

CLIMATE AND CONFLICTS IN SOMALIA

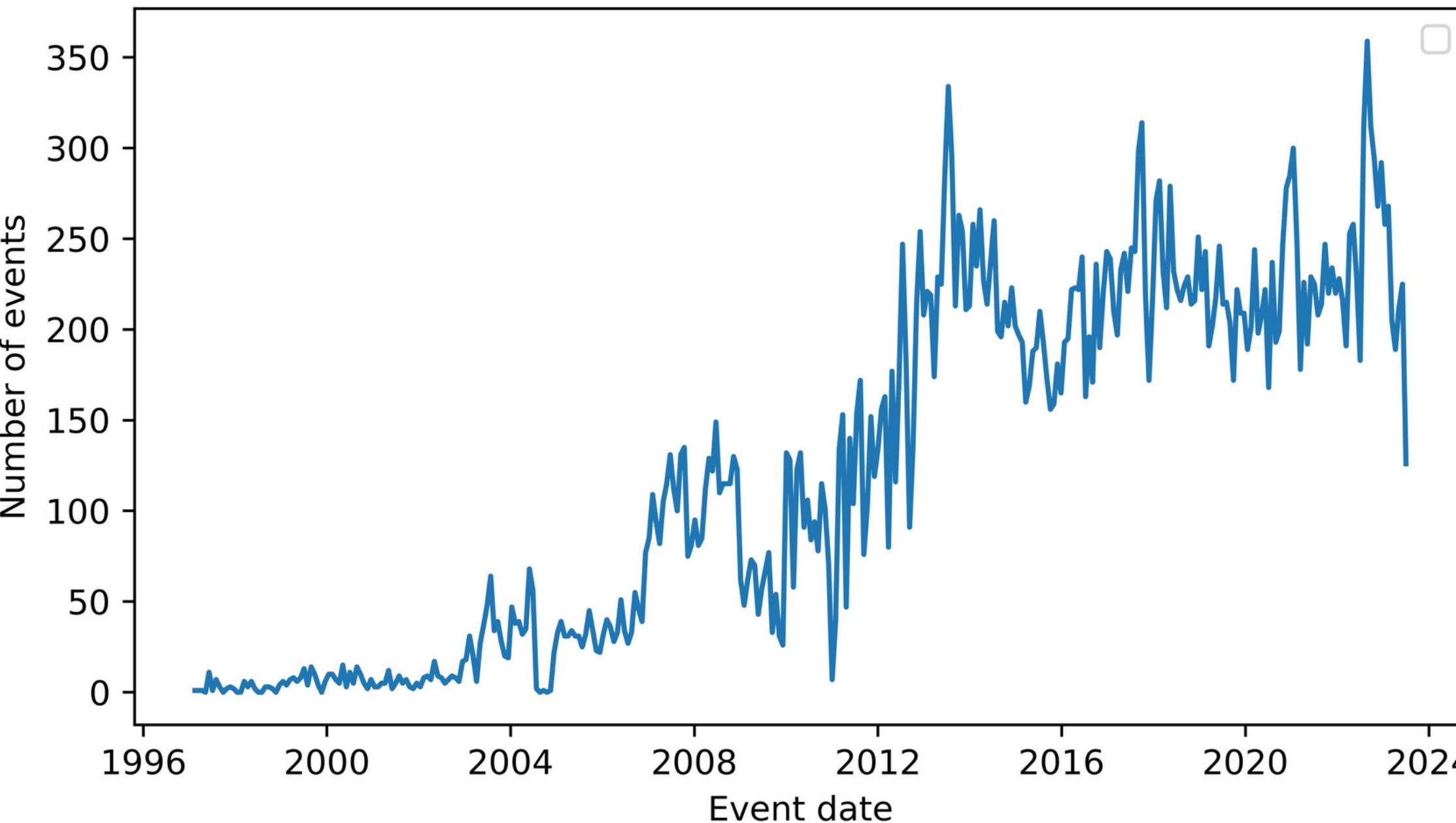
Sara Ghivarello



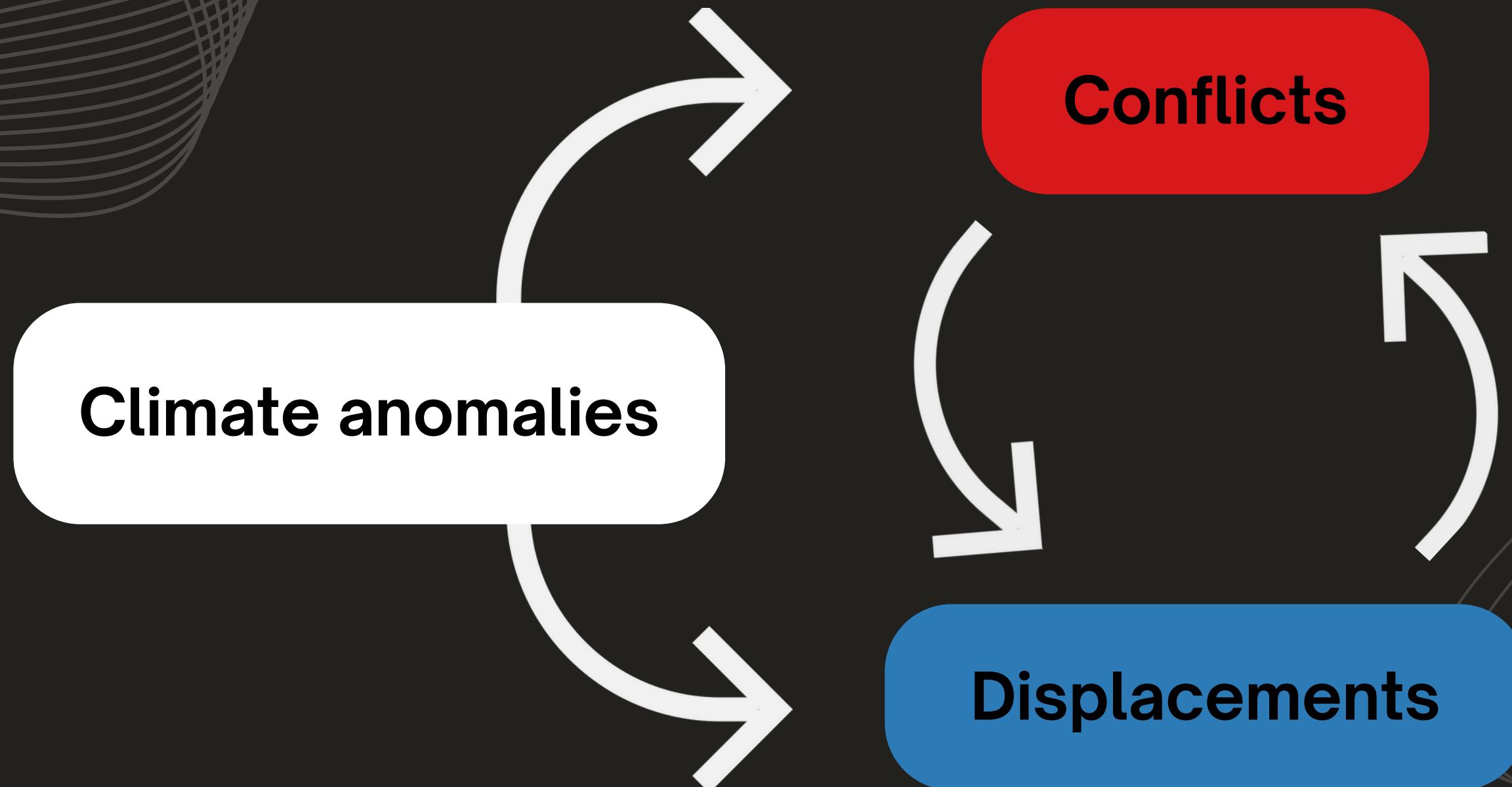
Motivation

- Deterioration of global climatic conditions
- Consequences of climate affect regions disproportionately
- The Horn of Africa is an area already vulnerable to climate stress
- Unstable political situation in Somalia
- Investigate the relationship between climate variables and conflict events, with Somalia as case study

PROTESTS AND VIOLENT EVENTS



COMPLEX INTERACTION PATHWAYS



DATA

Climate

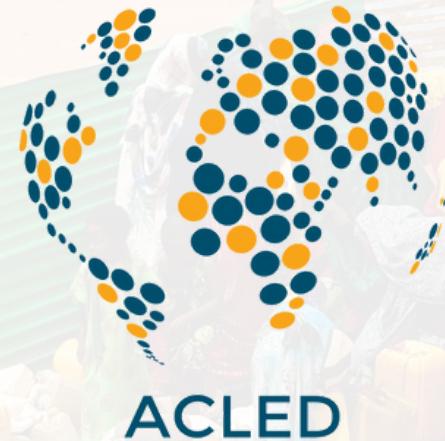


Timeseries dataset of gridded temperature and precipitation

$$TA_{i,m,y}^n = \frac{1}{n} \sum_n \frac{T_{i,m,y} - \mu_{i,m}^T}{\sigma_{i,m}^T}$$

$$PA_{i,m,y}^n = \frac{1}{n} \sum_n \frac{R_{i,m,y} - \mu_{i,m}^R}{\sigma_{i,m}^R}$$

