

War and Student Academic Achievement

Evidence from Ukraine

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Motivation

- **Academic achievement**

- ▶ Differences play a crucial role in explaining individual differences in earnings
 - ▶ Shaped by personal, household, school, and broader socioeconomic factors

- **Wars disrupt learning**

- ▶ Students live and attend school in conflict zones
 - ★ Potentially important determinant of academic achievement
 - ★ significant knowledge gaps concerning both the effects of conflict and the mechanisms

- **Why it matters:**

- ▶ Academic achievement shape future outcomes
 - ▶ Long-term educational disruptions can limit human capital formation

The Russo-Ukrainian War

- **Origins and Context**

- ▶ Full-scale invasion on February 24, 2022.

- **Key Aspects of the War**

- ▶ Massive displacement (UNHCR, 2025):
 - ★ **3.7 million internally displaced** due to heavy shelling and fighting.
 - ★ **6.9 million refugees** have crossed into Poland, Hungary, Moldova, and other countries
 - ▶ Infrastructure Destruction (UNICEF, 2024):
 - ★ 1,300+ educational facilities damaged or destroyed—true numbers likely higher.
 - ▶ Economic impact (NBU, IMF, 2024):
 - ★ **2022:** Ukraine's GDP fell by nearly **30%** due to the full-scale invasion.
 - ★ Even in the baseline scenario, pre-war GDP levels will not be restored until 2030

Bachelor Admission Test in Ukraine

- The **National Multi-Subject Test (NMT/ZNO)** is the national test used for admission to bachelor's programs in Ukraine.
- It is the primary criterion for university admission.
- High school graduates usually take the test in June or July, in the year they finish school.
- **NMT 2024 structure:**
 - ▶ **Mandatory:** Ukrainian Language, Mathematics
 - ▶ **Optional (choose one):** History of Ukraine, Foreign Language (English, German, French, or Spanish), Biology, Physics, or Chemistry
- Each subject is scored from 100 to 200 points. Results are used for admission ranking.

Research Question

- What is the impact of the Russo-Ukrainian War on individual performance in the NAT among Ukrainian high school students?
- Explore potential mechanisms through which conflict affects academic performance

Literature

- **Frameworks**

- ▶ Education Production Function Todd and Wolpin 2003
 - ★ Children's cognitive skills are produced over time through family and school inputs

- **Empirical Evidence**

- ▶ Short run adverse effects on health, psychological well-being, child labor and education
Minoiu and Shemyakina 2014; Akresh et al. 2012; Blattman and Annan 2010; Di Maio and Nandi 2013; Shemyakina 2011; Brück et al. 2019; Di Maio and Nisticò 2019

- **Brück et al. 2019**

- ▶ Studied effect of local violence during the Second Intifada (2000–2006) on high school exam performance in the West Bank.
- ▶ Conflict measure: number of all Palestinian fatalities in student's locality during academic year
- ▶ **Key results:** Conflict reduces the probability of passing final exam, the total test score, and probability of being admitted to university.

Data

- **Administrative Data from UCEQA**

- ▶ Individual test scores in all subjects at the NMT for the whole population of test-takers in Ukraine for 2016 - 2024
- ▶ Main variable of interest: weighted raw subject score (0-76 points)
- ▶ Age, gender, residence of student, name and locality of the school the student enrolled in.

