.014 (0.009)	−0.018 (0.015)
Log Cumulative Attacks				0.018 (0.026)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

Table 9: 2SLS Estimates on Employment – Number of Adults in Household

	<i>Dependent variable:</i>			
	Employment			
	(1)	(2)	(3)	(4)
Number of Adults	−0.375*** (0.110)	−0.380*** (0.110)	−0.352*** (0.110)	−0.347** (0.174)
< High School		0.024 (0.030)	−0.025 (0.029)	−0.026 (0.035)
Vocational Degree		0.012 (0.024)	−0.011 (0.023)	−0.011 (0.023)
Displaced Month		0.0003 (0.006)	0.006 (0.008)	0.006 (0.008)
No. of Months at Host		0.014*** (0.002)	0.013** (0.005)	0.013** (0.006)
Log Cumulative Attacks				−0.001 (0.010)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parenthesis. Cross-national population-relative weights were applied. Columns (3) and (4) include fixed effects on host countries and survey rounds.*

**Table 10: 2SLS Estimates on Employment –
Number of Male Adults in Household**

	<i>Dependent variable:</i>			
	Employment			
	(1)	(2)	(3)	(4)
Number of Male Adults	−0.653*** (0.191)	−0.674*** (0.197)	−0.647*** (0.211)	−0.535** (0.261)
< High School		−0.034 (0.029)	−0.074*** (0.028)	−0.075*** (0.026)
Vocational Degree		−0.027 (0.026)	−0.045* (0.025)	−0.039 (0.025)
Displaced Month		0.008 (0.006)	0.006 (0.008)	0.007 (0.007)
No. of Months at Host		0.015*** (0.002)	0.009 (0.005)	0.009* (0.005)
Log Cumulative Attacks				−0.008 (0.007)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

Table 11: 2SLS Estimates on Employment – Child-Adult Ratio

	<i>Dependent variable:</i>			
	Employment			
	(1)	(2)	(3)	(4)
Child-Adult Ratio	0.604*** (0.193)	0.630*** (0.201)	0.667*** (0.245)	0.881 (0.628)
< High School		-0.039 (0.036)	-0.064* (0.037)	-0.059 (0.046)
Vocational Degree		0.032 (0.029)	0.025 (0.033)	0.037 (0.050)
Displaced Month		0.018** (0.009)	0.007 (0.010)	0.005 (0.013)
No. of Months at Host		0.011*** (0.003)	-0.001 (0.009)	-0.005 (0.015)
Log Cumulative Attacks				0.014 (0.026)
Country-Wave FE	No	No	Yes	Yes
N	6086	6086	6086	6086

*Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$. Heteroskedasticity-robust standard errors in parenthesis. Cross-national population-relative weights were applied. Columns (3) and (4) include fixed effects on host countries and survey rounds.*