Conflicts



Protests and violent events at a sub-national level, grouped per month

Displacements



Protection and Return Monitoring Network (PRMN) survey

Control

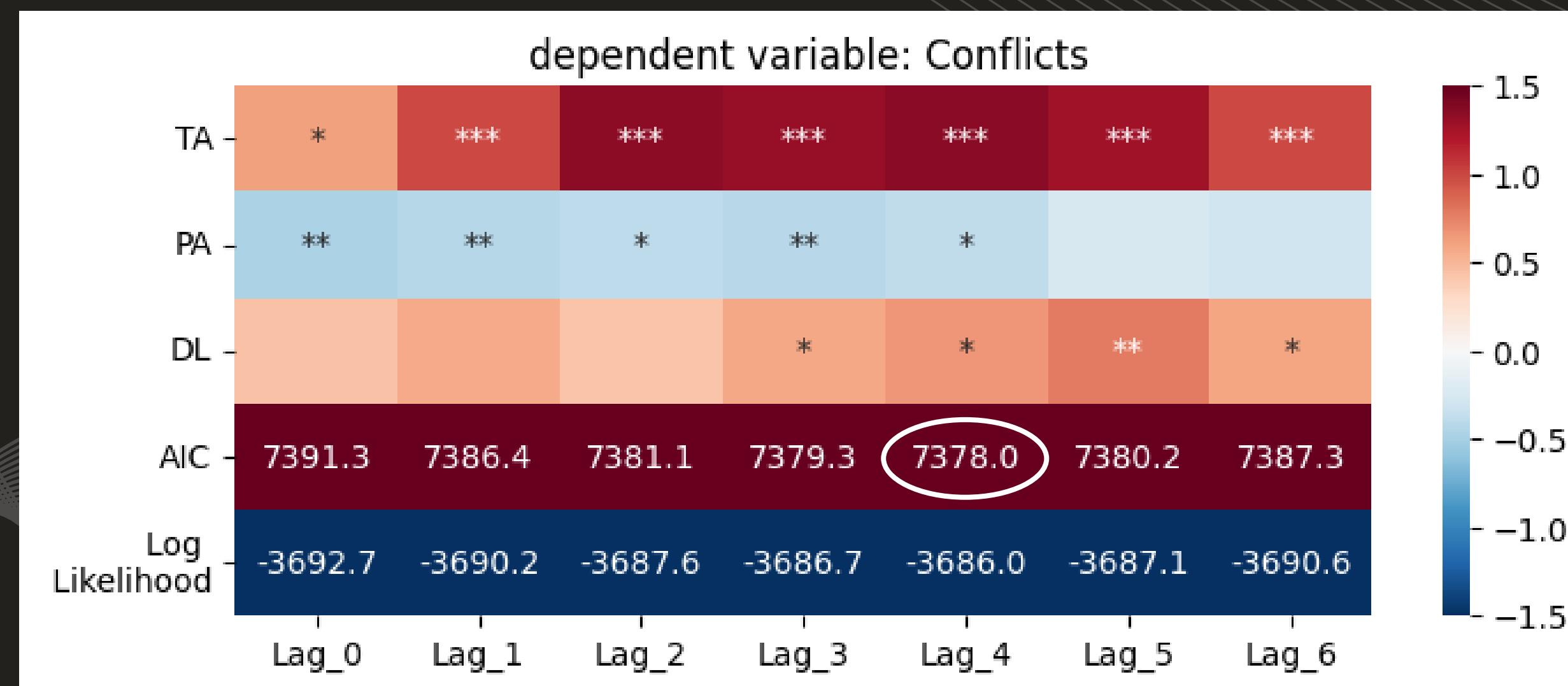


AIDDATA

GDP and population density

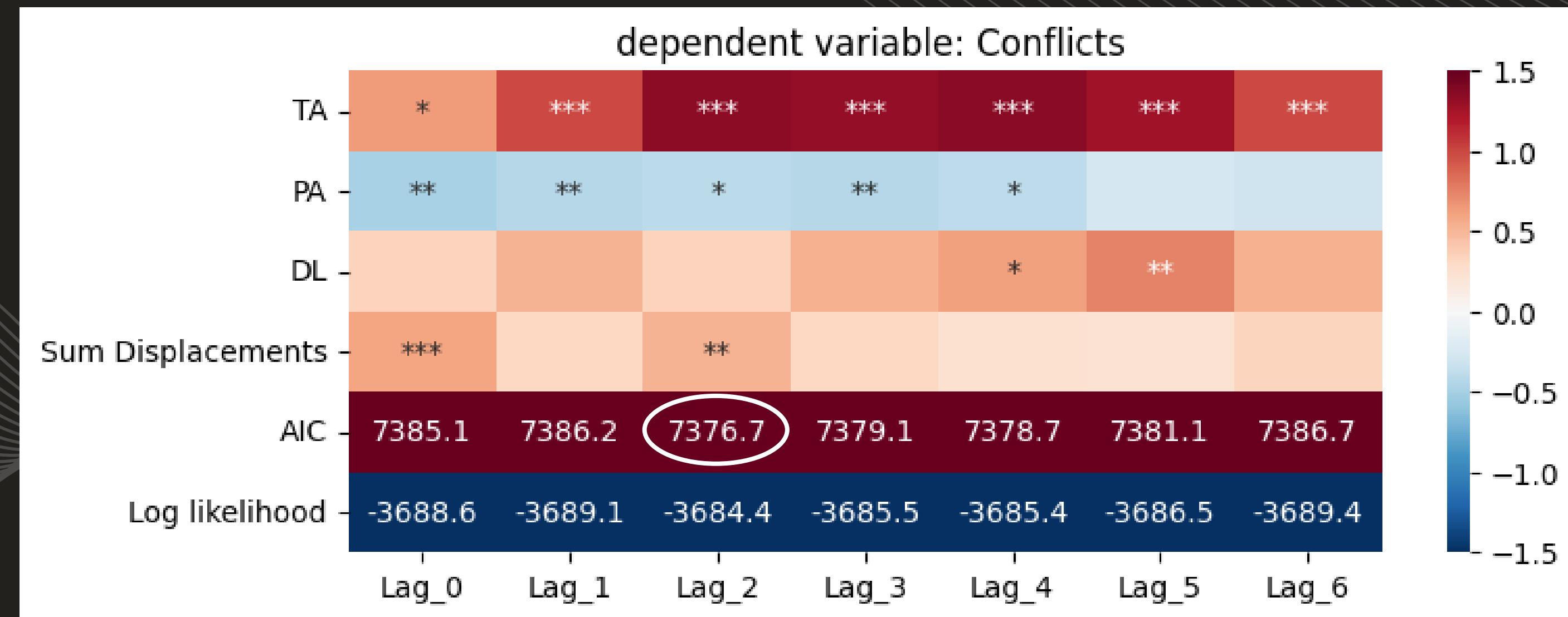
CLIMATE EFFECT ON CONFLICT

