# Interregional Disaggregation of National Input-Output Tables

## 15. Input-Output-Workshop in Osnabrück

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# Interregional Input-Output Tables (IRIOT)

- IRIOTs are an efficient way to analyze regional impact of shocks
  - Structural change
  - Interregional dispersion
  - Winner and looser of change and politics
- Impact on Policy consultancy
  - Rivaling goals
    - Green transformation vs Structural equality
  - More nuanced impact analysis

# IRIOT in Germany

- IRIOTs do not exist
- Some RIOTs exist
  - One region and Rest of the World
- Must be reconstructed

# The Idea

- The idea is not new
- Based on Krebs (2020)[1]
- IO meets Network Theory
  - Counties as nodes
  - Trade as edges

[1] Krebs, Oliver (2020), RIOTs in Germany - Constructing an interregional input-output table for Germany

# The Data

- Combine different data-sources
  - World Input-Output Database
  - Regional Production Data
  - Shipment Data

# The Data I

World Input-Output Database

- WIOD is adjusted for inventory
- International trade flows
- Able to link with shipment data

# The Data II

Regional Production Data

- Gross Value Added per Region (National Accounts of the Federal States)
- Gross Value Added per Sector (Federal National Accounts)
- Disaggregation

# The Data II

## Disaggregation

| | Sector | | | | | | |
|---|---|---|---|---|---|---|---|
| Region | 1 | 2 | 3 | ... | 90 | 91 | $\sum$ |
| 1 | | | | | | | |
| 2 | | | | | | | |
| 3 | | | | | | | |
| ... | | | | | | | |
| 401 | | | | | | | |
| 402 | | | | | | | |
| $\sum$ | | | | | | | |

# The Data II

## Disaggregation

| | Sector | | | | | | |
|---|---|---|---|---|---|---|---|
| Region | 1 | 2 | 3 | ... | 90 | 91 | $\sum$ |
| 1 | | | | | | | State Data |
| 2 | | | | | | | State Data |
| 3 | | | | | | | State Data |
| ... | | | | | | | State Data |
| 401 | | | | | | | State Data |
| 402 | | | | | | | State Data |
| $\sum$ | Federal Data | | | | | | |

# The Data II

Problems

- State and Federal Data does not necessarily add up
- 36 582 unknowns

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Solutions

- Employment data as proxy
- Matrix Balancing
  - RAS Algorithm (see Krebs)
  - MCMC Sampling[2]

[2] Boratyński (2016), A Bayesian Approach to Matrix Balancing: Transformation of Industry-Level Data under NACE Revision

# The Data III

Shipment Data

- Total shipments in tons by water, train or truck
- German counties and their trade partners
- 25 product categories
- 0.5‰ of one week
- Available for 2010

