DATA RELATED METHODOLOGICAL CHALLENGES OF REGIONAL CONVERGENCE AND RESILIENCE

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EFOP-3.6.2-16-2017-00007
From Solow to regional convergence

• **Solow, 1956: exogenous growth model**

• **Barro and Sala-i-Martin, 1991-1995**
  – Convergence analysis

• **Regional level models**
  – Since 2000
  – Remaining at NUTS2 level – data availability

• **NUTS 3 level**
  – In the 2010s

• **Spatial structure based models**
  – recently
  – to cover the surface continuously, based on merging NUTS3 regions to create metropolitan regions
Convergence

• **Absolute convergence**
  – if differences are temporary

• **Conditional convergence**
  – if differences are permanent because of cross-country structural heterogeneity

• **Club convergence**
  – if initial conditions determine long-run outcomes

• **\( \beta \)-convergence**
  – cross-sectional analysis of growth rates

• **\( \sigma \)-convergence**
  – time series comparison of distributions (generally summarized by the standard deviation)
GDP per capita

- **GDP calculation changes in time**
  - time series are not comparable in time
  - long series are not available at regional level
  - now typically since 2000

- **Price level use** – convergence at national, divergence at regional level problem

<table>
<thead>
<tr>
<th>Approach</th>
<th>Meaning</th>
<th>Advantage</th>
<th>Disadvantage</th>
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<tbody>
<tr>
<td>Local currency</td>
<td>Nominal convergence</td>
<td>Easy to find data and calculate</td>
<td>Comparison of different currency areas is not possible</td>
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<tr>
<td>Local currency transformed by exchange rate</td>
<td>Nominal convergence</td>
<td>Easy to find data and calculate</td>
<td>Exchange rate volatility does not reflect neither economic</td>
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<td></td>
<td></td>
<td></td>
<td>performance nor price level</td>
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<tr>
<td>PPS</td>
<td>Nominal convergence</td>
<td>Good measure of convergence of</td>
<td>Lack of regional price indices, distortion at regional level</td>
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<td>Standard of living</td>
<td>standard of living</td>
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<tr>
<td>Volume index</td>
<td>Real convergence</td>
<td>Best measure of production</td>
<td>Lack of regional price indices, distortion at regional level</td>
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<tr>
<td></td>
<td></td>
<td>convergence</td>
<td></td>
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Territorial scope

- **Traditionally at NUTS2 level**
  - spatial structure of the economy does not follow it
  - too large

- **NUTS3 level**
  - better, but not for capital metropolitan regions
  - in our example, Budapest, Bratislava, Prague and Warsaw are separated from their agglomeration

- **NUTS2/3 – metropolitan regions**
  - idea in ESPON documents
  - own elaboration in 2016
  - Eurostat 2018

- **In our analysis**
  - The Eurostat version except Bratislava
  - versus the NUTS3
• PPS vs chain linked volumes
• NUTS3 (114 units) vs NUTS2/3 (101 units) compared
**β-convergence, 2000-2015**

<table>
<thead>
<tr>
<th></th>
<th>CL 101</th>
<th>PPS 101</th>
<th>CL 114</th>
<th>PPS 114</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Initial level</strong></td>
<td>-5.98e-7 (-1.55)</td>
<td>-6.57e-7* (-1.77)</td>
<td>-2.26e-7 (-0.74)</td>
<td>-2.77e-7 (-0.94)</td>
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<tr>
<td><strong>Constant</strong></td>
<td>0.033*** (13.35)</td>
<td>0.049*** (21.36)</td>
<td>0.032*** (15.03)</td>
<td>0.048*** (24.63)</td>
</tr>
</tbody>
</table>

**Chain linked 101 regions**

**PPS 101 regions**

**Chain linked 114 regions**

**PPS 114 regions**
The resilience period

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<tr>
<td>Initial level</td>
<td>-7.07e-7* (-1.96)</td>
<td>-5.89e-7* (-1.69)</td>
<td>-5.59e-7** (-2.42)</td>
<td>-5.13e-7** (-2.43)</td>
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<tr>
<td>Constant</td>
<td>0.033*** (10.11)</td>
<td>0.046*** (14.61)</td>
<td>0.032*** (13.90)</td>
<td>0.046*** (21.21)</td>
</tr>
</tbody>
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Chain linked 101 regions

- GDP per capita in 2010, EUR
- Average growth rate, 2010-2015

PPS 101 regions

- GDP per capita in 2010, EUR
- Average growth rate, 2010-2015

Chain linked 114 regions

- GDP per capita in 2010, EUR
- Average growth rate, 2010-2015

PPS 114 regions

- GDP per capita in 2010, EUR
- Average growth rate, 2010-2015
Conclusion

• **Results are data dependent**
  – conclusion based on stylized facts depends on data

• **Nomenclature should be stable**
  – NUTS delimitations change often by the needs of EU funds hunting
    • maybe advantageous for governments, inconvenience for researchers

• **Lack of regional price indices**
  – results are slightly biased through partial consideration of price differences
  – the challenge can be helped by online price information and Big Data issues

• **To explain the growth patterns shown by the regions, we need additional information**
  – sectoral data (GDP or GVA, employment)
  – detailed regional indicators that are not yet available at NUTS3 or metropolitan regions level
THANK YOU FOR YOUR ATTENTION!

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