

# Internal versus international scholarly mobility and migration worldwide

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# Outline

- Introduction
  - Theoretical and methodological inspirations of our work
- Methodological framework and prototype
- Global mobility based on Scopus
  - International, country level
  - International, region level
  - Internal, region level

# Introduction

- Theoretical impressions
  - Internal versus international migration<sup>1</sup>
  - Research Trails<sup>2,3</sup>
- Methodological impressions
  - Using bibliometric data alongside demographic life events<sup>4</sup>
  - Repurposing bibliometric data for migration research<sup>5,6,7</sup>
  - Repurposing bibliometric data for knowledge transfer<sup>8,9</sup>
- **Our proposal:** repurposing bibliometric data for:
  - Internal versus international mobility
  - Internationalized scholarly collaborations
  - Forming ties before (or during) mobility
  - *Integration in host country/institution's collaborations*

- [1] Skeldon, R. (2006). Interlinkages between internal and international migration and development in the Asian region. *Population, Space and Place*, 12(1), 15–30. <https://doi.org/10.1002/psp.385>
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- [3] Laudel, G., & Gläser, J. (2017). Manual for Constructing Research Trails (Sciences). <http://www.laudel.info/downloads/research-trail-download/>
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- [5] Miranda-González, A., Aref, S., Theile, T., & Zagheni, E. (2020). Scholarly migration within Mexico: Analyzing internal migration among researchers using Scopus longitudinal bibliometric data. *EPJ Data Science*, 9(1), 34. <https://doi.org/10.1140/epjds/s13688-020-00252-9>
- [6] Vaccario, G., Verginer, L., & Schweitzer, F. (2020a). Reproducing scientists' mobility: A data-driven model. *ArXiv:1811.07229 [Physics]*. <http://arxiv.org/abs/1811.07229>
- [7] Vaccario, G., Verginer, L., & Schweitzer, F. (2020b). The mobility network of scientists: Analyzing temporal correlations in scientific careers. *Applied Network Science*, 5(1), 1–14. <https://doi.org/10.1007/s41109-020-00279-x>
- [8] Aman, V. (2018). A new bibliometric approach to measure knowledge transfer of internationally mobile scientists. *Scientometrics*, 117(1), 227–247. <https://doi.org/10.1007/s11192-018-2864-x>
- [9] Aman, V. (2020). Transfer of knowledge through international scientific mobility: Introduction of a network-based bibliometric approach to study different knowledge types. *Quantitative Science Studies*, 1–17. [https://doi.org/10.1162/qss\\_a\\_00028](https://doi.org/10.1162/qss_a_00028)

# Data (gathering & processing)

## For methodological prototype

- Publications from Scopus web interface (APR 2021)
- Gold standard from publicly available CVs; or, ORCID record (education and experience sections)

