Seminario de Microeconomía Aplicada - The Bomb Effect: Mobile Trace Data and the Dynamics of Conflict-Driven Displacement

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Abstract: Armed conflict and violence are driving displacement at unprecedented scale, with 73.5 million people internally displaced by conflict by the end of 2024. These shocks impose immense humanitarian, social, and economic costs, yet remain difficult to measure in real time. A central empirical challenge is the mismatch between finely observed conflict events and lagged displacement data, which obscures how populations respond dynamically and heterogeneously to conflict. This paper addresses this gap by combining novel high-frequency mobility data with a staggered difference-in-differences (DiD) research design. We use anonymised, GPS-based mobile phone data—capturing near-continuous location traces from approximately 25 million devices—to measure population movements at unprecedented spatial and temporal resolution. These data are integrated with geo-coded conflict events from the Armed Conflict Location and Event Data Project (ACLED), allowing precise matching between violence and displacement in both space and time.

We implement a staggered DiD framework that exploits variation in the timing of conflict exposure across locations. Specifically, we construct a panel of 20×20 km grid cells and define treatment as the onset of a conflict event within a cell. By comparing changes in population levels before and after exposure—relative to not-yet-treated locations—we estimate dynamic displacement responses to violence while addressing biases arising from heterogeneous treatment timing. Our first contribution is methodological. We show how high-frequency GPS data can be embedded within a modern staggered DiD event study to recover time-resolved estimates of displacement. This approach captures abrupt mobility responses within hours or days of conflict, overcoming the limitations of traditional survey and administrative data. Our second contribution is empirical. Focusing on the first year after the escalation of the war in Ukraine in 2022, we provide granular evidence on how populations respond to conflict shocks. We document large, immediate increases in displacement following conflict, with effects concentrated in the short term but varying substantially across space. Responses differ between urban and rural areas and depend on the intensity and type of violence, as well as proximity to safer locations.

More broadly, this paper demonstrates the value of combining non-traditional data sources with rigorous causal inference methods to better understand—and respond to—population movements in conflict settings.

About the exhibitor: Elisabetta Pietrostefani is a Senior Lecturer (Associate Professor) in Geographic Data Science and Deputy Lead of the Geographic Data Science Lab at the University of Liverpool. She is Deputy Director of IMAGO, the ESRC SDR-UK Imagery Data Service. She has previously held positions as a Visiting Research Fellow at LSE Geography and Environment, Honorary Senior Research Fellow at UCL’s Institute for Global Prosperity and Research Associate at the LSE Middle East Centre.

Exposure time: 1 hora y 30 minutos.

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