Regional convergence: The “new economic geography” perspective

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Plan of the presentation

A. Theory
- building blocks of NEG
- main theoretical results
  - across countries
  - within countries

B. Empirics
- Why Finland
- NEG predictions
- growth regressions
A. THEORETICAL APPROACH

Prelude

- Places differ in terms of natural resources, access to natural means of communication, climatic condition
  
  **First Nature**

  This is not sufficient to explain observed dramatic differences in economic development

- Other forces are necessary, that are inherent to the functioning of economic interactions and that are able to generate uneven development even across ex-ante identical places
  
  **Second Nature**
Various ‘second nature’ forces have been studied by economists, geographers, and regional scientists.

NEG focuses on the interactions among firms and workers taking place in the market.

Intense scale returns and market power generate self-sustaining process of agglomeration.
1. Location problem
2. Circular causation
3. Micro-structure
   - industry characteristics
   - accessibility and competition
   - countries
   - regions
   - globalization

- Transportation is costly
  - when customers and intermediate suppliers are dispersed, proximity allows to minimize transportation costs by patronizing them through many small local plants
- Fragmentation is costly
  - economies of scale are reaped by concentrating production in a single plant

Building Block 1:
Plant level economies and shipping costs generate a trade-off between ‘proximity’ and ‘concentration’
Economies of scale imply market power
– Associated with product differentiation, few competitors, or both

A firm’s market power (and expected profits) depends on the number of nearby competitors

**Building Block 2:**
A firm can increase its market power with respect to its competitors by careful geographical positioning

- The location decision of a firm affects other firms profits and overall welfare
- No quid-pro-quo is paid for these impacts
  - NEG ‘pecuniary’ externalities: through market-interactions
  - ‘technological’ externalities: through non-market interactions

Building Block 3:
Firm’s location decisions jointly generate localized externalities that determine regional attractiveness
Proximity to customers and suppliers

Concentration of production in a few plants

Distance from competitors

- The three objectives are often in conflict
- Their relative impact on profits depends on a set of industry characteristics
- Their pursuit is affected by and affects the location decisions of other agents (customers/suppliers/competitors). This may give rise to circular causation mechanisms
A2. Circular causation: 1/3. Example

Workers

Final Goods

Prices

Labour

Wages

Expected profits

Market expansion

Intermediate Goods

Final Producers

Expected profits

Intermediate Producers

Market crowding
Small transitory local shocks can give rise to large permanent spatial unbalances
A2. Circular causation: 3/3. The contribution of NEG

- General equilibrium modeling
- Solid micro-economic foundations

The evolution of the spatial landscape can be related to key micro-economic parameters
A3. Micro-structure: Key relationships

Proximity to customers and suppliers

Concentration of production in a few plants

Distance from competitors

Industry characteristics matter

Proximity matters

Result 1:
Sectors with higher economies of scale are more clustered.

Result 2:
NMP and RMP predict sales and profits. Differences in RMP predict the future evolution of the economic landscape.
A3. Micro-structure: Industry characteristics

- Circular causation depends on the relative strength of market crowding and market expansion effects.
- Market crowding effects are weaker in case of industries with intense returns to scale and strong market power.
- Increasing returns and market power give strength to ‘second nature’ against ‘first nature’.

**Result 1:**
Positive externalities are stronger in sectors with pronounced scale economies and strong market power. These sectors are more clustered.

- **Market potential** measures the location appeal of a region A in terms of customer and supplier proximity.

- *Nominal Market Potential*: weighted *nominal* average expenditures across all regions that a plant can tap if located in A
  - It measures customer proximity
  - It predicts the *sales* of the firm

- *Real Market Potential*: weighted *real* average expenditures across all regions that a plant can tap if located in A
  - It measures customer and competitor proximity
  - It predicts the *profits* of the firm
Since firms can freely pick plants location, they will be attracted by high RMP (ie, profits) areas.

In the long run competition will bring profits back to the same normal level everywhere.

RMP differences will eventually vanish as NMP differentials are capitalized in local price differences.

**Result 2:**
The sales and profits an average firm can make if located in a certain area are measured by the area’s Nominal and Real Market Potentials.

Differences in RMP predict the future evolution of the economic landscape.
Traditional approach to international trade is based on a two-country model
  – the ‘home’ and ‘foreign’ country

No attention to the internal geography of countries
  – no internal transportation costs

No labour mobility
- Start with two identical countries
  - Same expenditures, same number of plants
- Positive shock to expenditure in the ‘home’ country
- Its NMP (ie, the sales) and RMP (ie, the profits) increase
  - as access to local customers is costless, but access to foreign customers is costly
- As profits rise, supply expands until profits are back to the normal level everywhere
• In the transition
  – the home country will grow faster as higher profits increases the returns to investment in both physical and human capital and the returns to innovation

• In the end
  – the larger country will host more plants and, on average, these will be larger, more productive, more profitable
  – because of imperfect competition the final supply gap will be higher than the initial expenditure gap (‘home market effect’)

**Result 3:**
Markets with higher NMP host more firms. These are larger, more productive and more profitable than firms in lower NMP
Accumulation of capital poses the basis of cumulative causation
– as additional income generated by newly accumulated capital feeds into additional expenditures

Again, if the market expansion (generated by the new income) is bigger than the market crowding effect (due to new and larger firms)...

