CONCEPTUAL THINKING ABOUT REGIONAL COMPETITIVENESS:

COMPETITION, REGION TYPES, MODELING, AND MEASURING

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HUNGARY
Think globally, act locally, panic internally.

Compete globally, collaborate locally, ‘competitive cooperation’ internally, develop independently.
Starting points

Main subject areas on regional competitiveness (Barkley 2008):
(1) definitions, conceptualizations and modeling of competitiveness;
(2) measures of competitiveness, estimation of competitiveness indices (ratings, rankings, scores); and
(3) benefits and shortcomings of following a strategy to enhance regional competitiveness.

Main questions of modeling and structure of my lecture:
(1) *Is there competition among regions?*
(2) *How can regional competitiveness be defined?*
(3) *What indicators should be used to measure it?*
(4) *Which factors are influencing it and how?*
1. Is there competition among regions?

- Krugman (1994): there is no competition among countries, because in an international division of labor based on **comparative advantages** every nation may become a winner.
- Porter (2008): 'territorial competition is existing, but it is based on **competitive advantages**'
- Malecki (2002): 'in the competition among the different regions within a country *scarcity* derives from two interrelated factors: investments made in the new market segments demanding special expertise and talented experts' and 'in short, **competition among cities is real** and has become 'fiercer”
- Capello (2007): ‘**Regions compete on absolute rather than comparative advantage**’
Budd and Hirmis (2004): integrated model for territorial competition

**Firm level**
- **COMPETITIVE ADVANTAGE**
- Localization economies
- Enhanced productivity

**Economy level**
- **COMPARATIVE ADVANTAGE**
- Activity-complex economies
- Urbanization economies
- Enhanced economic efficiency

**Regional Competitiveness and Its Dynamics**
- Region
- Nation

**X-Efficiency**
Main dilemmas of interregional competition

1. Region types (territorial units, aggregation levels)
   • Normative regions (measuring) and/or functional (nodal) (improving) regions
   • ESPON settlement hierarchy (5 city-tiers)
   • Hall (1997) and others: mega cities, world cities, global cities, ...
   • Parkinson (2013): capital cities, second-tier cities
   • USA: metropolitan regions, nonmetropolitan regions (areas)
   • McCann (2008): industrial clusters in interregional competition (by transaction costs)
     - pure agglomeration (urban): urbanization agglomeration economies (NEG)
     - industrial complex (local but not urban): localization agglomeration economies
     - social networks (local but not urban): localization agglomeration economies

2. Dimensions of interregional/territorial competition:
   - Direct competition: between firms, inside same industry (transferable goods, services) → horizontal competition (between regions of same type)
   - Indirect competition: between regions for attracting firms, institutions, talented experts, sources for public goods → vertical competition (between regions of all type)
Hungarian territorial system

<table>
<thead>
<tr>
<th>Level of territorial units</th>
<th>Number of territorial units</th>
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</thead>
<tbody>
<tr>
<td>NUTS 2 = region</td>
<td>7</td>
</tr>
<tr>
<td>NUTS 3 = county</td>
<td>19 + Budapest (capital)</td>
</tr>
<tr>
<td>LAU 1 = microregion</td>
<td>176</td>
</tr>
</tbody>
</table>
GDP/ capita of the Hungarian countries, NUTS3 (EU-27=100, PPS)
The types of 176 microregions (LAU1), according to agglomeration economies:

- **Budapest** (population of 2 million): *urbanization agglomeration economies* (Jacobs’ externalities)
- **31 urban microregions** (OECD: at least 50,000 living in town, sum total 3.6 million): *localization agglomeration economies* (MAR externalities)
- **144 small (rural type) microregions** (sum total 4.4 million)
Types of 31 microregions by localization economies (clusters) (Lengyel-Szakálné Kanó 2012)
Competitiveness types of 31 Hungarian urban microregions (LAU1)
(approx nodal regions, travel-to-work districts)