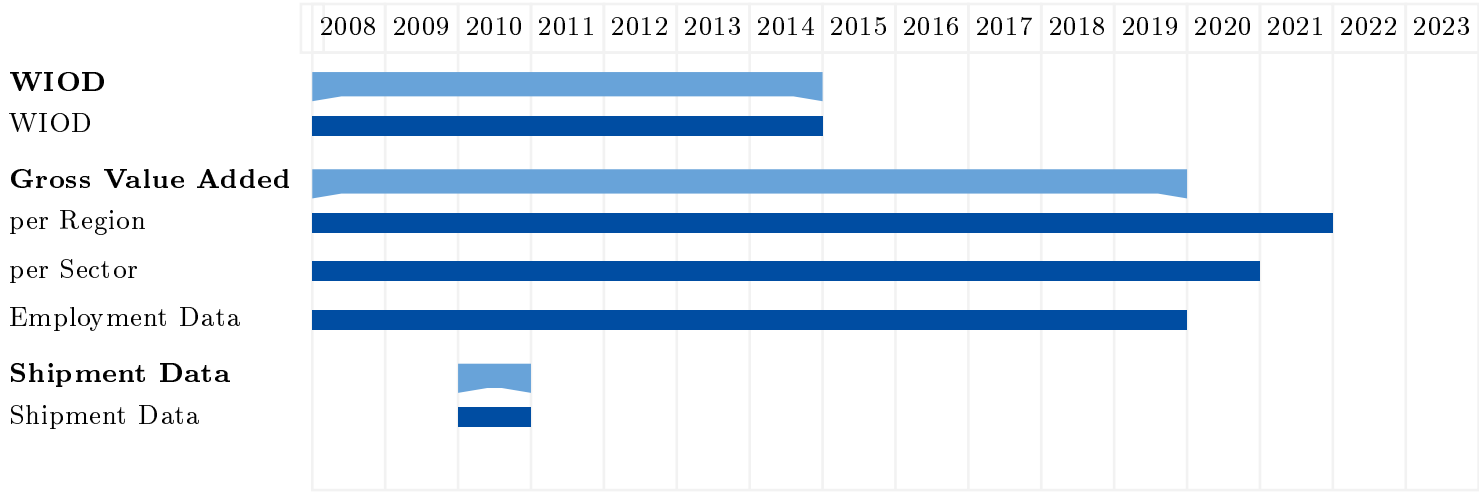
# The Contribution

Why the hassle if it has been done already?

- Probabilistic approach
- Incorporate uncertainty of the data into modeling
- Implement forecasting

# Data Availability

Different years of data availability:

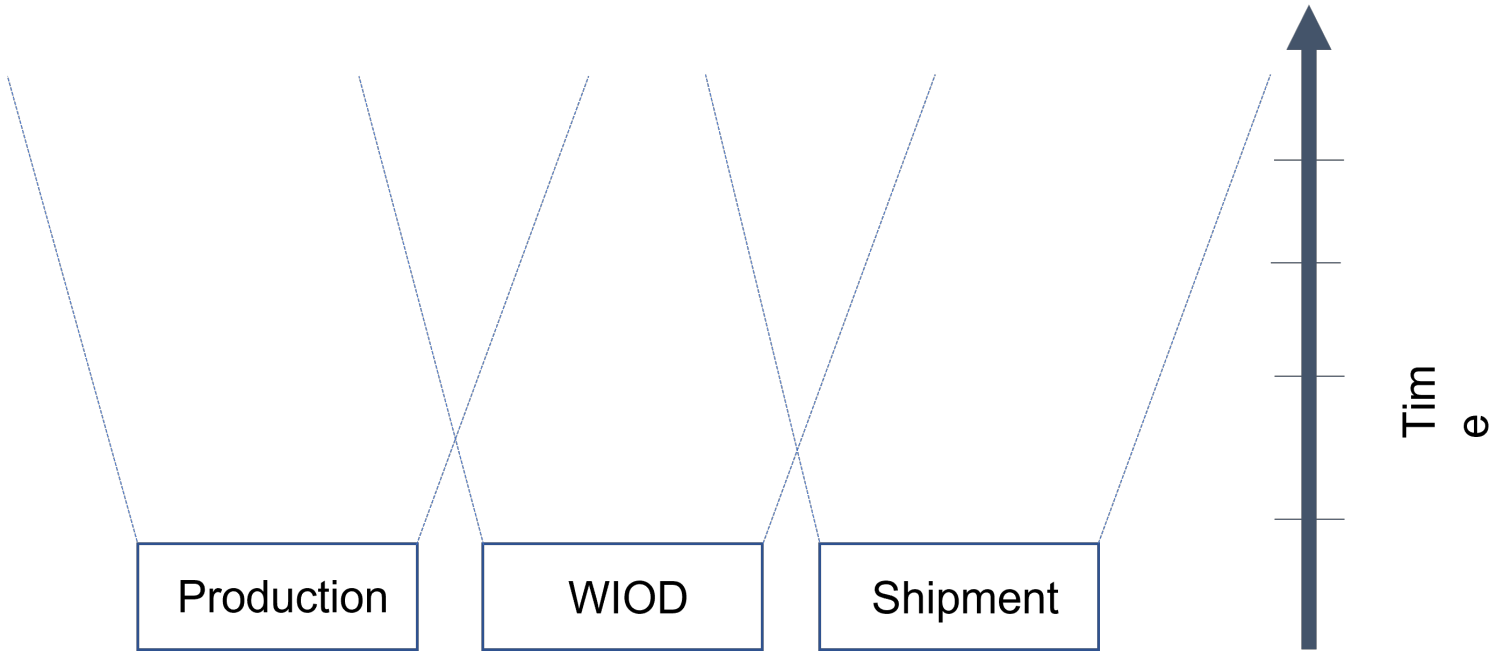


# The Contribution

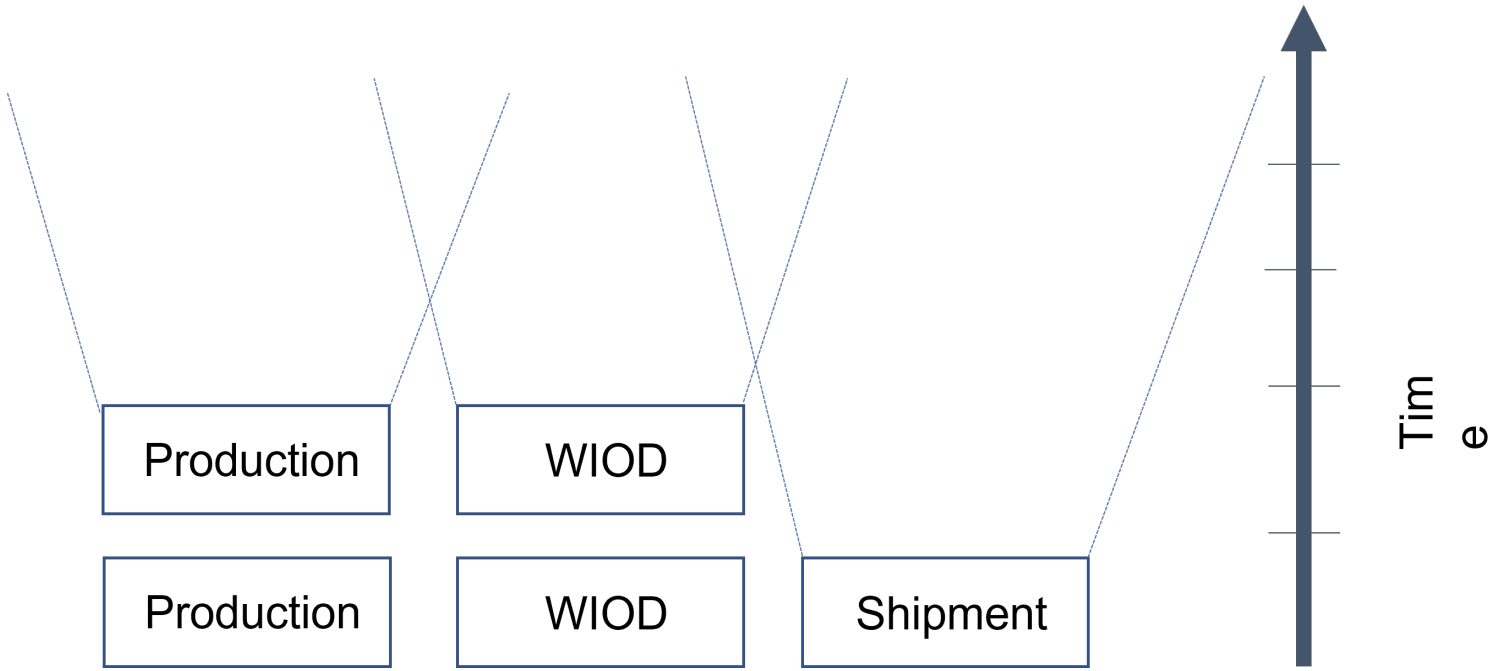
Optimize the model for forecasting

- Easy to update parts of data
- Reduce the uncertainty corridor
- Simplify for future data updates

# The Contribution



# The Contribution



# The Contribution

- We benefit from public available code
- Our code and results will be shared

**Thank you for your attention!**

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