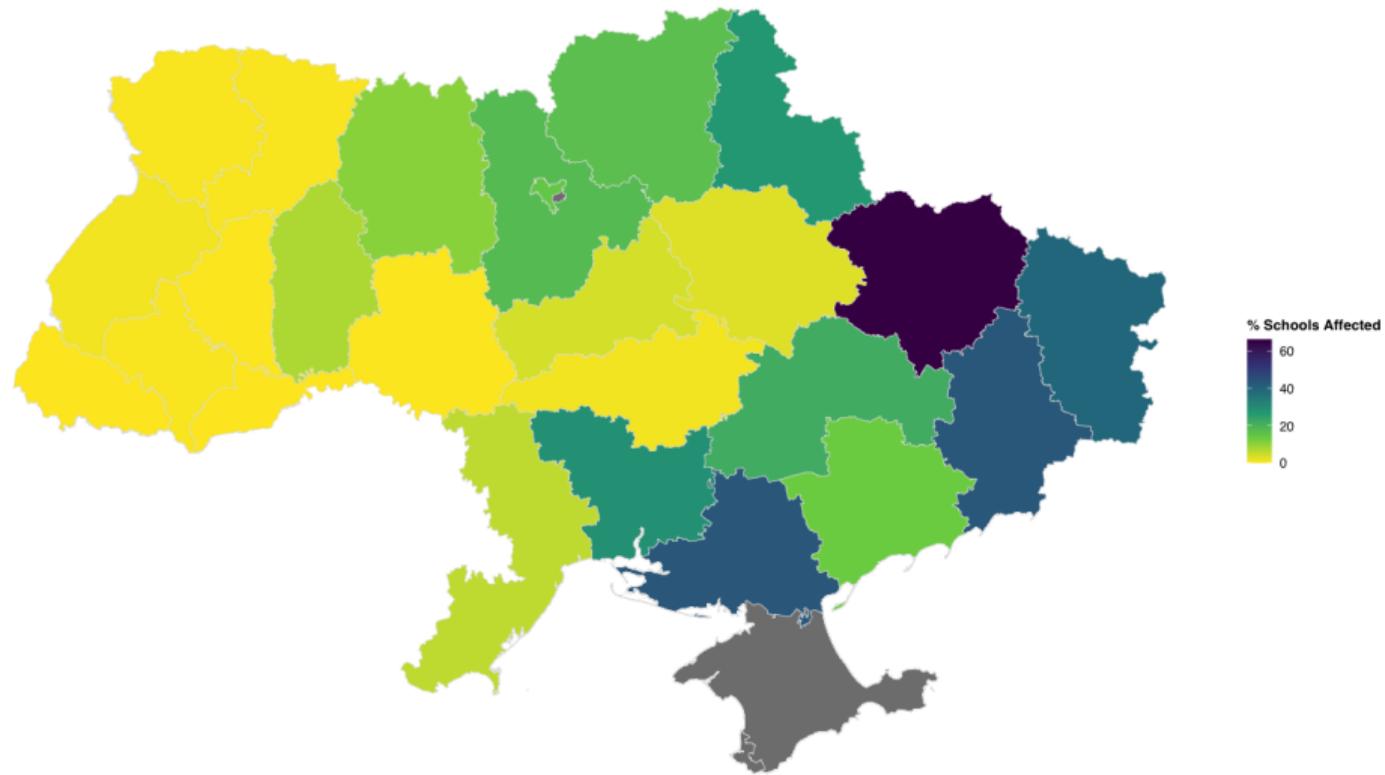
- **ZNZ-1 School Data**

- ▶ Data on school characteristics, enrollment, and teaching staff for all secondary schools in Ukraine (2021 - 2024)