## Processing (on all sources)

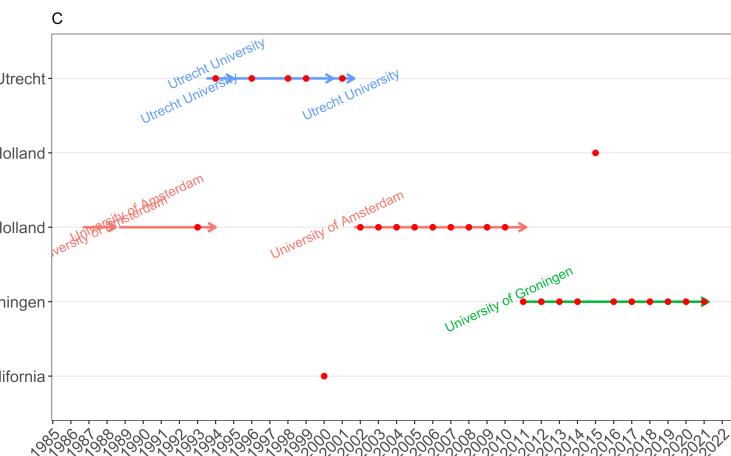
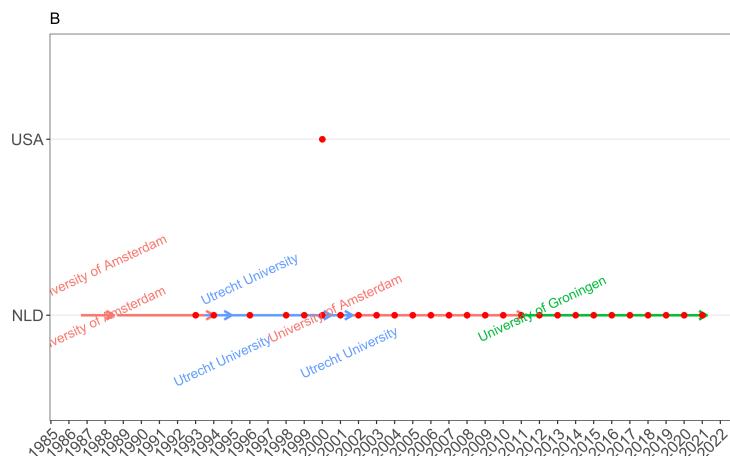
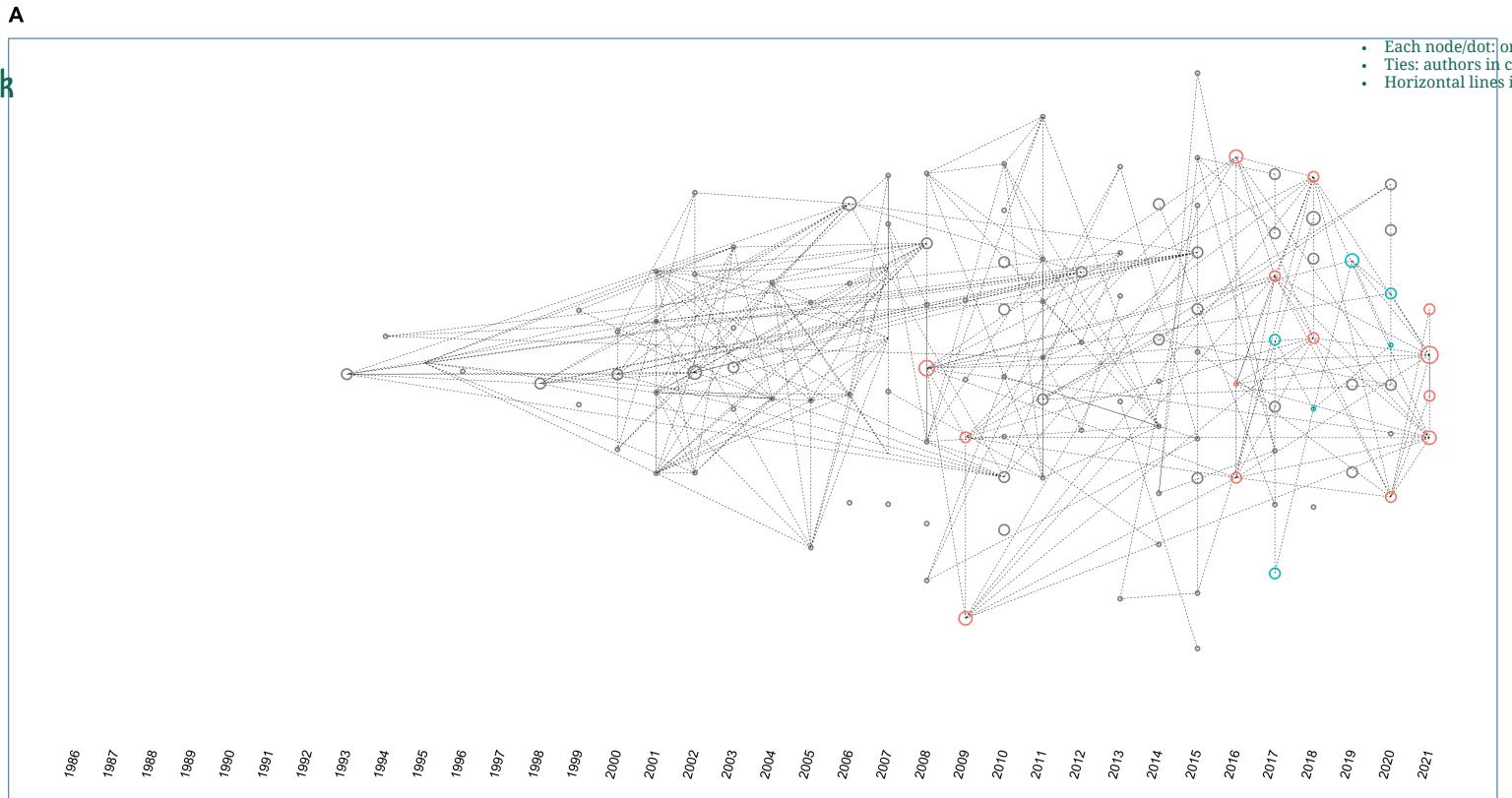
- Processing time entries in CV which is not coherent
- Need to clean the bibliometric data even from web interface (example follows)
- Encoding country of affiliation from bibliometric record (not perfect, need proper disambiguation)
- Organization name disambiguation using **ROR API**, based on Akbaritabar (2021)
- Author name disambiguation based on Scopus author IDs (more than 90% precision and recall)
- Coverage of GeoNames codes for intra-country regions is dependent on previous step (example follows)
- Using specific coordinates in network visualization with stress minimization, Leiden algorithm for community detection
- **Net Migration Rate:**