...cumulative causation sets in creating a self-sustaining cycle of income and expenditure growth in the home country

...and a symmetric cycle of income and expenditure contraction arise in the foreign country
When trade costs are very high, some firms still find more profitable to locate close to customers in the foreign country.

When trade costs are very low, there is little scope for using market location to boost market power.

First nature is dominant when countries are isolated or highly integrated. Circular causation is more likely for intermediate level of trade costs.

**Result 4:**
Initially, international trade liberalization fosters cross-country divergence. However, further reductions in trade impediments trigger a reverse process of convergence.
A3. Micro-structure
Countries (6/6. Globalization and forces)

- Centripetal forces
  - market-size ▼
  - matching ▼
  - spillover ▼

- Centrifugal forces
  - factor market-crowding ▼ / =
  - product market-crowding ▼ ▼
  - congestion =

forces
agglomeration
trade costs

- Interregional mobility of labour

  **Result 5:**
  Labour mobility fosters regional divergence

- Internal geography and infrastructures

  **Result 6:**
  Initially the implementation of interregional transport infrastructure fosters cross-region divergence. Further improvements in transportation trigger a reverse process of convergence.

- Multilocation economies

  **Result 7:**
  The presence of transport ‘hubs’ and ‘gate regions’ makes clustering more likely

- Demand shock creates an incentive for supply to expand
- Output expansion will require additional employees, pushing up wages and attracting workers from foreign location
- Local income rises feeding back into higher expenditures

Capital expansion is no longer necessary for cumulative causation to take place

**Result 5:** Labour mobility fosters regional divergence
Across countries, divergence is mainly shaped by international trade impediments.

Within countries, divergence is mainly shaped by interregional trade impediments – transport infrastructures playing a key role.

Result 6:
Initially the implementation of interregional transport infrastructure fosters cross-region divergence. However, further improvements in transportation trigger a reverse process of convergence.
A ‘hub’ is a location with better accessibility to all other locations
  – a positive demand shock to any other location may result in supply expanding in the hub and contracting elsewhere

A ‘gate’ is a location through which goods mostly flow in and out of a country
  – a gate-less country is more likely to be agglomerated when its main trade partner has a gate region

(Result 7)
The presence of transport ‘hubs’ and ‘gate regions’ makes clustering more likely
PART B – EVIDENCE FROM FINLAND

- Methodology and data
- Descriptive analysis
- Econometric results

Summary result
NEG implications matter
- Units: EU NUTS 4 corresponding to sub-regional units whose borders follow closely those of commuting districts
- Period of analysis: 1977-2002
- Two sub-periods:
  - Pre-recession: 1977-1990
    (1987-1990 for house prices)
  - Post-recession: 1994-2002
- Within country: smaller institutional variation
- Dramatic exogenous shock: early Nineties ‘recession’ as a turning point
  - **Regional imbalances.** A long period of regional convergence ends.
  - **Internal migration.** People become more mobile. Migrants tend to be young and educated.
  - **Educational attainment.** Younger generations rank among the most educated in the world.
‘recession’ as a turning point (cntd):

- **Industrial structure.** Take-off of ICT. Knowledge-intensive economy.
- **Internal policies.** From short-term macro to long-term micro. Focus on research and technology.
- **International scenario.** In 1995 Finland joins the EU and adopts the euro since the very start.

→ These changes have effects according to NEG. They are also exogenous to any region-specific development.
B1. Methodology:

1/8 Price and quantity effects

- NMP captures customer/supplier proximity and measures expected sales
- RMP captures customer/supplier and competitors proximity and measures expected profits
- Cross-location RMP differentials will eventually vanish in the long run
  - as firms move to high RMP areas and NMP differentials are capitalised in local price differences
- Similarly, real wage differences (ie, RMP) should eventually vanish in the long run
  - as nominal wage differentials (ie, NMP) are capitalised in local price differences
Expected effects on factor prices

- Higher NMP should be associated with higher profits and higher nominal wages, and higher local prices in the long-run

Expected effects on factor quantities

- Positive shocks to NMP should attract both firms and workers
B1. Methodology:
3/8 Productivity vs amenity

prices of non-tradables in $c$

Impact of market potential

Free migration

Free entry ($NMP_c > NMP_{c'}$)

Free entry ($NMP_{c'}$)

wages in $c$
Three indicators of regional performance

- income per capita growth (taxable and primary)
- population growth (adjusted and unadjusted for natality and mortality)
- house prices growth
### Population/local price variation