Conflicts \propto Temperature anomalies TA
Precipitation anomalies PA
Drought lenght DL



CLIMATE & DISPLACEMENTS EFFECT

Add the number of displacements arriving to the region



CLIMATE EFFECT ON DISPLACEMENTS

Target variables:

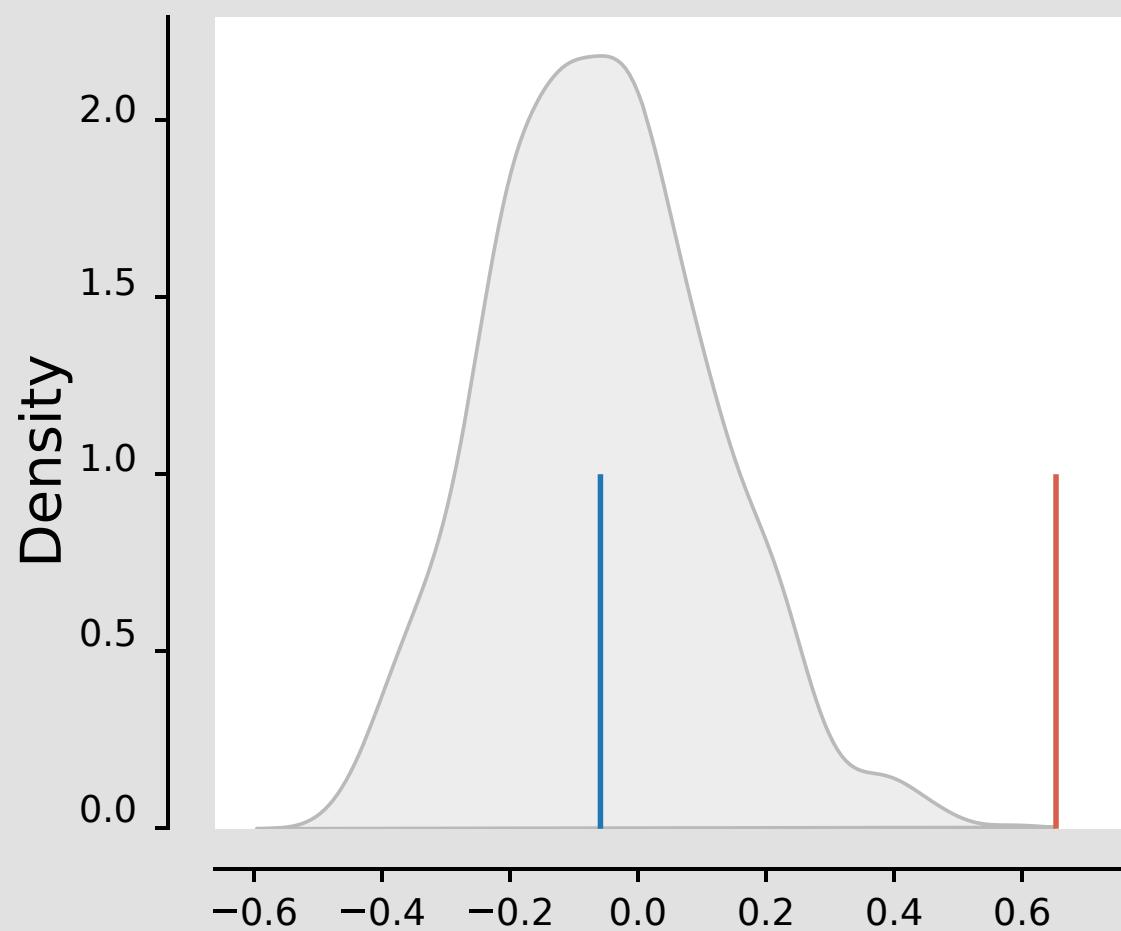
- Log (Drought-Displacements)
- Log (Conflict-Displacements)