$$NMR_{i,t} = \frac{I_{i,t} - E_{i,t}}{N_{i,t}} \times 1000$$

## Affiliations based on public CV (top) and bibliometrics (bottom)

row_id	authorsid	name	highest_level_affiliation	country	city	start_date	end_or_max_date	year	country
authorsid	authorswithaffiliations							year	country
1	23494432900	Emilio_Zagheni	Max Planck Institute for Demographic Research	DEU	rostock	2018-09-01	2021-03-30	2020	DEU
2	23494432900	Emilio_Zagheni	University of Washington	USA	seattle	2014-09-01	2018-08-30	2020	DEU
3	23494432900	Emilio_Zagheni	City University of New York	USA	new york	2012-08-01	2014-08-30	2020	DEU
4	23494432900	Emilio_Zagheni	Max Planck Institute for Demographic Research	DEU	rostock	2010-08-01	2012-07-30	2020	DEU
5	23494432900	Emilio_Zagheni	University of California	USA	berkeley	2005-08-01	2010-04-30	2020	DEU
6	23494432900	Emilio_Zagheni	Bocconi University	ITA	milan	2000-09-01	2004-12-30	2020	DEU
23494432900	Zagheni, E., Laboratory of Digital and Computational Demography, Max Planck Institute for Demographic Research, Rostock, Germany							2020	DEU
23494432900	Zagheni, E., Laboratory of Digital and Computational Demography, Max Planck Institute for Demographic Research, Rostock, Germany							2020	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research Rostock, Germany							2020	DEU
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23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Rostock, Germany							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Konrad-Zuse-Straße 1, Rostock, 18057, Germany							2019	DEU
23494432900	Zagheni, E.							2019	DEU
23494432900	Zagheni, E., Department of Sociology, University of Washington, Seattle, United States, Max Planck Institute for Demographic Research, Rostock, Germany							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Germany							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Rostock, Germany							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Germany							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Konrad-Zuse-Str. 1, Rostock, 18057, Germany							2019	DEU
23494432900	Zagheni, E., Qatar Computing Research Institute, Doha, Qatar							2019	QAT
23494432900	Zagheni, E., Max Planck Institute for Demographic Research							2019	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Rostock, Germany							2018	DEU
23494432900	Zagheni, E., Max Planck Institute for Demographic Research, Rostock, Germany							2018	DEU
23494432900	Zagheni, E., University of Washington, Max Planck Institute for Demographic Research, United States							2018	USA
23494432900	Zagheni, E., University of Washington and Max Planck Institute for Demographic Research, United States							2018	USA
23494432900	Zagheni, E.							2017	DEU
23494432900	Zagheni, E., Department of Sociology, University of Washington, Seattle, 211 Savery Hall, Box 353340, Seattle, WA 98195-3340, United States							2017	USA
23494432900	Zagheni, E., University of Washington, Seattle, United States							2017	USA
23494432900	Zagheni, E., University of Washington, United States							2017	USA
23494432900	Zagheni, E., University of Washington, Seattle, United States							2016	USA
23494432900	Zagheni, E., Department of Sociology, University of Washington at Seattle, 211 Savery Hall Box 353340, Seattle, WA 98195-3340, United States							2016	USA
23494432900	Zagheni, E., University of Washington, Seattle, WA, United States							2015	USA
23494432900	Zagheni, E., Department of Sociology, University of Washington, United States							2015	USA
23494432900	Zagheni, E., University of Washington, Seattle, United States							2015	USA
23494432900	Zagheni, E., Department of Sociology, University of Washington, Seattle, United States							2015	USA
23494432900	Zagheni, E., Department of Sociology, University of Washington, Seattle, WA, United States							2015	USA

