How to Evaluate a Road Project using Remote Sensing Data: The Case of Iraq Expressway

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Context and Challenges to Collect Data

- Dealing with a geography marred by unrest
- This limits our ability to work directly with counterparts on the ground
- Limits also data collection options
- How then, can we find innovative ways to use other sources of data?

Source: Armed Conflict Location and Event Data (ACLED)
Intervention: Expressway and the N-S Corridor

Sections of Expressway Rehabilitation (R7&8): 257km

Girsheen and Suheila Road: 23km
**Geospatial IE: A Method to Assess Transport Corridor**

**Iraq Expressway and Local Economic Growth**

- Infrastructure deficiencies limit Iraq’s transport and trade corridors’ abilities to play their role efficiently.

- Use geographically precise information on the timing and location of road improvement to examine changes in nighttime lights by pixel for the Expressway 1 (red outlined area).

- Merging multiple sources of spatial data with quasi-experimental methods (triple difference, synthetic control, event study, etc.) to determine the project’s impact.

- **Is there enough variation in the light across the study area and over time to detect substantive changes due to treatment?**
  - **YES:** Between 2012 and 2016, 45.7% (51.5%) increase in the mean (median) value of nighttime lights around the Expressway.
Data Strategy

- Satellite Remote Sensing: High frequency nighttime lights data
- High-resolution population data: LandScan
- Settlement Data from UN OCHA: Cities, towns, villages and neighborhoods
- Empirical Studies of Conflict (ESOC): Violent and non-violent actions
- Road Network of Iraq
Nighttime Light around R7&8 and along Expressway

Example: Mean Nighttime Light Data 2012
Variable Correlation with NTL in 750m buffer

Household expenditure: 0.30
Health expenditure: 0.24
Communication expenditure: 0.24
Time Needed to reach work: 0.15

LSMS Household Data: 2012-2013

Created 750m buffers around households in the LSMS Survey

Extracted the average nighttime light data from the buffer

Correlated with household, health, transport, and communication expenditure data
NTL 2012 and LSMS Data 2012
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Households That Said Yes to Having Problems in Transportation
Other Sources of Data

Settlement Data 2014 from UN OCHA
Empirical Studies of Conflict (ESOC) Database

Distribution of Ethno-religious Groups and Tribes in Iraq

Shias

GRMP_shia

≤50

≤100,000

≤20,000

≤576,000

Sunnis

GRMP_sunny

≤50

≤100,000

≤20,000

≤576,000

Kurds

GRMP_kurd

≤50

≤100,000

≤20,000

≤576,000
ESOC data on Protests and Fatalities: 2016-2018