

Transnational Mental Health Costs of War

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Introduction

Motivation

- ▶ The economic costs of war are increasingly well understood
 - Direct output losses for countries at war, plus spillovers to neighboring and trading countries (de Sousa et al. 2022; Federle et al. 2026)
 - Propagation to distant regions via food prices and household welfare (Alfano et al. 2026)
- ▶ The *psychological* costs of war may extend well beyond economic losses
 - Elevated PTSD, depression, and anxiety in conflict zones: large-scale meta-analyses (Steel et al. 2009) and surveys from Ukraine (Karatzias et al. 2023)
 - Economics literature has focused predominantly on measurable economic outcomes: output, earnings, human capital (Akresh 2012; Cesur et al. 2013; Akbulut-Yuksel 2014; Singhal 2019)

Introduction

Motivation

- ▶ Do the psychological costs of war spill over onto diaspora populations?
 - Millions of immigrants maintain deep transnational ties through family networks, emotional ties, and cultural identity (Vertovec 2009; Waldinger 2015)
 - *Secondary trauma*: distress from learning about violence through others or media, not direct experience (Cieslak et al. 2013)
 - ◇ Amplified by social media's real-time conflict content (Levy & Ben-David 2021)
 - ◇ Especially acute when national identity is under attack (Hirschberger et al. 2018)
 - Home-country insecurity linked to worse diaspora mental health (Sønderskov 2021; Aksoy et al. 2024) — but causal evidence remains scarce

Introduction

Our research

- ▶ Causal effects of the 2022 Russian invasion of Ukraine on Ukrainian immigrants' mental health in Finland
 - Largest war in Europe since WWII, of exceptional destructive scale
 - Largely unexpected by the general population in timing and scale
- ▶ Full-population Finnish register data
 - FOLK dataset (Statistics Finland): demographics, income, household, migration
 - Kela nationwide prescription register: psychotropic medication use
- ▶ Causal inference: Bayesian synthetic control method (Bayesian SCM)
 - Counterfactual mental health trajectory built from a donor pool of unaffected immigrant-origin countries
 - Full posterior distributions of counterfactual outcomes and treatment effects, not just point estimates

Introduction

Contributions to the literature

- ▶ Health consequences of war: previously studied only for directly exposed populations
 - Combatants and civilians in conflict zones, across the life course and generations (Akresh 2012; Lee & Mason 2014; Phadera 2021; Akresh et al. 2023)
 - Our contribution: mental health costs of war extend well beyond national borders to diaspora populations with no direct exposure
- ▶ Home-country conditions and immigrant well-being
 - Economic downturns, natural disasters, internet access, safety conditions (Akay & Constant 2017; Bharadwaj 2025; Yarkin 2024; Aksoy et al. 2024)
 - Our contribution: full-scale war as one of the most acute such shocks; causal evidence (vs. correlational, Sønderskov 2021) for the entire population of long-settled migrants
 - Concurrent work: Karadja & Beyond (2026) — Swedish data, labor supply focus; we focus on mental health with a Bayesian SCM and rich within-gender heterogeneity
- ▶ Systematic evidence that mental health impacts of a distant conflict fall entirely on women
 - Consistent with clinical/epidemiological evidence on gendered trauma responses (Tolin & Foa 2006; Silver et al. 2002)

Context and data

The 2022 Russian invasion of Ukraine

- ▶ The most serious security crisis in Europe since the end of the Cold War
 - Preceded by Russia's 2014 annexation of Crimea and support for Donbas separatists
 - Yet the full-scale 2022 attack remained unexpected in its timing and scale
 - Population, government, expert consensus, and even intelligence services were caught off guard
- ▶ Immediate and severe consequences: economic losses, deteriorating living conditions, public health crisis
 - Approximately 5.9 million Ukrainians registered as refugees globally by 2026
 - National counseling hotline: 50% surge in call volumes within three months
- ▶ Finland's position: long eastern border with Russia and historical memory of conflict
 - May heighten public salience of the invasion for Ukrainian immigrants in Finland

Context and data

Data sources

- ▶ Two linked sources of comprehensive individual-level Finnish register data
 - **FOLK** (Statistics Finland): demographics, education, employment, income, household structure, and migration (exact dates and countries of origin, 1983–2024)
 - **Kela prescription register**: all doctor-prescribed, reimbursed medication purchases
- ▶ Mental health outcome: psychotropic medication use
 - ATC classes: antipsychotics, anxiolytics, hypnotics/sedatives, antidepressants, other psychostimulants
 - Defined daily dose (DDD) information used to identify ongoing treatment episodes, not isolated purchases
 - Binary indicator: active treatment episode within each 90-day (quarterly) period