Explanatory variables:

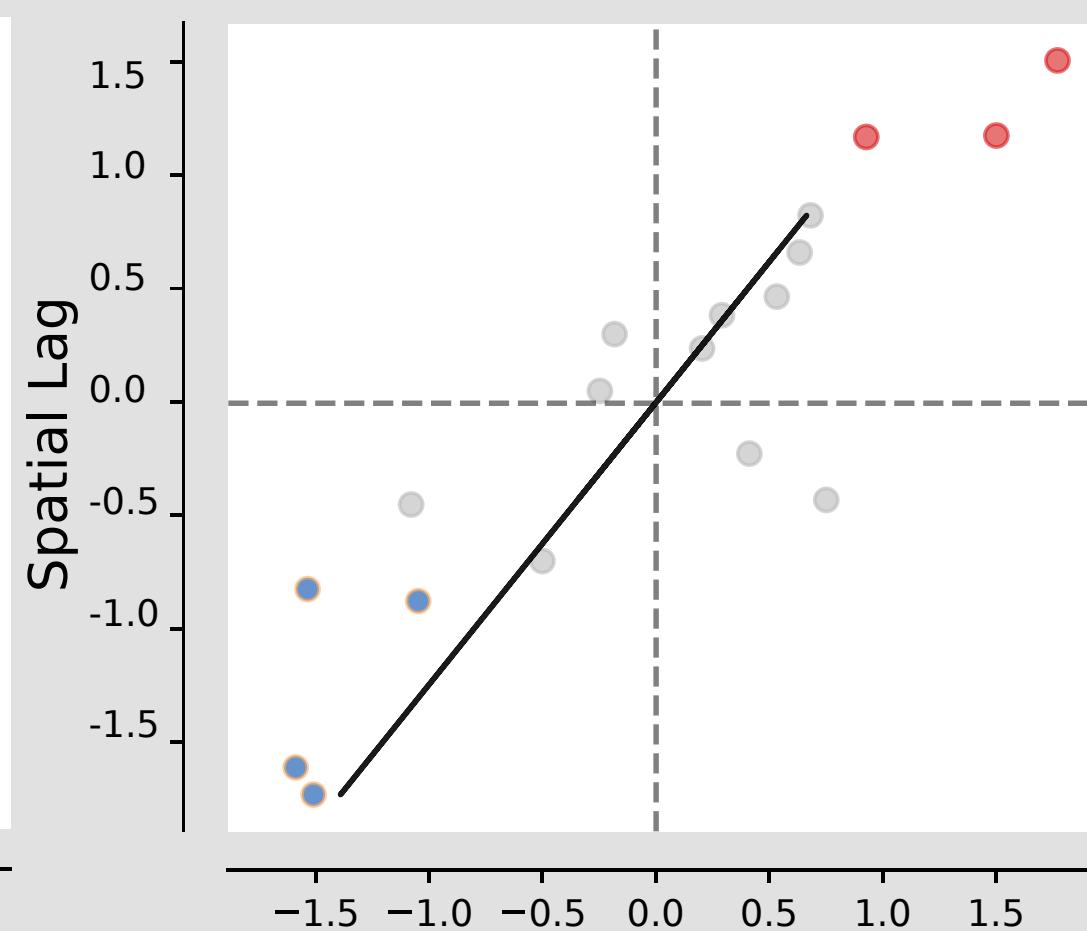
- Climate and conflict variables in the departure and arrival regions
- Inverse distance^{^2}
- Control variables

