When the well runs dry, where do we go now? Exploring internal migration due to climate stress in Asia and Central and South America

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Background & objectives

- Increase in scholarly and policy interests in the impacts of climate change on migration but knowledge in the field remains varied, patchy and limited (Piguet et al. 2011).
- Extant studies on environmental-migration connections are often case studies of specific geographic areas.
- This study aims to: 1) **model internal migration flows** for 26 countries in Central and South America and Asia; and 2) **examine the influence of "push" and "pull" factors** and environmental stress in driving migration.

Data

Migration and sociodemographic data

- Microcensus data obtained from the Integrated Public Use Microdata Series (IPUMS) International database
- 77 samples from 26 countries drawn from censuses collected between 1970 – 2011.

Climate data

- Precipitation data obtained from the CRU-TS historic climate database version 3.22
- Time-series data for monthly mean precipitation from the period 1901 – 2013 calculated on 0.5 x 0.5 degree grids

Methods

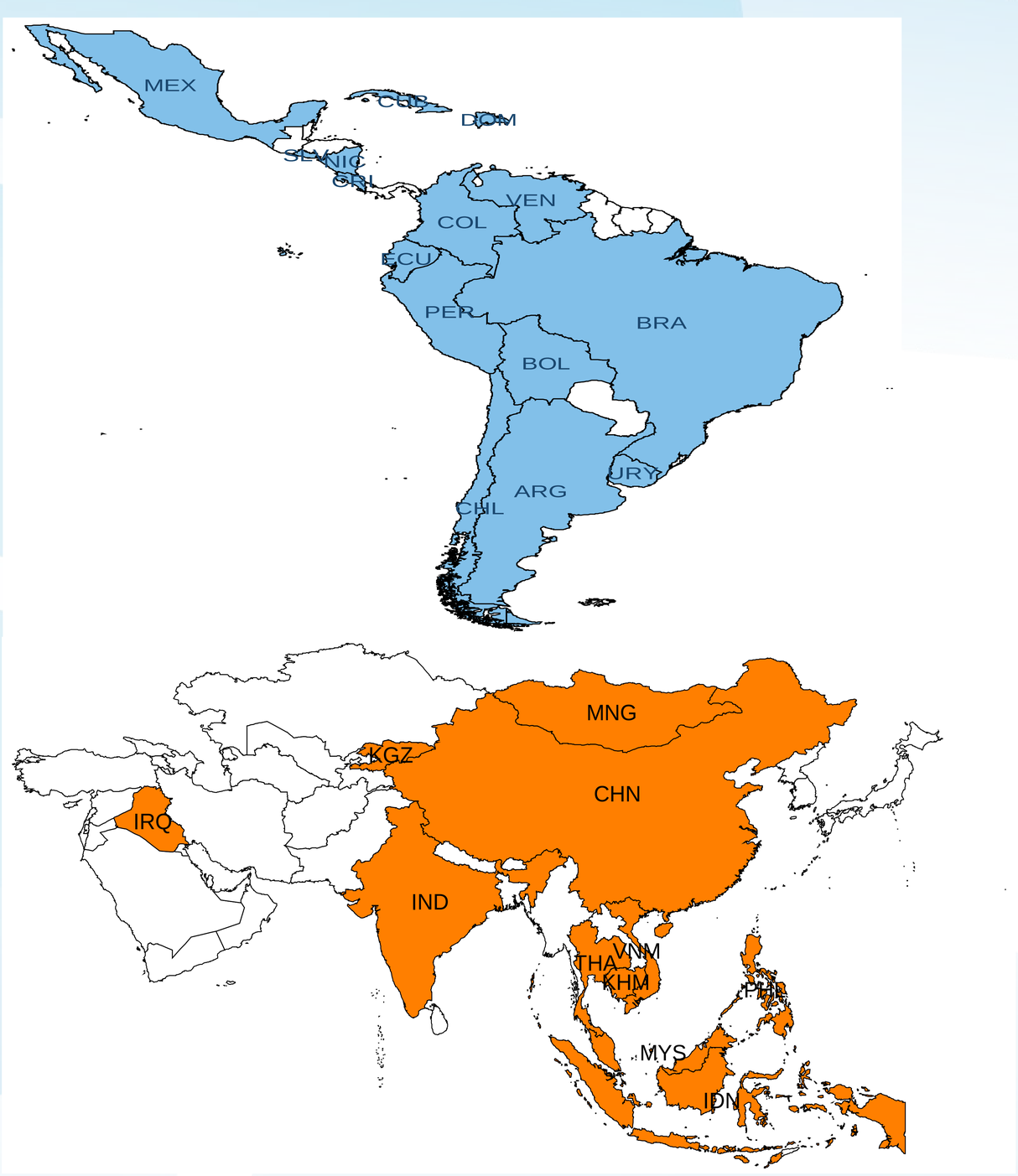
- Fit a sequence of spatial interaction models using Poisson regression for each country, time and migration interval

