Climate-induced migration: evidence on existing gaps in modelling and data gathering

Cristina Cattaneo[1]

[1]CMCC Foundation - Euro-Mediterranean Center on Climate Change and RFF-CMCC European Institute on Economics and the Environment

Workshop on Climate Change and Human Migration: An Earth Systems Science Perspective, March 18-19, 2024

Existing gaps in modelling climate-induced migration

- Gap n. 1: global migration data
- Gap n. 2: knowledge of the interplay between alternative adaptation mechanisms and migration
- Gap n. 3: moderating factors - heterogeneous responses
- Gap n. 4: projections of future climate-induced flows

Gap n. 1 - Standard sources of international migration data

- Data gathered from censuses or registers in destination countries
  - Pros: large temporal coverage, though quite disperse - decadal resolution!
  - Cons: lack of wide geographical coverage of destinations (often OECD only) or lack of fine geographical details of origin - unit is country as a whole; lack of socio-demographic details (except for gender and education)
- Data gathered from origin country sources
  - Pros: they provide geo-localised information of place of origin; provide socio-demographic characteristics of movers
  - Cons: lack of migration purposing (poverty or health surveys); lack of representativeness; difficulty in extracting generalizable messages; limited temporal coverage

Gap n. 1 - Novel sources of international migration data

- Innovative data sources — often referred to as "Big Data" or "digital trace data"
    - Geo-tagged data from social media such as Facebook, Twitter - capture the location where users log in or information on location provided by users through geo-tagged posts
    - Geo-tagged data from Mobile phone Call Detail Records (CDR) - capture the call signals sent to cell towers
    - Remote sensing technologies - satellite or aircraft-based sensor technologies (i.e. drones)
- Pros: fine geographical details
- Cons: lack of socio-demographic details, used on narrowly defined locations and limited time frames

Gap n. 2 - Modelling interplay of alternatives

- Migration is only one possible strategy for adapting to climate change
- Migration is often a last-resort solution
  - More psychologically costly than crop switching, change in livestock species, change in occupation, agricultural innovations, insurance
- Is migration considered as a failure to adapt?
- Very few attempts to study the interplay of alternative adaption strategies

Gap n. 3 - Modelling heterogeneity - immobility

- Lack of resources can prevent migration
- Poor people have higher incentives to migrate (most vulnerable to the impacts of climate change), but lower resources to invest in migration
- Trapped populations are typically the most vulnerable ones
  - Poorest, the least educated, women
- There might be many other sources of immobility that need to be studied
  - Implications arising from Gap n. 2
  - Immobility can be a choice (i.e. other adaptation mechanisms are in place)

Gap n. 4 - Modelling climate-induced migration

- A lot of uncertainty concerning estimates of climate-induced flows
- Some studies estimate migration based on the number of people at risk
  - Exposure to a climate hazard does not necessarily imply migration – alternative forms of adaptation
- Others base end-of-century projections on historical relationships
- They extrapolate the effect of short-term, and unpredictable weather shocks to predict long-term impacts
  - Short-term responses are different from long-term responses
- Great uncertainty of future climate models, as well as socioeconomic scenarios

Gap4 - Modelling climate-induced migration

- Existing projections: World Bank GROUNDSWELL (2021)
  - By 2050 climate change could force more than 216 million people to move within their countries
  - These are internal climate migrants only
- Existing projections: Missirian and Schlenker (2017)
  - The authors study the effect of weather anomalies on asylum applications from 103 source countries to any EU member states to predict future projections in applications
  - Asylum applications are predicted to increase by 28% under intermediate and 188% under high-emission scenario by the end of the century
  - Only Refugees included and unilateral context

Gap4 - Modelling climate-induced migration

- Implications arising from Gap n. 1
    - Projections need to be trained on long historical data
    - Very few sources are long enough
- Implications arising from Gap n. 2
    - A better knowledge of the interplay between alternative adaptation strategies can better inform models on future migration
- Implications arising from Gap n. 3
    - Based on some contexts/features, we can expect less out-migration rather than more
    - Which are these moderating factors?

THANKS

cristina.cattaneo@cmcc.it