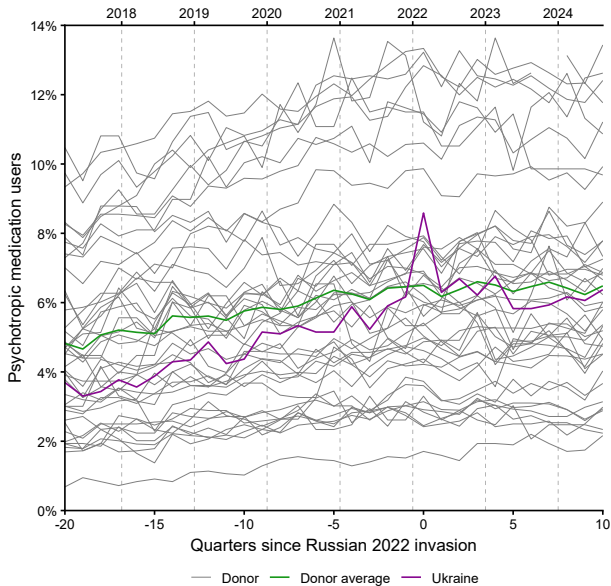
Context and data

Sample construction

- ▶ Sample restrictions
 - Immigrants who entered Finland 1983–2016 and remained continuously resident and alive throughout 2016–2021
 - Long-settled immigrants: exposure operates through transnational ties, not displacement
 - Origin countries with at least 100 immigrants aged 16+ present each year from 2016 onward
- ▶ Panel structure: 31 quarters (90-day periods) centered on February 24, 2022
 - 20 pre-invasion and 11 post-invasion quarters
- ▶ Final sample: 52 country-of-origin groups
 - Ukraine, Russia, 9 conflict-adjacent countries (excluded from donor pool), and 41 donor (control) countries

Context and data

Psychotropic medication trends



Methodology

Empirical challenge

- ▶ Need a credible counterfactual: what would Ukrainian medication use have looked like absent the invasion?
 - Only one treated group (Ukrainians); other immigrant groups differ in size, composition, and pre-trends
- ▶ Alternative: individual-level matching (as in Karadja & Beyond 2026)
 - Powerful with large treated samples, but involves discretionary choices and an unverifiable parallel trends assumption
- ▶ Our approach: synthetic control method (Abadie 2010)
 - Fewer discretionary choices; transparent counterfactual via explicit donor weights
 - Weaker, directly verifiable assumption; well suited to a single treated unit

Methodology

Synthetic control setup

- ▶ Observed outcome for unit i at time t :

$$y_{it} = Y_{it}(0) + \tau_{it}D_{it} \quad (1)$$

- ▶ Counterfactual trajectory as a convex combination of donors:

$$\hat{y}_{ot} = \sum_{j=1}^J w_j y_{jt}, \quad \mathbf{w} \in \Delta^{J-1} \quad (2)$$

- ▶ Estimated treatment effect: $\hat{\tau}_t = y_{ot} - \hat{y}_{ot}$
- ▶ Standard SCM limitation: uncertainty quantification relies on placebo-based p -values and asymptotic approximations that perform poorly with few pre-treatment periods and a single treated unit

Methodology

Bayesian synthetic control method

- ▶ Bayesian SCM (Helske et al. 2026), implemented in R package bscm

$$y_{ot} \sim N\left(\alpha + \sum_{j=1}^J y_{jt} \omega_j, \sigma^2\right) \quad (3)$$

- ▶ Donor weights ω treated as unknown parameters with a Dirichlet($\kappa = 1$) prior
 - Posterior reflects genuine uncertainty over which donors best approximate Ukraine
- ▶ Weakly informative priors: $\alpha \sim N(m, 2)$, $\sigma \sim \text{Exponential}(1)$
- ▶ Delivers full posterior distributions $\rightarrow$ credible intervals with a direct probabilistic interpretation, avoiding asymptotic approximations