Outcome: Migration flows (y_{ij})

Explanatory factors: Distance $(DIST_{ij})$; Contiguity $(CONT_{ij})$; total number of population (POP); proportion living in an urban environment $(URBAN)$; proportion economically active $(ACTIVE)$; proportion male $(MALE)$; median age (AGE)

Climate factors: Drought $(DROUGHT)$; Rainfall variability $(RAIN)$

Fig.1: Maps of 26 countries used in this study

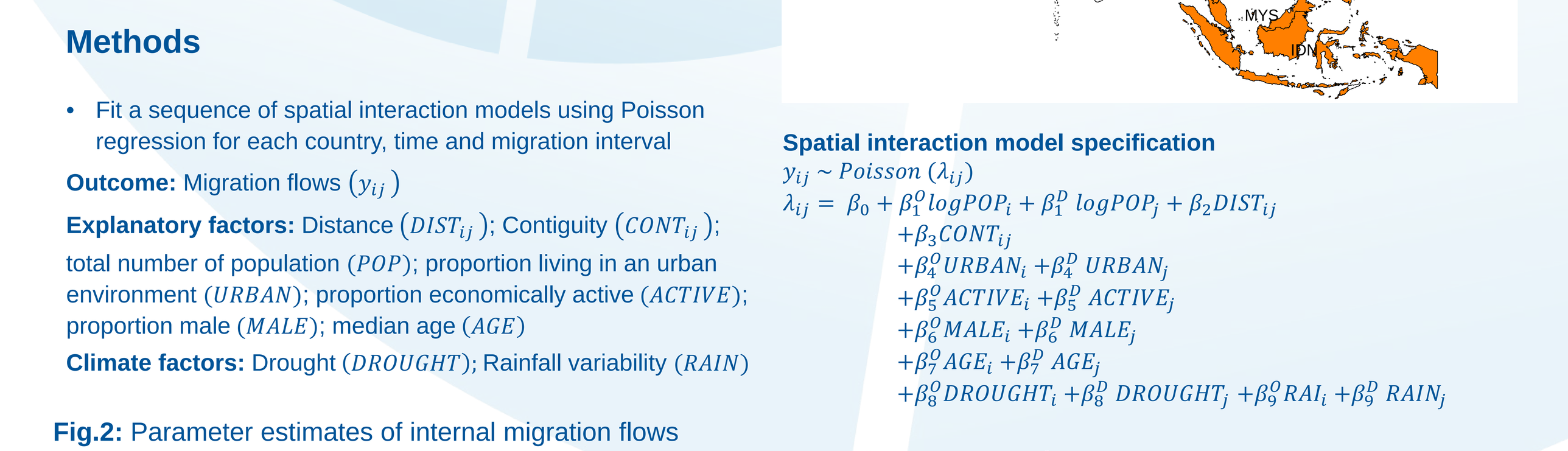


Spatial interaction model specification

$$y_{ij} \sim Poisson\,(\lambda_{ij})$$

$$\begin{aligned}\lambda_{ij} = {} & \beta_0 + \beta_1^O logPOP_i + \beta_1^D\, logPOP_j + \beta_2 DIST_{ij} \\ & + \beta_3 CONT_{ij} \\ & + \beta_4^O URBAN_i + \beta_4^D\, URBAN_j \\ & + \beta_5^O ACTIVE_i + \beta_5^D\, ACTIVE_j \\ & + \beta_6^O MALE_i + \beta_6^D\, MALE_j \\ & + \beta_7^O AGE_i + \beta_7^D\, AGE_j \\ & + \beta_8^O DROUGHT_i + \beta_8^D\, DROUGHT_j + \beta_9^O RAI_i + \beta_9^D\, RAIN_j\end{aligned}$$

Fig.2: Parameter estimates of internal migration flows



Discussion

- Drought influences outmigration from areas frequently affected by droughts but migration flows are more common between regions sharing geographical proximity. Migration is greater in the destination with higher proportion of urban population.