Exploring possible futures for territorial attractiveness - The ATTREG-future-model
Background

- WIOD-project – applications within regional modeling at the European level
- The ESPON-ATTREG-project=The Attractiveness of European regions and cities for residents and visitors
  - Econometric analysis:
    - Dep. var.: Mobility (migration & tourism)
    - Indep. var.: Territorial capital
    - Regional unit: NUTS-2 (EU) & LAU-1 (DK & Slovenia)
  - Case studies – "outlier regions"
  - ATTREG-future model which is used for forecast and scenario analysis
- Synthesis: How to (in the future) include IO in regional demographic models?
Outline

- Mobility (dep.) – Capital (in-dep.)
- The ATTREG-future model
- The DEMIFER and the ATTREG-future scenarios
- Scenarios include multiplier experiments with the ATTREG-future-model
- The ATTREG-future model with a regional IO (WIOD)-core: How to include the interaction between demography and economic development into environmental modelling at the regional level.
Mobility and territorial capital
ATTREG-project

- Econometric analysis:
  - Dep. var.: Mobility (migration & tourism)
    - 15-24 year / 25-49 year / 50-64 year
    - Domestic / Foreign tourism
  - Indep. var.: Territorial capital
    - "Antropic capital"
    - "Economic and Human capital"-variables
    - "Environmental capital"
    - "Institutional capital"
    - "Social and Cultural capital"
  - Regional units: NUTS-2 (EU) & LAU-1 (DK & Slovenia)
Mobility and territorial capital
Econometric results

• Please see the paper (and related papers/ESPON-reports)
• Expected signs
• .......
• Then: How to include the demographic core into the ATTREG-future model
ATTREG-future model
Causal structure

- 2 simultaneous blocks:
  - Migration – Population – Attractions
- Direct effects from attractions
- Derived effects from attractions should add impacts from the 2 simultaneous blocks with a number of iterations
- “Double multipliers”
- See equations in the paper
The ATTREG-future model and scenarios with the ATTREG-future model

• ATTREG-future model is an extended demographic model
• Scenarios with the ATTREG-future-model:
  – 1 reference scenarios (Forecast to 2025)
    • Unchanged migration pattern
    • Trends in productivity
    • Etc.
  – 3 policy packages / multiplier experiments
    • Smart policy
    • Sustainable policy
    • Inclusive policy
  – Applied for 2 clusters
    • Objective 1 regions
    • Overheating regions (“population congested regions”)
Selection of policy package instruments
Selection of policy package instruments
Selection of policy package instruments
The ATTREG-future model
Scenario/Multiplier results

• Direct effects in the “policy region” (=Object 1 regions)
  – Depend on the sign of direct effects
  – Assume positive in-migration

• Where does in-migration originate?
  – Derived negative effects on surrounding regions (within country)

• Derived effects
  – Conventional multiplier effects (positive)
  – Real Exchange rate / export job effects (negative / positive)
    • Short run – might be negative
    • Long run – normally positive
Results of Multiplier experiment:
ratio of the number of university students against people aged 15 to 24 years increases with +0.10

- New in-migration almost constant per year
- Accumulated in-migration growing through years
- Out-migration from other regions growing (negative in-migration)
- Population increases/decreases with the
  - Initial increase (2010)
  - Accumulated in-migration (2020 and 2030)
- Labor force and employment by place of residence increase
  - not very much the first years (2010) (low labor participation rates for young)
  - more the following years (2020 and 2030) the older the in-migrants become (higher labor participation rates)
- Population dependent jobs increase
  - More the first years (2010)
  - Less the following years (2020 and 2030)
- Export jobs
  - Decrease the first years (2010)
  - Increase the following years (2020 and 2030)
- GDP per capita
  - Decreases the first years (2010)
  - Increases the following year (2020 and 2030)
Integrating economic model (IO) into the extended demographic model (ATTREG-future)

• Demographic and economic development
• How to capture commodity market effects (economic financial and depth crisis)?
• How to capture population changes in economic models (in- / out-migration)?
• Impacts on the environment
Interregional trade

Supply matrices

USE matrices
<table>
<thead>
<tr>
<th>Sector (J)</th>
<th>Commodity (I)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PRODUCERS</strong></td>
<td></td>
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</tbody>
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### Place of production (P)

### Commodity market place (S)

\[
x = DTBx + DTf
\]

\[
x = (I - DTB)^{-1}DTf
\]

\[
x = (I + DTB^1 + DTB^2 + DTB^3 + \ldots)DTf
\]

instead of

\[
x = Ax + f
\]

\[
x = (I - A)^{-1}f
\]

\[
x = (I + A^1 + A^2 + A^3 + \ldots)f
\]

**Make-Use Approach**

**Institutional Approach**