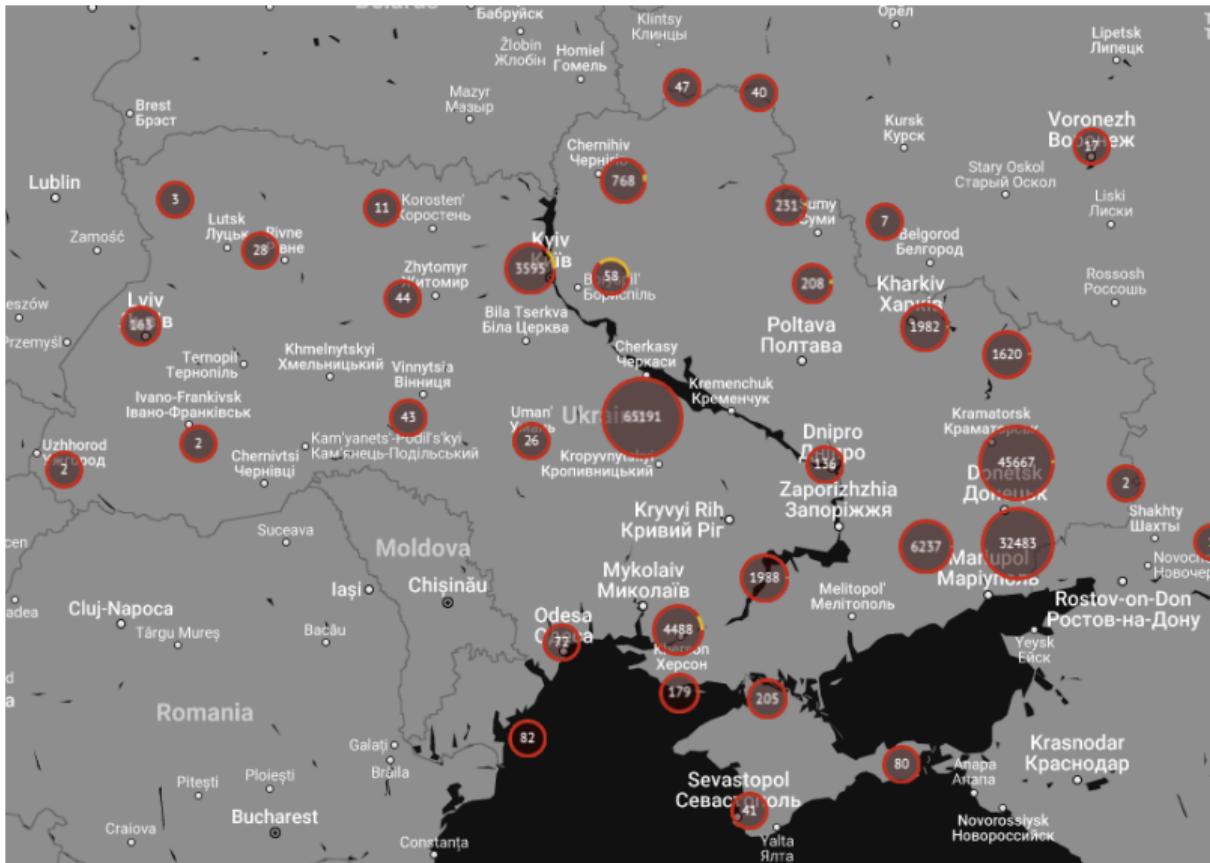
- **Conflict Exposure Data (UCDP)**

- ▶ Geo-coded data on violent events from the Uppsala Conflict Data Program (2014–2024)
- ▶ Includes event date, location, actor, and number of fatalities

Damage to Schools in Ukraine by Region



Geographic Distribution of Conflict Fatalities in Ukraine



Research Design

Use a fixed effects panel framework, where identifying variation comes from changes in conflict intensity across years within the same school

$$\text{Score}_{islt} = \alpha + \beta \cdot \text{Conflict}_{lt} + \gamma \mathbf{X}_{it} + \delta \mathbf{Z}_{lt} + \mu_s + \lambda_t + \epsilon_{islt} \quad (1)$$

- Score_{islt} : NMT score of student i in school s , locality l , and year t .
- Conflict_{lt} : number of fatalities in school locality l caused by war during academic year t
- \mathbf{X}_{it} : Vector of student-level characteristics (e.g., age, gender).
- \mathbf{Z}_{lt} : Vector of region-level covariates (e.g., school infrastructure damage, regional GDP).
- μ_s : School fixed effects to control for time-invariant school-specific factors.
- λ_t : Academic year fixed effects
- ϵ_{islt} : Idiosyncratic error term.

Research Design

- **Identifying Assumption**

- ▶ Conditional on fixed effects and observable controls, year-to-year variation in local conflict exposure is assumed to be exogenous to unobserved factors affecting student performance.

- **Imputed Counterfactual**

- ▶ A similar student (same school, same locality, similar characteristics) in a different year with lower or no conflict exposure.

- **Threats to Identification**

- ▶ Migration and Displacement (Main Threat)
 - ▶ Sample Selection Bias

To Do List

- **Data Cleaning and Merging**
 - ▶ Harmonize UCEQA test score data (2016–2024)
 - ▶ Merge with ZNZ-1 school registry by locality/school-year
 - ▶ Match geo-coded UCDP conflict data to school locations and years
- **Empirical Implementation**
 - ▶ Estimate baseline fixed-effects regressions
- **Address Identification Threats**
 - ▶ Check for selective migration or dropout bias
- New Recent Idea: Conflict and University Application Behavior