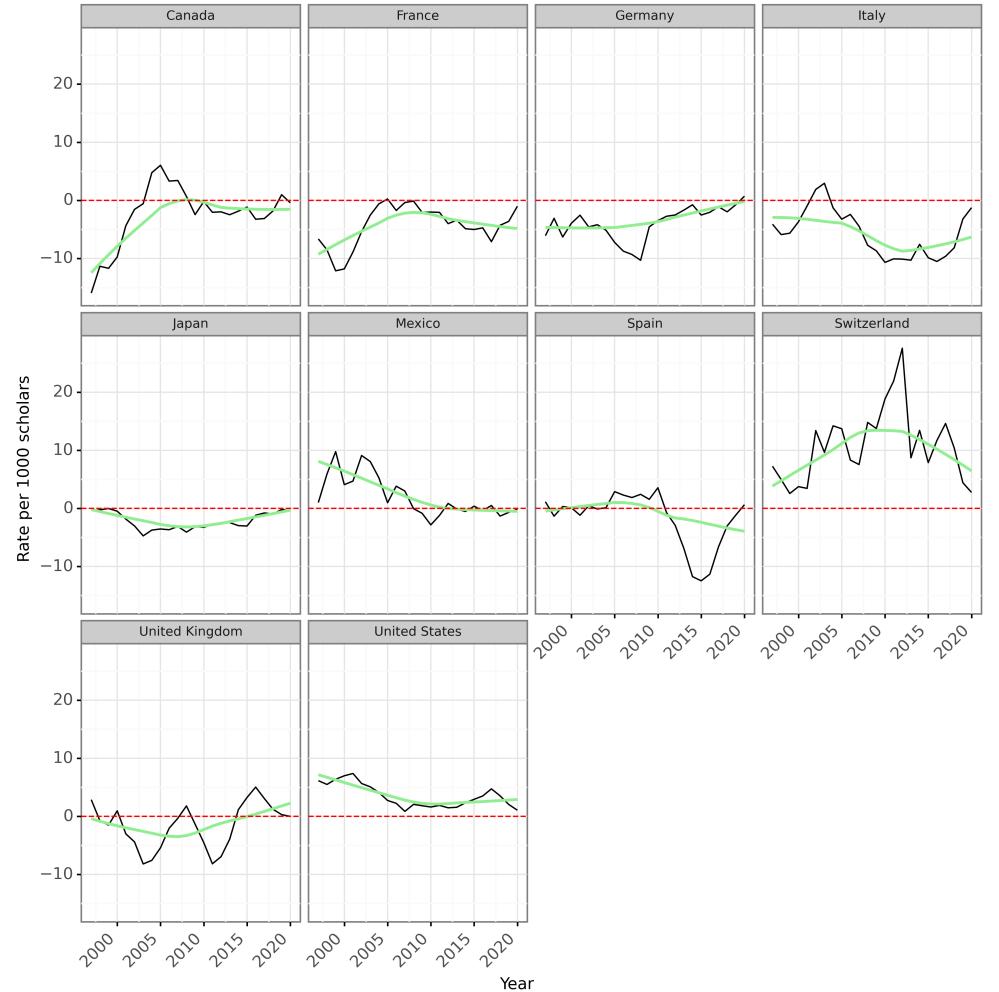
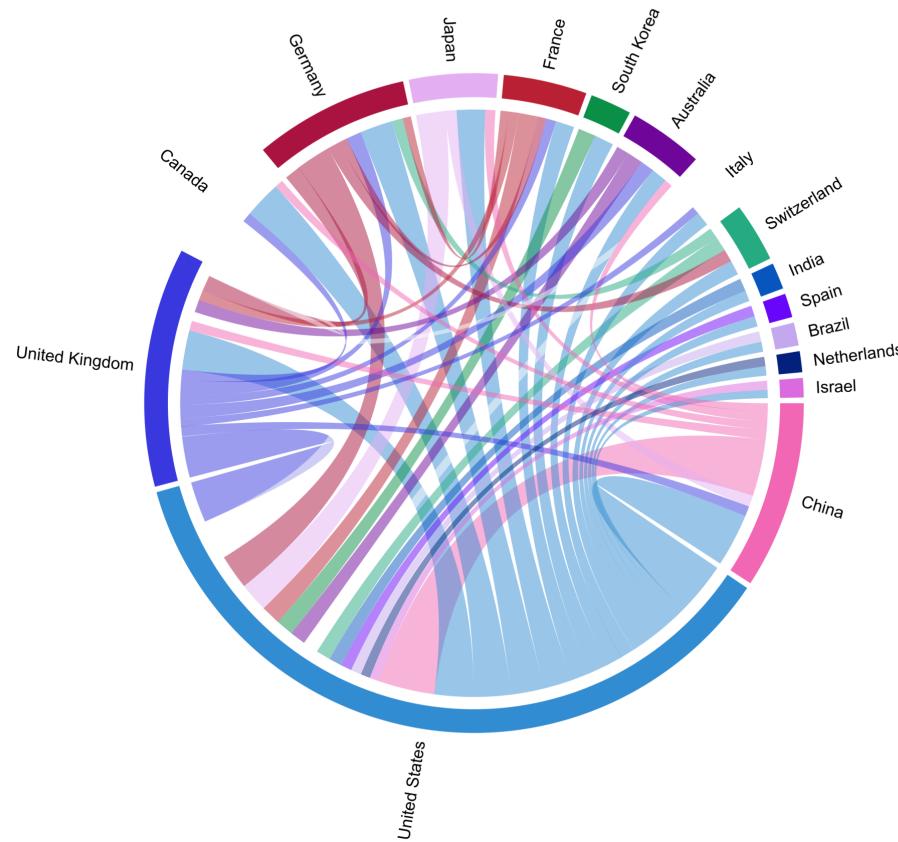
## Proposed framework



# Global mobility based