SPATIAL AUTOCORRELATION

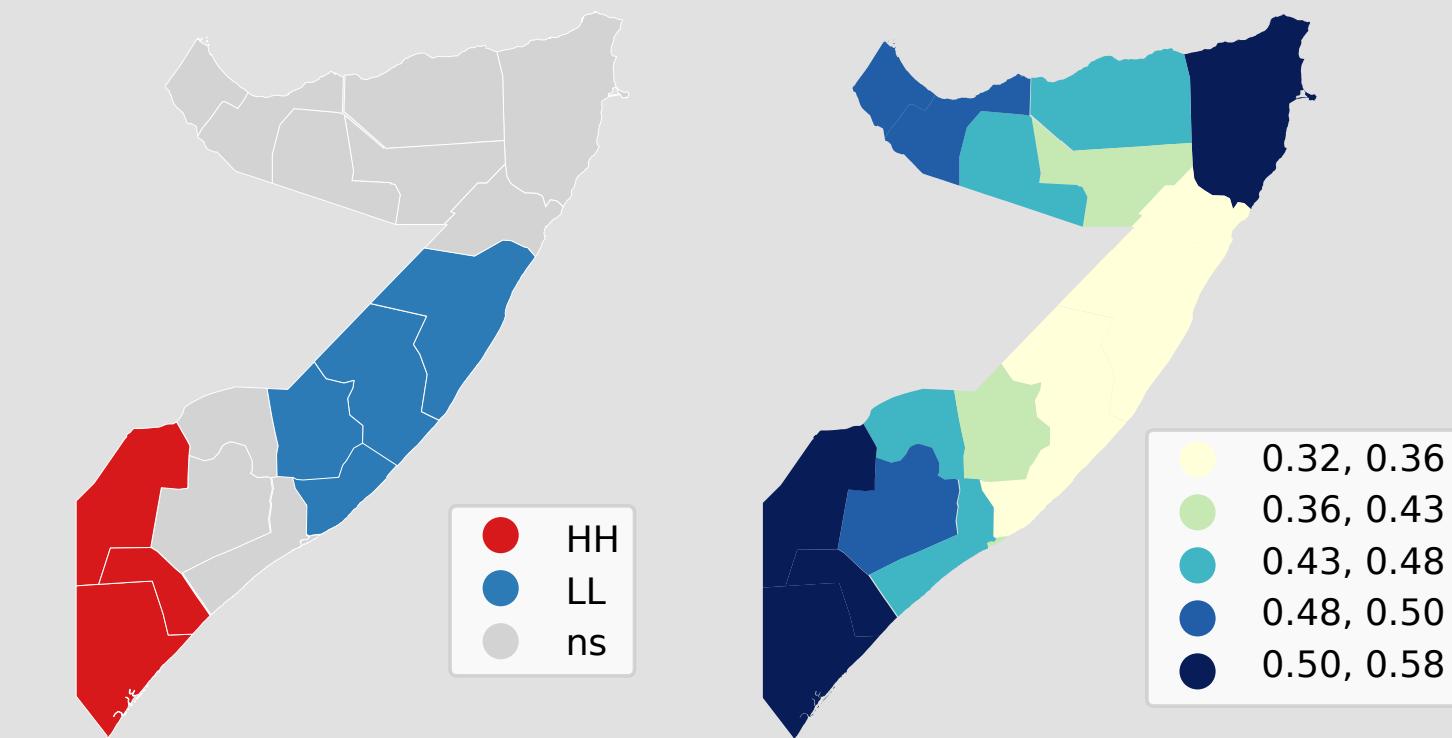
Reference Distribution

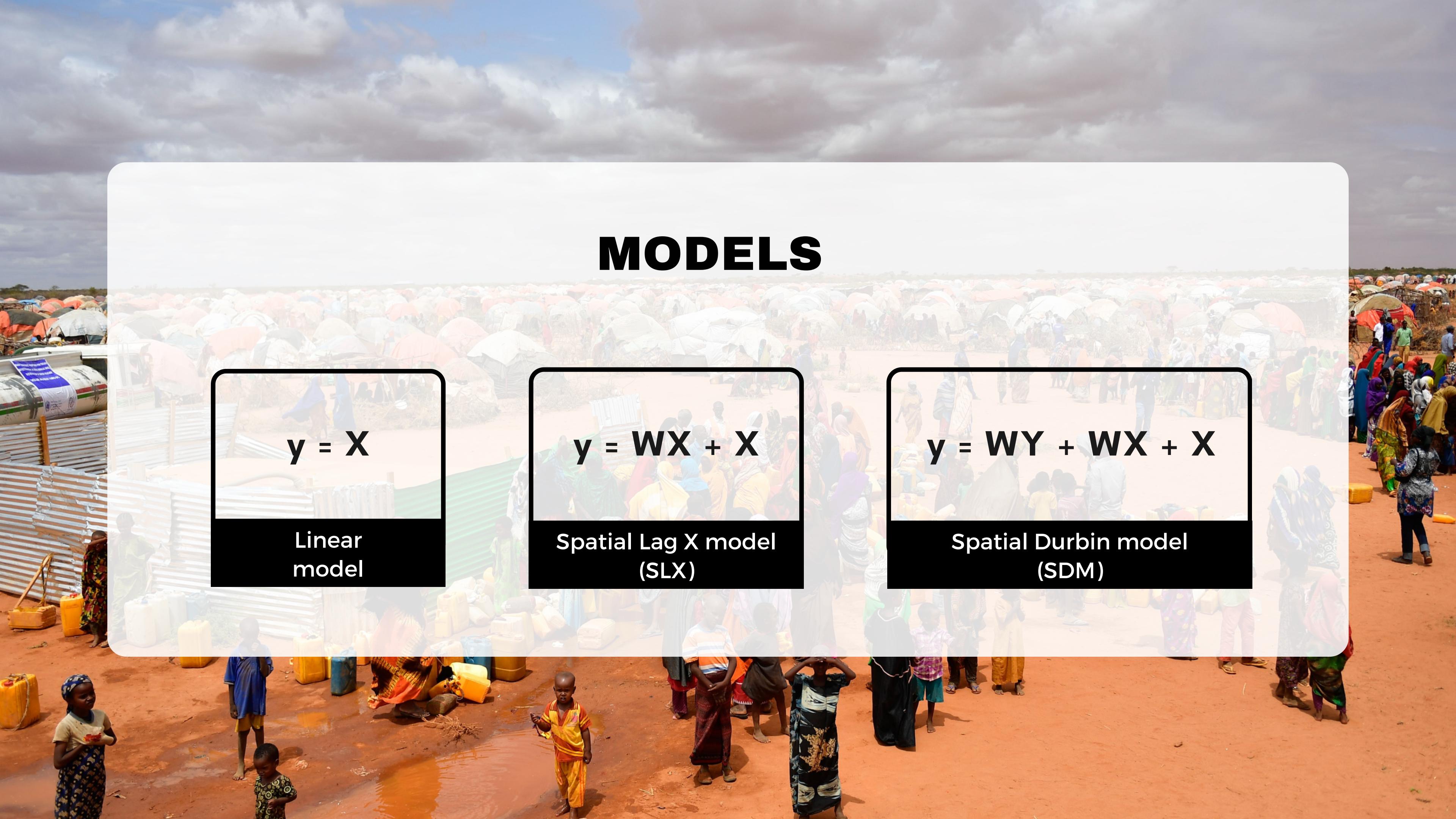


Moran Local scatterplot



Somalia's map with HH, LL clusters