• **Budapest and microregions around it** (about 3 million inhabitants): developing quickly → **urbanization agglomeration economies**

• **Manufacturing microregions**: outside-oriented, significant FDI and export, high (manual workers) employment, but weak RTD and human capital. These regions are located at the northwestern border and in the central region, and are well-integrated into the EU economy → **localization agglomeration economies** (cluster type: industrial complex)

• **University towns**: excellent human capital and state-financed RTD, but a low level of export capabilities in the business sector, low levels of productive capital, labor productivity and employment → **potential localization agglomeration economies** (cluster type: social networks)

• **Remaining urban microregions**: weak human capital, low levels of traded sectors, usually surrounded by rural settlements
(2) How can be regional competitiveness defined?

Storper (1997): place competitiveness is ‘the ability of an (urban) economy to attract and maintain firms with stable or rising market shares in an activity while maintaining or increasing standards of living for those who participate in it’

European Competitiveness Report (EC 2008, p. 15): “Competitiveness is understood to mean a sustained rise in the standards of living of a nation or region and as low a level of involuntary unemployment, as possible.”

Porter (2008): “competitiveness depends on the productivity with which a location uses its human, capital, and natural resources”

Dijkstra – Annoni - Kozovska (2011) A New Regional Competitiveness Index (EU, by WEF methodology)

But some critical reflections on regional competitiveness: Kitson, Martin and Tyler (2004), Bristow (2010)

Capello (2007) in the textbook of ‘Regional economics’: connection between territorial competitiveness and regional development, as well as regional growth (both for endogenous and exogenous)

Regional competitiveness: economic growth driven by high labour productivity and high employment rate (and high household income)
(3) What indicators should be used to measure it?

Huggins (2003) recommends three-level model for measuring competitiveness: inputs, output, and outcomes

- inputs are described by three indicators: business density (firms/capita), knowledge based business (per cent of all businesses), and economic participation (activity rates)
- output is estimated by productivity (GDP per capita)
- outcomes consist of two indicators: earnings (full time wages), and unemployment (ILO)

Kitson, Martin and Tyler (2004) measuring competitiveness: regional productivity, employment rate and standard of living

Stimson and Stought (2010): role of leadership and institutions as factors for endogenous development of non-metropolitan regions

Traditional pyramid model for regional competitiveness
(Lengyel 2000, 2004)

Target

Basic Categories

Development factors

Success determinants

Quality of life
Standard of living

Regional performance
Gross Regional Product

Labour productivity
Employment rate

Research and technological development
Infrastructure and human capital
Foreign direct investment
Small and medium-sized enterprises
Institutions and social capital

Economic structure
Innovative activity
Regional accessibility
Skills of work force

Social structure
Decision centres
Environment
Regional identity

Target Outcome

Aggregate Urban Economic Performance

Revealed Urban Competitive Economic Performance

Key Drivers of Competitive Economic Performance

Fundamentals

Business Environment  Educational Base  Physical Infrastructure  Social/cultural infrastructures/nets  Governance Structure

Innovation/Creativity  Investment  Human capital  Economic diversity/specialisation  Connectivity  Quality of life  Decision making

Labour productivity  Employment rate  Wages and profits

Self-reinforcing feedback effects

Urban Standard of Living

Economic performance
GDP/GVA capita

Urban Competitive Performance

Key Drivers of Competitive Economic Performance

Fundamentals

Self-reinforcing feedback effects
Modifying the pyramidal model
(Williamson (2000): levels of social analysis)

Level | Frequency (years) | Purpose
--- | --- | ---
L4: Outputs: | continuous | Get the marginal conditions right. 3rd order economizing
(neoclassical | | 3rd order economizing
economics/agency | | 3rd order economizing
theory)

L3: Economic development | 1 to 10 | Get the governance structures right. 2nd order economizing
drivers (improving | | 2nd order economizing
competitiveness)