<table>
<thead>
<tr>
<th>Income/wage variation</th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Positive</strong></td>
<td>Higher productivity</td>
<td>Lower quality of life</td>
</tr>
<tr>
<td><strong>Negative</strong></td>
<td>Higher quality of life</td>
<td>Lower productivity</td>
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</table>
B1. Methodology:
6/8 Explanatory variables: growth theory

- Controlling for convergence
- Proximate sources of growth
  - human capital
    - % of population with tertiary education
  - knowledge capital
    - R&D expenditure, number of patents (in per capita terms)
- Wider influences
  - policies
    - unemployment rate
    - central government expenditure and central government grants to municipalities (in per capita terms)
  - international openness and infrastructures
    - distances from airports, ports and Russian border
  - industrial structure
    - % of employment in agriculture/manufacturing
    - % of employment in ICT
B1. Methodology:

7/8 Explanatory variables: first and second nature

- **First nature**
  - natural communications
    - distance from ports
  - climate and natural conditions
    - % of land covered by lakes
    - average annual temperature

- **Second nature**
  - pecuniary externalities
    - market potential
  - technological externalities
    - density of the population

Taxable income per capita growth 1977-1990 (% pa)

('000 Eur, 2000 prices)
B2. Descriptive analysis:

2/6 Convergence in income per capita 1994-2002

Taxable income per capita growth 1994-2002 (% pa)

Taxable income per capita, 1994
(‘000 Eur, 2000 prices)
B2. Descriptive analysis:
3/6 Income per capita and market potential 1977-1990

![Graph showing taxable income per capita growth 1977-1990 vs market potential, 1977.](image)
B2. Descriptive analysis:
4/6 Income per capita and market potential 1994-2002

[Graph showing a scatter plot with taxable income per capita growth (1994-2002, % pa) on the y-axis and market potential, 1994, on the x-axis.]
B2. Descriptive analysis:
5/6 Population and market potential 1977-1990

Population growth 1977-1990 (% pa)

Market Potential, 1977

0  100,000  200,000  300,000  400,000  500,000
-2.5 -1.5 -0.5  0.5  1.5  2.5
B2. Descriptive analysis:
6/6 Population and market potential 1994-2002

Population growth, 1994-2002 (% pa)

Market Potential, 1994
LEGENDA:

(P+) = positive impact on productivity
(P-) = negative impact on productivity
(C+) = positive impact on quality of life
(C-) = negative impact on quality of life
(conv) = regional convergence
(div) = regional divergence
-- = no significant impact.
B3. Econometric results:

2/3 Summary

<table>
<thead>
<tr>
<th>Explanatory variables (↕) \ Period (⇌)</th>
<th>1977(87)-1990</th>
<th>1994-2002</th>
</tr>
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<tbody>
<tr>
<td>Income per capita</td>
<td>(conv)</td>
<td>(conv)</td>
</tr>
<tr>
<td>Density of population</td>
<td>(conv) (P-)</td>
<td>--</td>
</tr>
<tr>
<td>House price</td>
<td>(conv)</td>
<td>(div)</td>
</tr>
<tr>
<td>Median age</td>
<td>(P-), (C+)</td>
<td>(P-), (C+)</td>
</tr>
<tr>
<td>Level of education</td>
<td>(P+), (C+)</td>
<td>(P+), (C+)</td>
</tr>
<tr>
<td>Market potential</td>
<td>(P+)</td>
<td>(P+)</td>
</tr>
<tr>
<td>Share of employment in ICT</td>
<td>--</td>
<td>(P+)</td>
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### B3. Econometric results: 3/3 Summary

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<thead>
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<tr>
<td>Distance from main airports</td>
<td>(P-), (C-)</td>
<td>--</td>
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<tr>
<td>Distance from Russian crossing borders</td>
<td>(P+)</td>
<td>(P+)</td>
</tr>
<tr>
<td>Distance from ports</td>
<td>(P+)</td>
<td>--</td>
</tr>
<tr>
<td>Unemployment rate</td>
<td>(C-)</td>
<td>(P-), (C+)</td>
</tr>
<tr>
<td>Share of manufacturing and construction</td>
<td>(P-)</td>
<td>--</td>
</tr>
<tr>
<td>Lake covered land</td>
<td>(P+)</td>
<td>--</td>
</tr>
</tbody>
</table>
B3. Econometric results: 3/3 Eight points

- No convergence after recession
- Regional productivity and quality of life
  - are promoted by education
  - are promoted by distance from Russia
- Regional productivity
  - is promoted by market potential
  - is affected by industrial specialisation
  - is hampered by unemployment
  - is unaffected by technological externalities
- Regional income per capita growth
  - is negatively associated with age
Successful regions are characterized by highly educated people, firms that are active in dynamic sectors, good access to national and international markets.