on Scopus 1996-2020

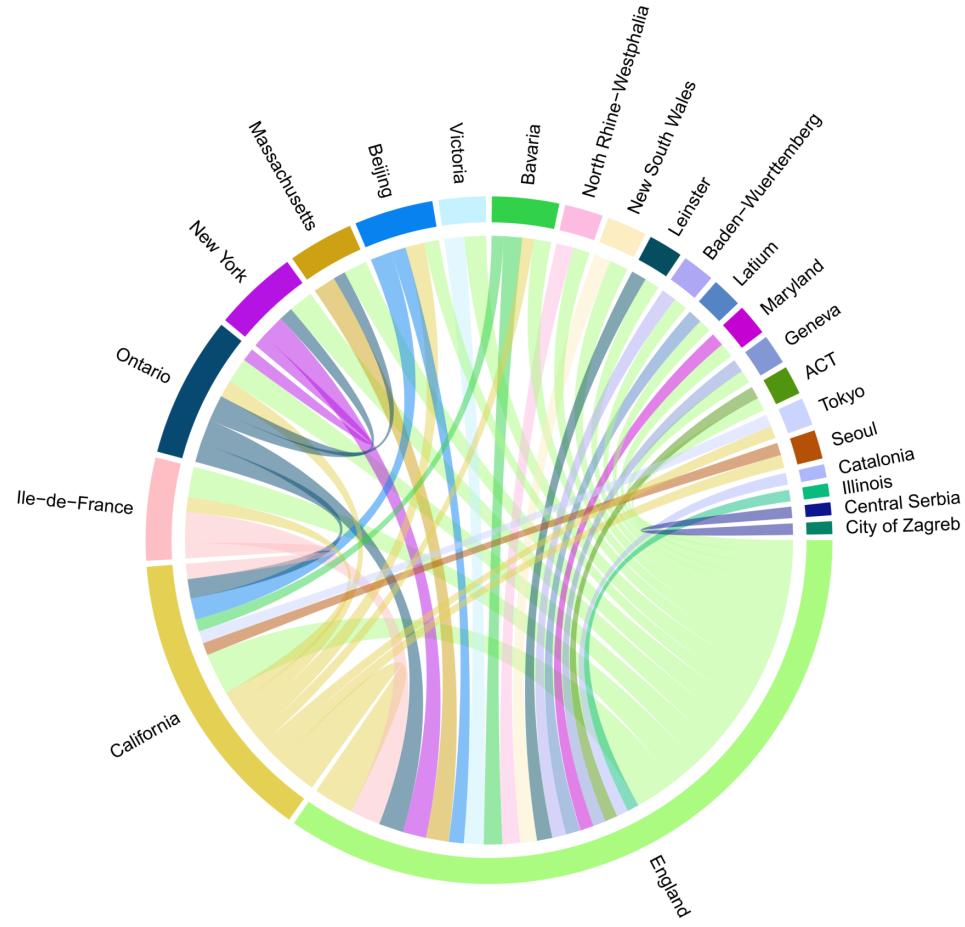
## Top 50, Country level, international: Scopus (left), NMR (right)