MODELS

$$y = X$$

Linear
model

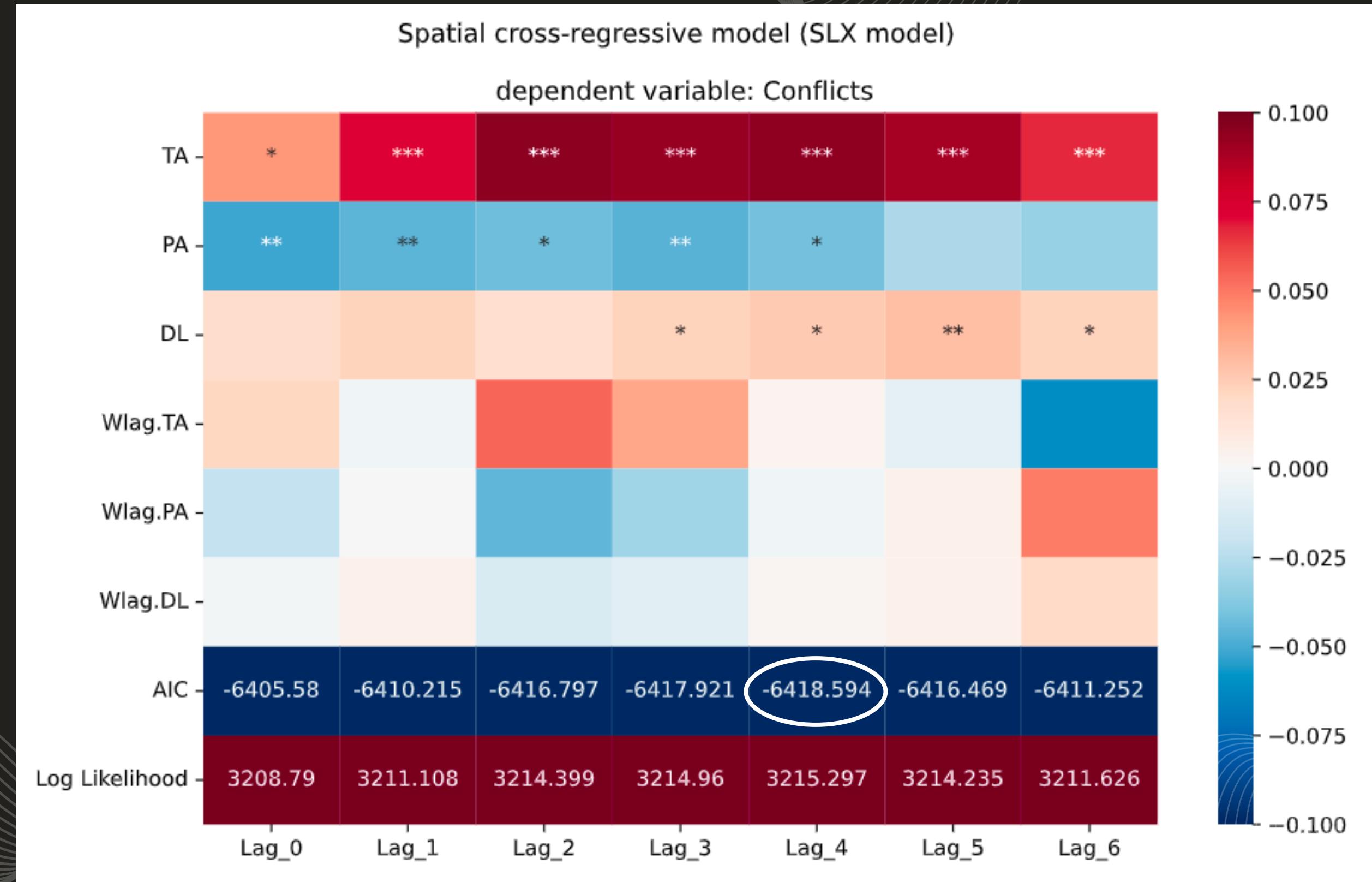
$$y = WX + X$$

Spatial Lag X model
(SLX)

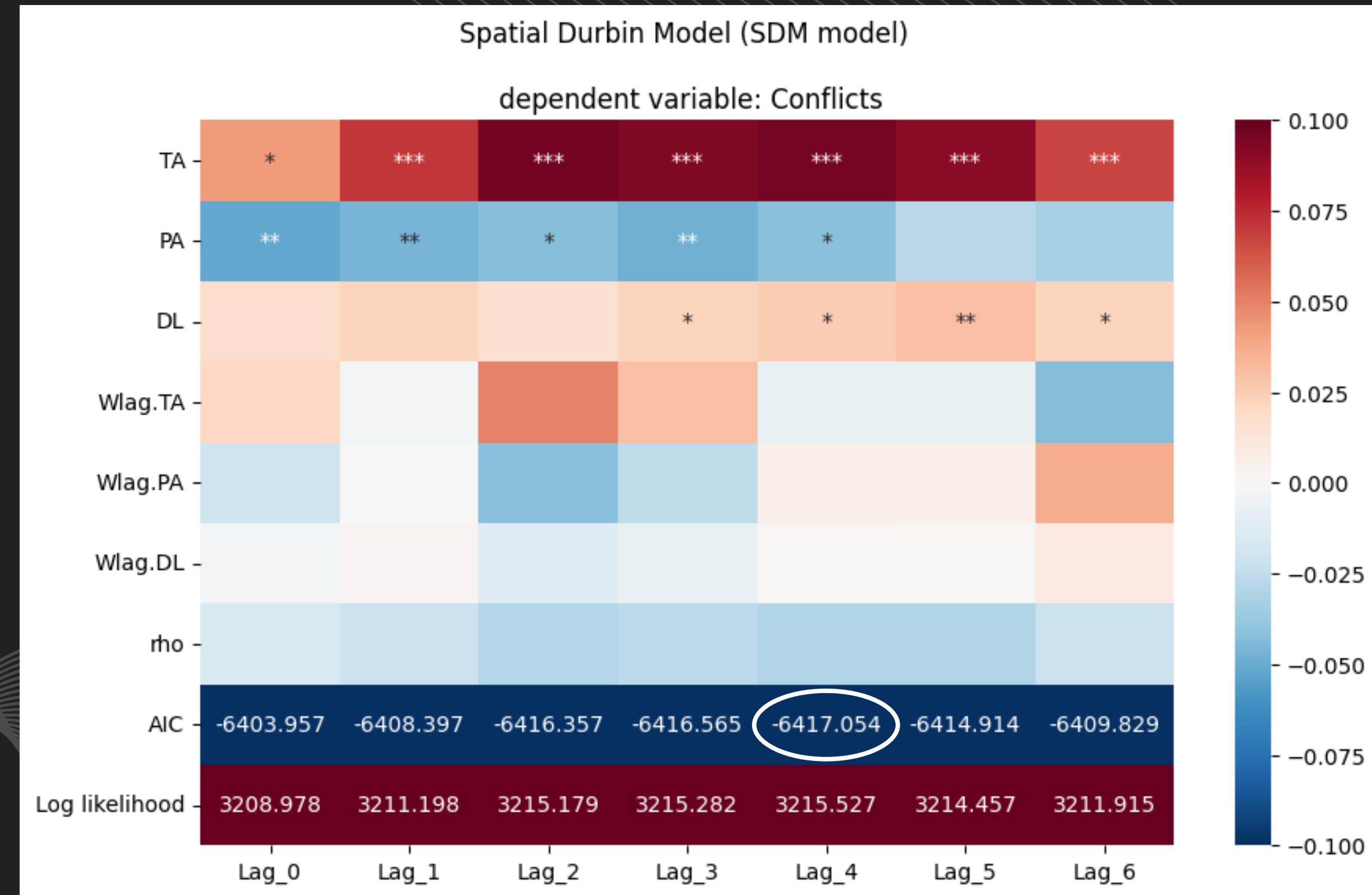
$$y = WY + WX + X$$

Spatial Durbin model
(SDM)