L2: Economic/social | 10 to 10² | Get the institutional environment right. 1st order economizing
development fundamentals | | 1st order economizing
(influencing competitiveness)

L1: social theory

Resource allocation and employment (prices and quantities; incentive alignment)
Governance: play of the game - esp. contract (aligning governance structures with transactions)
Institutional environment: formal rules of the game - esp. property (polity, judiciary, bureaucracy)
Embeddedness: informal institutions, customs, traditions, norms, religion

Purpose
Get the institutional environment right. 1st order economizing
Get the governance structures right. 2nd order economizing
Get the marginal conditions right. 3rd order economizing
Often noncalculative; spontaneous

Frequency (years)
continuous
1 to 10
10 to 10²
10² to 10³

Purpose
Get the institutional environment right. 1st order economizing
Get the governance structures right. 2nd order economizing
Get the marginal conditions right. 3rd order economizing
Often noncalculative; spontaneous

Level
L4: neoclassical economics/agency theory
L3: transaction cost economics
L2: economics of property rights/positive political theory
L1: social theory

Frequency (years)
continuous
1 to 10
10 to 10²
10² to 10³

Purpose
Get the institutional environment right. 1st order economizing
Get the governance structures right. 2nd order economizing
Get the marginal conditions right. 3rd order economizing
Often noncalculative; spontaneous

Level
L4: Outputs: economic growth, revealed competitiveness (measuring competitiveness)
L3: Economic development drivers (improving competitiveness)
L2: Economic/social development fundamentals (influencing competitiveness)
Porter (2007): measuring regional competitiveness

Target → Prosperity

Means → Competitiveness (Productivity)

Basis → Endowments

Prosperity

- Standard of living
- Inequality

Domestic Purchasing Power

- Consumption taxes
- Local prices
  ~ Efficiency of local industries
  ~ Level of local market competition

Per Capita Income

Labor Productivity

- Skills
- Capital stock
- Total factor productivity

Labor Utilization

- Working hours
- Unemployment
- Workforce participation rate
  ~ Population age profile
Renewed pyramidal model for nodal regions

L4 level: Revealed competitiveness: employment rate, labor productivity, wages (disposable income of households) (GDP measuring is questionable)

L3 level: Drivers of competitiveness

Traditional regional economic growth:
\[ Y = f (L, K, T) \]

Where:
- L labour: human capital
- K capital: productive capital and FDI
- T technology: research and technological development

+ **Endogenous regional economic development** (Stimson and Stought 2009):
\[ Y = f (L, K, T, C, L_s) \]

Where:
- C: Traded sectors and clusters (agglomeration economies)
- Ls: Leadership and institutions

→ renewed model of regional competitiveness with endogenous regional drivers of competitiveness
Renewed pyramidal model for nodal regions

- Quality of life
  - Standard of living
- Regional performance
  - Gross Regional Product
- Labour productivity
- Employment rate
- Disposable income of households

- Drivers of competitiveness
  - Research and technological development
  - Human capital
  - Productive capital and FDI
  - Traded sectors and clusters
  - Leadership and institutions

- Long-run sources of competitiveness

- Economic structure
- Innovative activity and entrepreneurship
- Regional accessibility and infrastructure
- Social capital

- Social structure
- Decision centres
- Environment
- Regional culture
Regional Competitiveness Function (RCF)

\[
RC (EMP, LPR, DIH) = f (RTD, HUM\_CAP, CAP\_FDI, TS\_CLUST, LED\_INST)
\]

Where dependant variables: RC - revealed competitiveness indicators
- EMP – employment rate
- LPR – labour productivity
- DIH – disposable income of households

Where explanatory variables:
- RTD – research and technological development
- HUM\_CAP – human capital
- CAP\_FDI – productive capital and FDI
- TS\_CLUST – traded sectors and clusters
- LED\_INST – leadership and institutions

→ regional competitiveness function is mixed construction:
  - exogenous and/or endogenous?
Empirical study for competitiveness of Central Europe regions
(Lengyel 2012, Lengyel-Rechnitzer 2013)