- USA dominates the country level flows
- in NMR, it shows a positive trend of receiving scholars



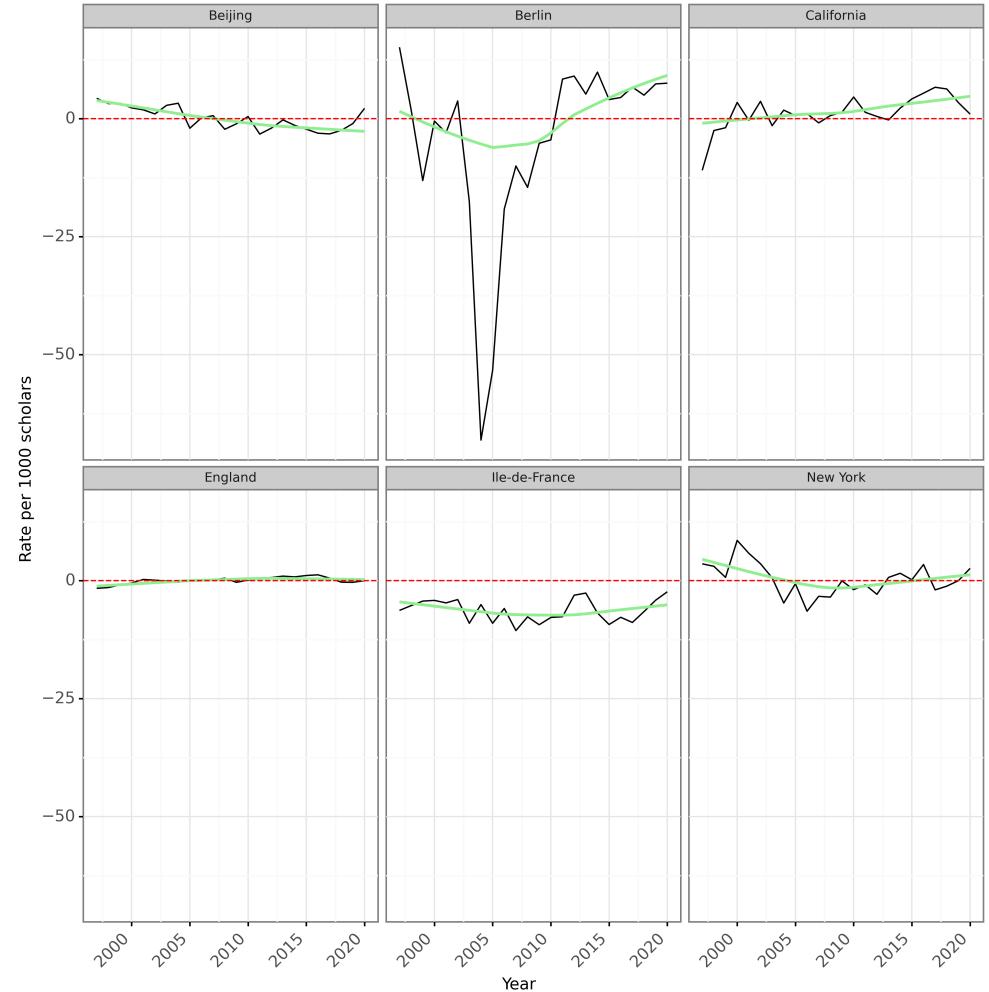
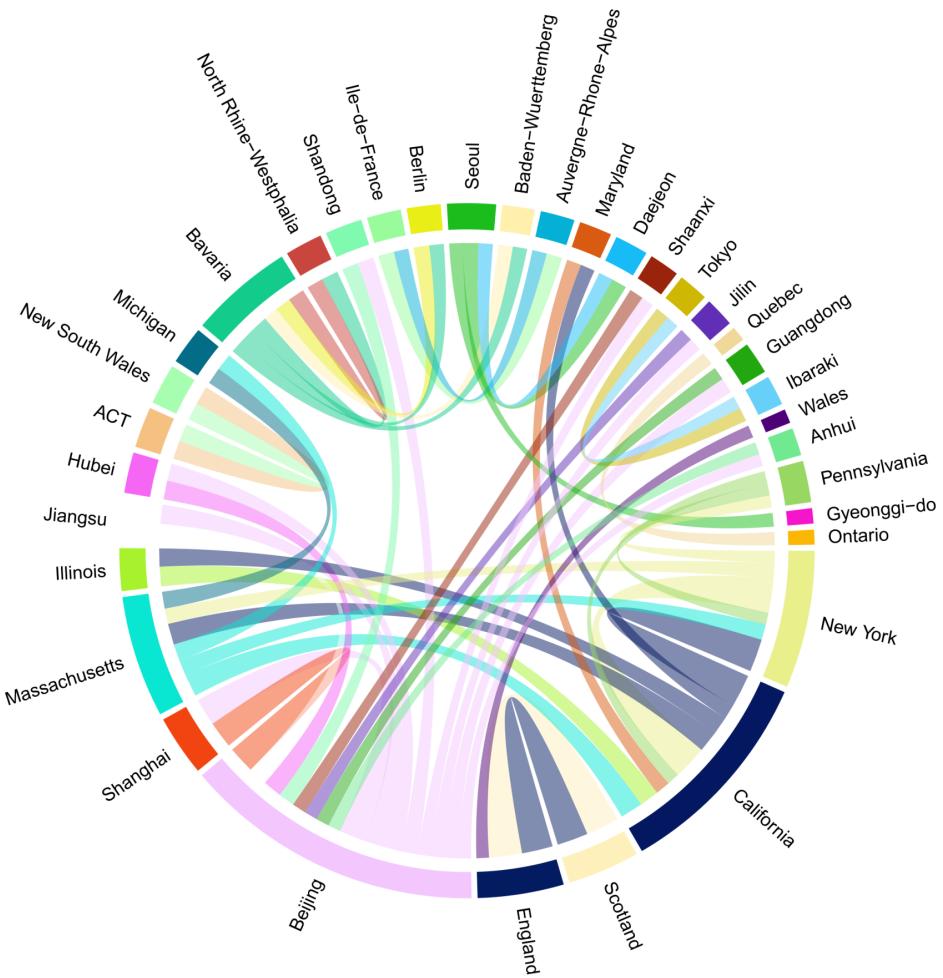
## Top 50, Region level, international: Scopus (left), NMR (right)