$$y = \beta X + W_{lag} \cdot \beta W X$$



$$y = \beta X + W_{lag} \cdot \beta W X + \rho W Y$$



Conclusion

- Conflict → Climate + displacements
- Displacements → Climate + conflict
- Conflict $\not\Rightarrow$ Climate + conflict of neighbouring regions (in time window from 2016), due to different reasons:
 - Misconfiguration of spatial weight matrix
 - Processes take place in different time frames
 - Presence of nonlinearities
- Aim: climate in neighbouring regions as proxy for displacements

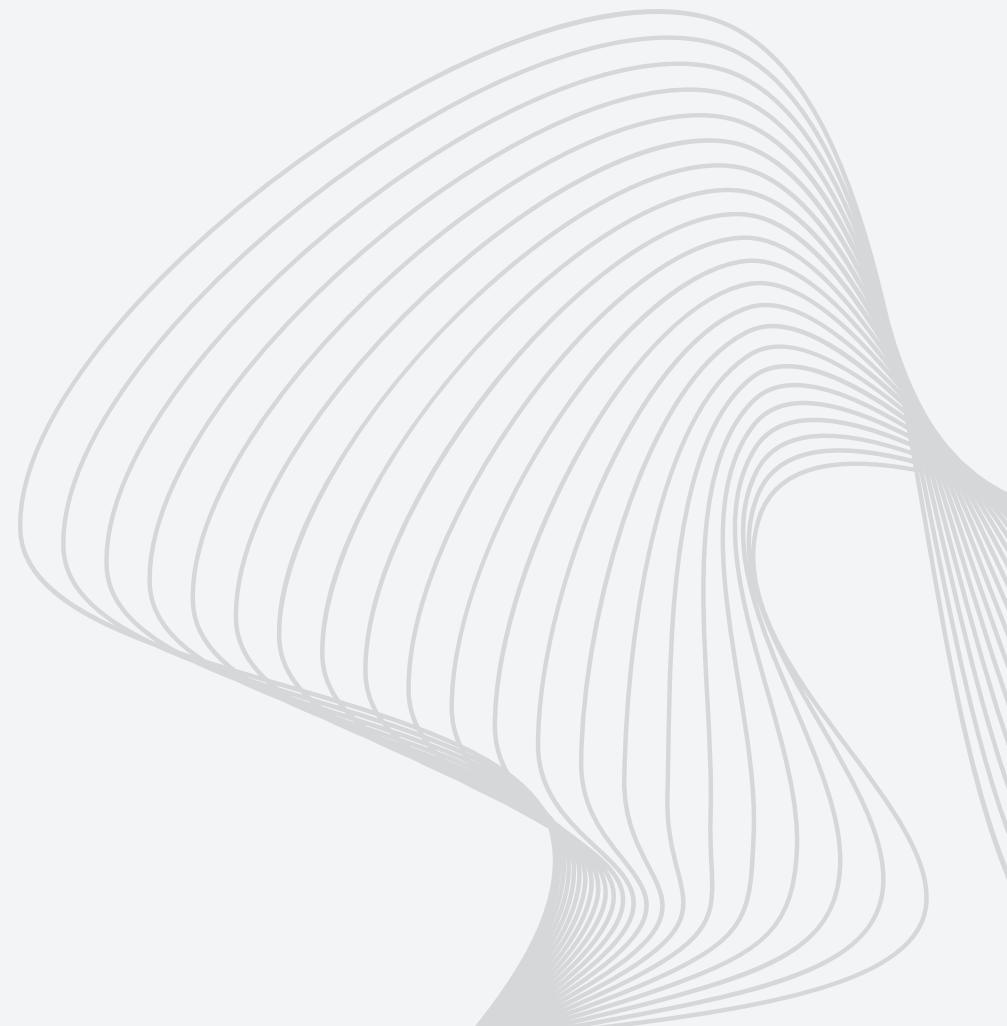
Thanks to the team

Elisa Omodei, Eugenio Valdano,
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Rossano Schifanella