We study the competitiveness of 93 NUTS2 regions of Central Europe:
- Austria: 9 regions, Czech Republic: 8 regions, Germany: 39 regions,
  Hungary: 7 regions, Poland: 16 regions, Romania: 8 regions, Slovakia: 4
  regions, Slovenia: 2 regions

Principal component analysis (3 dependant variables): **RC is principal
component**
- RC contains 92.8% of the 3 indicators information
- commonalities:
  - Labprod07: 0.938
  - Empr1509: 0.883
  - Dispinc07: 0.961
# Indicators of empirical study

Revealed competitiveness (RC): 3 indicators  
Competitiveness factors: 21 indicators  
   - RTD - research and technological development: 5 indicators  
   - HC - human capital: 5 indicators  
   - PC_FDI - productive capital and FDI: 1 indicator  
   - TSC – traded sectors and clusters: 2 indicators  
   - SCI - social capital and institutions: 8 indicators

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<thead>
<tr>
<th>Code</th>
<th>Denomination</th>
<th>Source</th>
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<tbody>
<tr>
<td></td>
<td><em>Revealed competitiveness</em></td>
<td></td>
</tr>
<tr>
<td>labprod07</td>
<td>Labour productivity in industry and services (GVA per employee, in the average of EU27), 2007, %</td>
<td>CR5</td>
</tr>
<tr>
<td>empr1509</td>
<td>Employment rate of the age group 15-64, 2007, %</td>
<td>Eurostat</td>
</tr>
<tr>
<td>dispinc07</td>
<td>Disposable income of private households (Purchasing power standard based on final consumption per inhabitant), 2007</td>
<td>Eurostat</td>
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</table>
### Research and Technological Development

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
<th>Source</th>
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</thead>
<tbody>
<tr>
<td>gerd07</td>
<td>Total intramural R&amp;D expenditure (GERD), percentage of GDP, 2007, %</td>
<td>Eurostat</td>
</tr>
<tr>
<td>emphigh08</td>
<td>Employment in high-technology sectors within the number of total employed, 2008, %</td>
<td>CR5</td>
</tr>
<tr>
<td>fp707</td>
<td>7th Framework Program, average funding per head (EU27= 100), %</td>
<td>CR5</td>
</tr>
<tr>
<td>pat1607</td>
<td>Patent applications to the European Patent Office (EPO), average 2006-2007, per inhabitant</td>
<td>CR5</td>
</tr>
<tr>
<td>lisbind08</td>
<td>Lisbon Index (0–100), 2008</td>
<td>CR5</td>
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### Human Capital

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<tr>
<th>Code</th>
<th>Description</th>
<th>Source</th>
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<tbody>
<tr>
<td>adedu08</td>
<td>Population aged 25-64 with tertiary education (ISCED 5-6), 2008, %</td>
<td>CR5</td>
</tr>
<tr>
<td>tertedu34</td>
<td>Population aged 30-34 with a tertiary education (ISCED 5-6), 2008, %</td>
<td>CR5</td>
</tr>
<tr>
<td>age25-64</td>
<td>The proportion of people aged 25–64 in the total population, 2004, %</td>
<td>CR4</td>
</tr>
<tr>
<td>weeklyh10</td>
<td>The number of average weekly hours worked (in full-time job), 2010, hour</td>
<td>Eurostat</td>
</tr>
<tr>
<td>mwork78</td>
<td>That proportion of people from the active age population who moved into the region from outside in the past two years (from within the EU, 2007–2008, %</td>
<td>CR5</td>
</tr>
<tr>
<td><strong>Productive Capital and FDI</strong></td>
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</tr>
<tr>
<td>gfcf07</td>
<td>Gross fixed capital formation per inhabitant (all NACE activities), 2007, Euro</td>
<td>Eurostat</td>
</tr>
</tbody>
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<tr>
<th><strong>Traded Sectors and Clusters</strong></th>
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<tbody>
<tr>
<td>indust05</td>
<td>Employment in industry (% of total employment), 2005, %</td>
</tr>
<tr>
<td>serv05</td>
<td>Employment in services (% of total employment), 2005, %</td>
</tr>
</tbody>
</table>