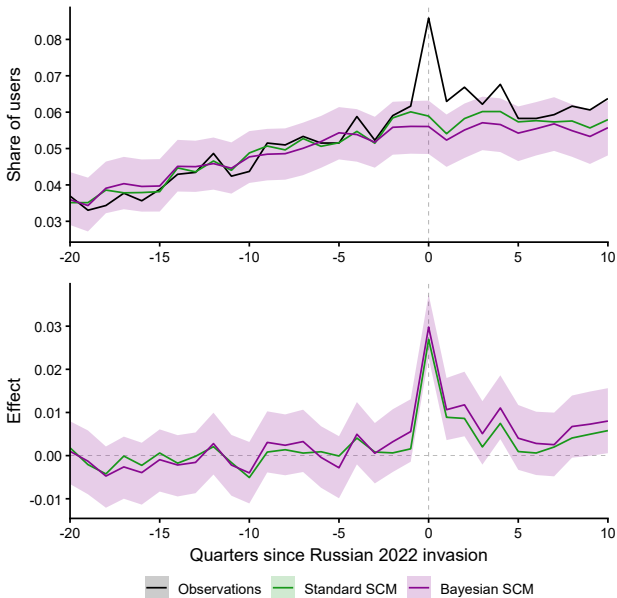
Methodology

Validation approach

- ▶ In-country placebo tests: reassign treatment to each donor in turn
- ▶ In-time placebo tests: reassign the treatment date to earlier quarters
- ▶ Leave-one-out checks: re-estimate excluding each donor in turn
- ▶ Cross-check against standard SCM and Synthetic Difference-in-Differences (Arkhangelsky et al. 2021)
- ▶ Robustness to donor pool restrictions (European/non-European, NATO/non-NATO) and prior sensitivity (κ)

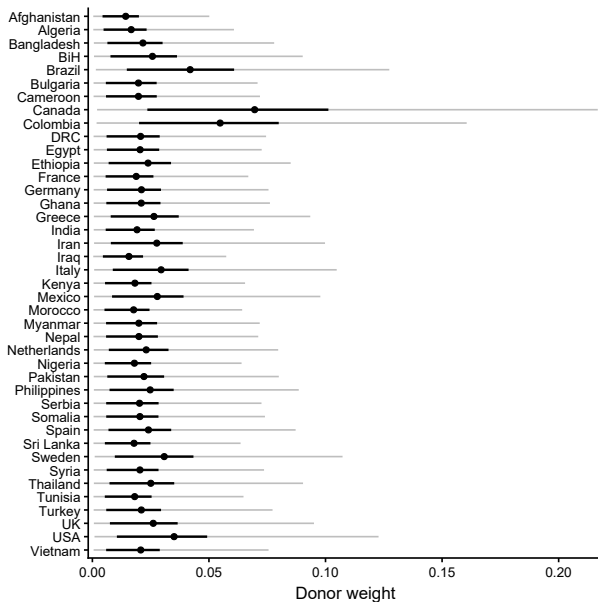
Results

Baseline effect



Results

Donor weights

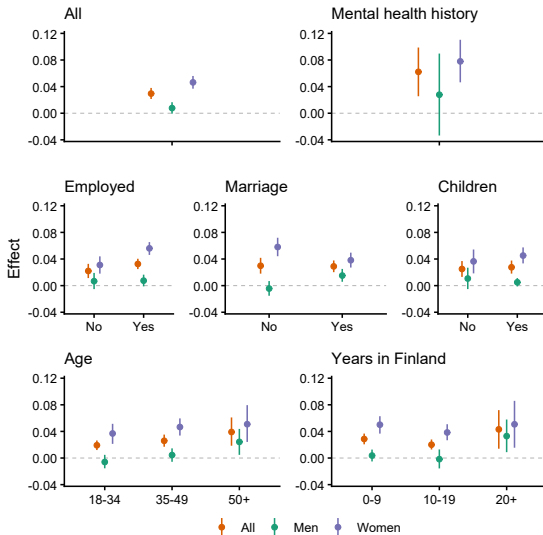


Validation



Results

Heterogeneity: gender and subgroups



Results

Key findings

- ▶ Immediate and large increase in psychotropic medication use among Ukrainian immigrants
 - About 3 pp. (nearly 54%) increase in the first post-invasion quarter
 - Effects persist but dissipate substantially: 0.8 pp. (+14%) after nearly three years
- ▶ Sharply gendered response
 - Women: 4.6 pp. increase (+67%) — almost the entire effect
 - Men: no significant response (0.8 pp.)
- ▶ Within women, effects are largest among those who are
 - Employed, more recently arrived in Finland, unmarried, and with prior mental health history
- ▶ Russian and conflict-adjacent immigrants show only minor effects
 - National identification with the attacked country, not geographic proximity, drives the response

Conclusion

- ▶ War imposes large and persistent mental health costs on diaspora populations with no direct exposure to violence
 - +53.6% increase in psychotropic medication use in the first post-invasion quarter, partially but not fully dissipating over three years
- ▶ The mental health burden falls almost entirely on women
 - Consistent with clinical and epidemiological evidence on gendered trauma responses
 - Concentrated among Ukrainians rather than Russian or conflict-adjacent immigrants → national identification, not geographic proximity, is the driver
- ▶ Policy implications
 - Host countries should consider mental health response protocols for diaspora communities during major conflicts abroad
 - Gender-sensitive screening and outreach, not reliant solely on formal care-seeking
- ▶ Broader takeaway: psychological costs of war extend well beyond conflict zones; our estimates likely represent a lower bound in host countries with less-developed mental health infrastructure

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