Thank you for
your attention

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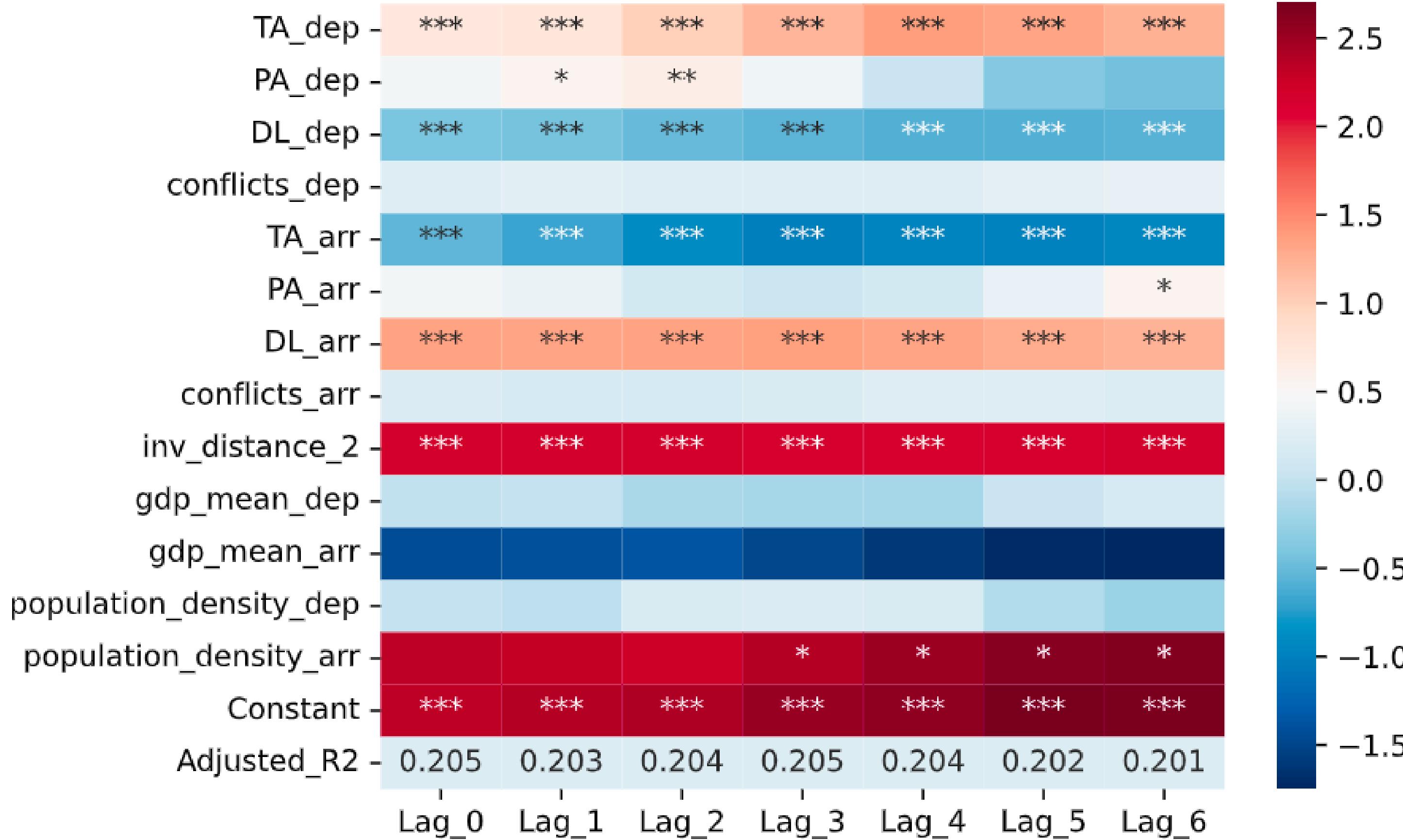


SUPPLEMENTARY

Regression coefficients and significance levels, 2016-2022

Number of observations: 3630

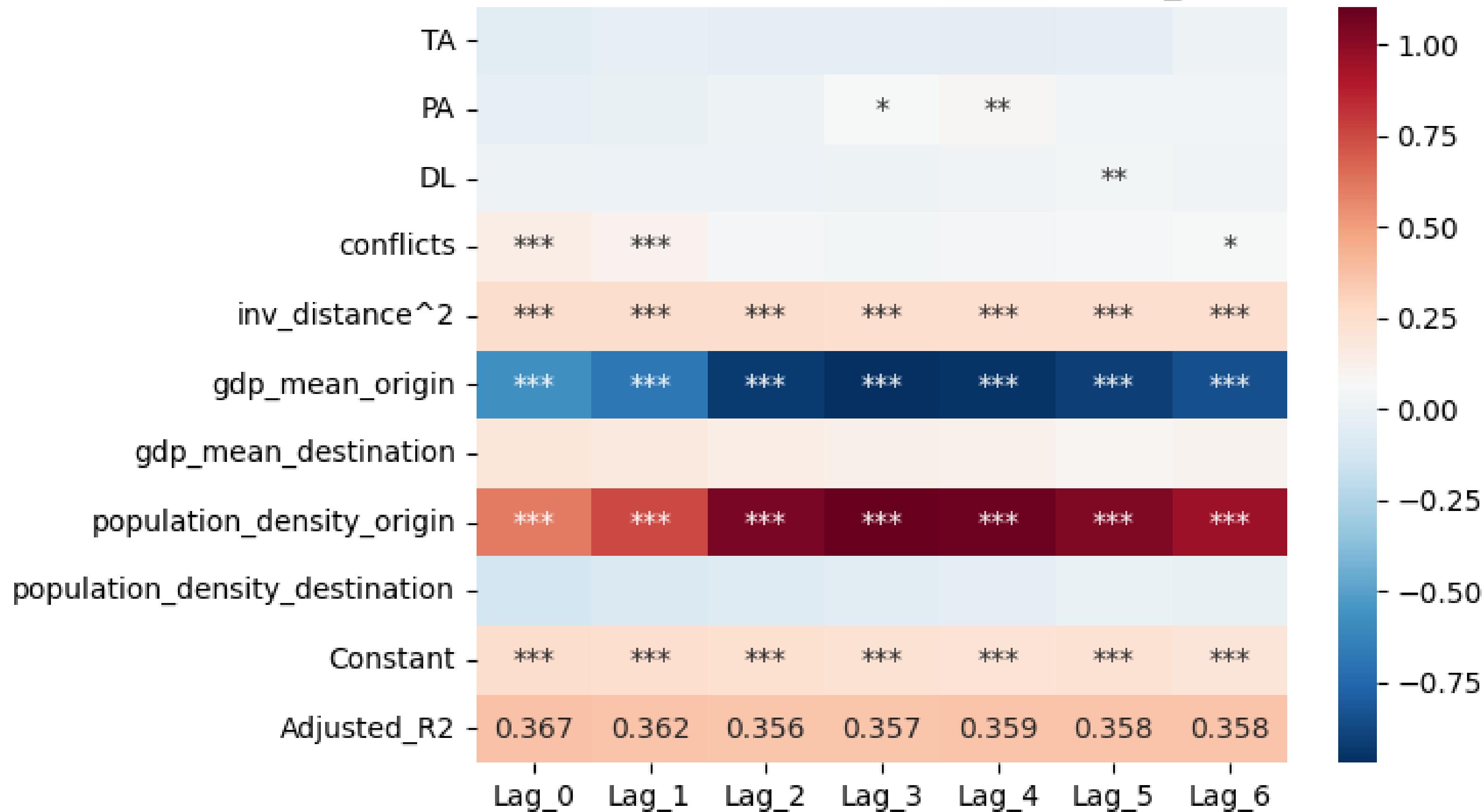
dependent variable: log(Displacements_Drought)



Regression coefficients and significance levels, 2016-2022

Number of observations: 1199

dependent variable: log(Displacements_Conf)



Spatial Durbin Model (SDM model)

dependent variable: Conflicts