- England region in the UK has the highest count of sending/receiving scholars
- NMR shows a negative trend for most selected regions
- California and New York are receiving international scholars



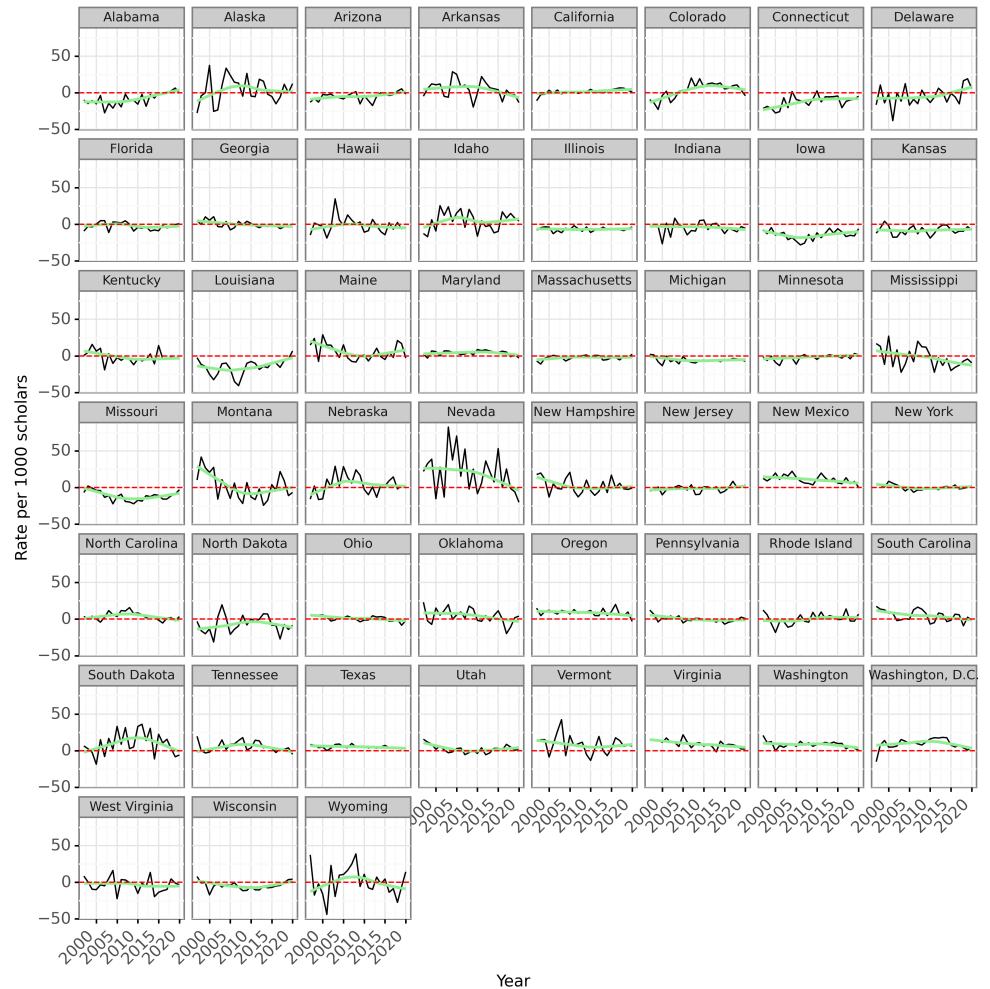
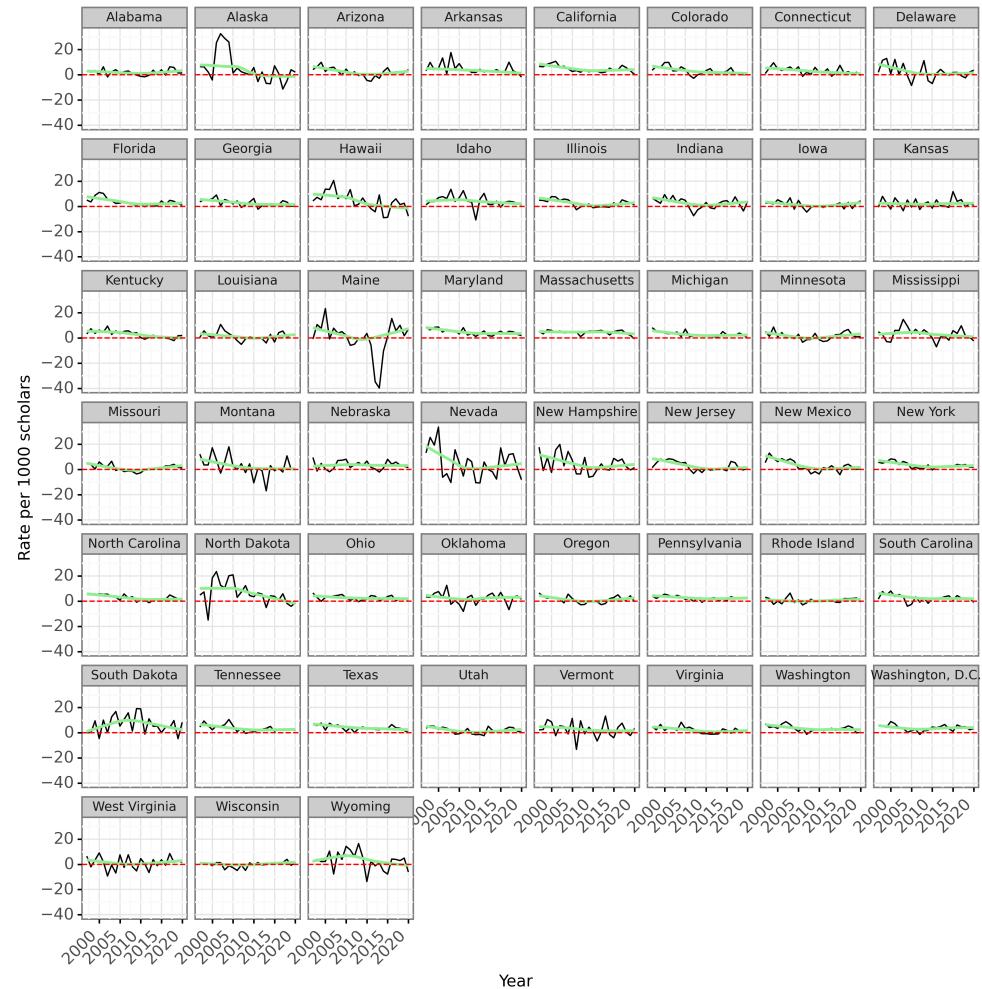
## Top 50, Region level, internal: Scopus (left), NMR (right)

- Limited trends to inside countries
- NMR shows that in internal trends, California and New York are less attractive