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<tr>
<th><strong>Social Capital and Institutes</strong></th>
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</thead>
<tbody>
<tr>
<td>adedutr08</td>
<td>Participation of adults aged 25-64 in education and training, 2008, %</td>
</tr>
<tr>
<td>eudev07</td>
<td>EU Human Development Index (0–100), 2007, %</td>
</tr>
<tr>
<td>povrisk08</td>
<td>The proportion of the population subjected to poverty even after receiving social benefits, 2008, %</td>
</tr>
<tr>
<td>unempr09</td>
<td>Unemployment rate, 2009, %</td>
</tr>
<tr>
<td>lowedu08</td>
<td>Population aged 25-64 with low education, (ISCED 1-2), 2008, %</td>
</tr>
<tr>
<td>lunempr09</td>
<td>Share of long-term unemployment (12 months and more), percentage of total unemployment, 2009, %</td>
</tr>
<tr>
<td>unempy08</td>
<td>Youth unemployment rate, 2008, %</td>
</tr>
<tr>
<td>unhump07</td>
<td>UN Human Poverty Index (between 0–100), 2007</td>
</tr>
</tbody>
</table>
Types of regions by competitiveness principal component (RC)
Connection between competitiveness principal component and GDP per capita
Relationship between RC and the drivers (factors created from 21 indicators of the drivers of competitiveness)

Factor analysis was performed for 21 indicators:

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<tbody>
<tr>
<td>Fw= 18,873</td>
<td>Fw=17,901</td>
<td>Fw=17,224</td>
<td>Fw=15,265</td>
<td>Fw=12,306</td>
</tr>
<tr>
<td>eudev07</td>
<td>0,701</td>
<td>fp707</td>
<td>0,866</td>
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<td>mwork78</td>
<td>0,684</td>
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<td>0,614</td>
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<td>0,642</td>
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<tr>
<td>age25-64</td>
<td>-0,819</td>
<td>lisbind08</td>
<td>0,602</td>
<td>-</td>
</tr>
<tr>
<td>weeklyh10</td>
<td>-0,906</td>
<td>gfcf07</td>
<td>0,544</td>
<td>-</td>
</tr>
</tbody>
</table>

Sum factor weights= 81,569 (81,6% of information)

The multivariate linear regression model:

\[ RC_i = + 0,691 F1_i + 0,439 F2_i + 0,322 F3_i - 0,334 F4_i + 0,22 F5_i + e_i \]

- \( R^2 = 0,935 \) (93,5%)
- there is no multicollinearity (because of factor analysis)
- there is no homoscedasticity to be observed
Factor 1 (human capital, workforce attraction, patents): +0.691
Factor 2 (R&D, high-tech empl., gross fixed capital formation): +0.439
Summary
(at half time of research)

Theoretical and methodological remarks:
• Renewed pyramidal model (with endogenous regional development elements)
• Regional competitiveness principal component: RC (3 dependant variables)
• Regional competitiveness function (testing will be continued: path analysis by region types)
• Functional urban regions, or NUTS3 regions instead of NUTS2 region (we are looking for partners from post-socialist countries to continue this investigation!!)

Some empirical conclusions:
• Influence of history: four clusters of regions (+ Romania)
  - West (West Germany, Austria and Slovenia)
  - East Germany regions
  - Capital regions of post-socialist countries
  - Other post-socialist regions
• Geographical proximity: west-east slope
• Emergence of capital towns: centralised society and economy
• Human capital is better than revealed competitiveness in East-Central Europe
Thank you for your attention!

E-mail: ilengyel@eco.u-szeged.hu

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