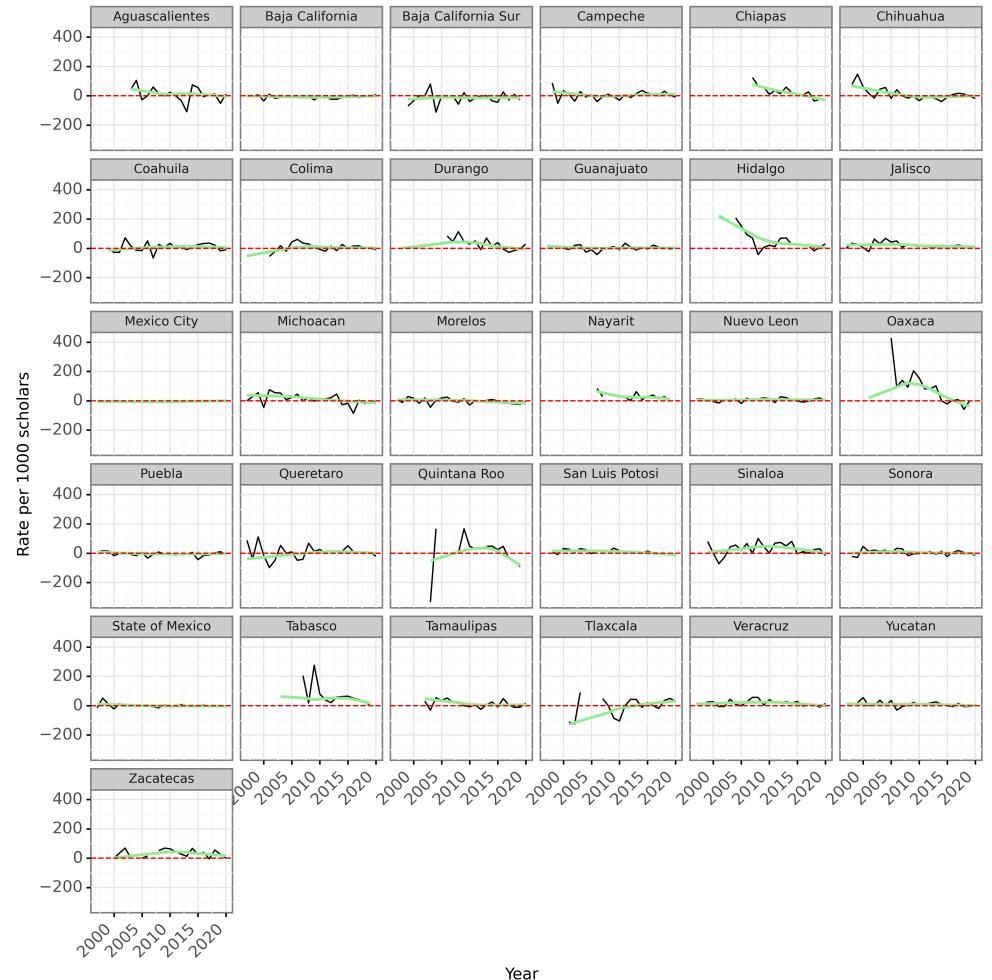
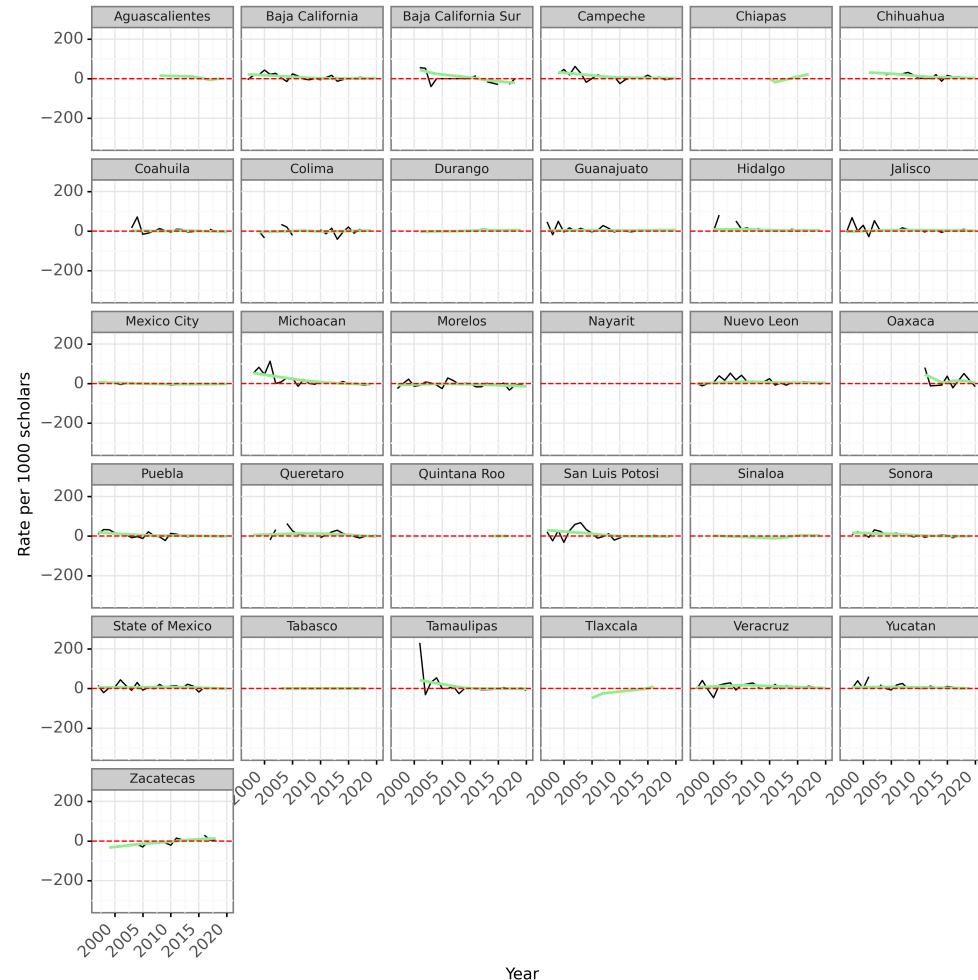


## USA, Region level, international (left), internal (right)

- Some regions more attractive internationally: California, Massachusetts
- Some regions more attractive internally: Washington, Washington D.C.
- Some with high variation in attractiveness: Nevada



## Mexico, Region level, international (left), internal (right)



# To summarize (and next steps):

- **Disambiguation** of authors and organization names (and addresses)
- **Collaboration** and **internationalization**
- **Gender** and **Disciplinary** differences
- A **macro** and **micro** global database of scholarly mobility
- **Internal** and/or/versus **international** scholarly mobility
- Individual level comparison of CV profiles using ORCID vs. Scopus
- More in-depth analysis and calculation of more migration indicators
  - Crude Migration Intensity
  - Migration Effectiveness Index
  - Aggregate Net Migration Rate

# Thank you for your attention

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