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Regional Impact Models: Problem of Applicability for Lithuania

EUMOptFin3 Workshop: The drivers of performance of large financial institutions

Neringa Cepaitiene
Bergamo, 19 May 2004
Structure of the Presentation

Defining Regional concept

Typology of Regions
  – Based on territoriality principle
  – Based on functional interaction causality
  – Based on the combined twofold breakdown matrix

Peculiarities of Regional Research
  – Multidisciplinary approach
  – Holistic approach

Regional Economics
  – Relation to Macroeconomics and Microeconomics
  – Theoretical Framework of Regional Economics

Approaches to Regional Modelling
  – Model Characteristics
  – Quantitative Regional Modeling Methods
  – Comparison of Regional Impact Models
The “Pool” of Regional Concepts

- Formal region
- Eco-region
- Political region
- Universal region
- Currency region
- Peripheral region
- Vernacular region
- Natural region
- Micro-region
- Mezo-region
- Sea regionas
- Geographic region
- Functional region
- Macro-region
- Identity region
- homogeneous region
- Perceptual region
- Mezo-region
- Nodal region
- Cross-border region
- Core region
- Economic region
- Administrative region
- Economic region
- Ethnic region
- Historical region
Definition of a Region:

- **Region** – is a *spatially solid* territory or *interrelated* units, that differ from the surrounding areas according to a chosen *criteria* or a set of the latter.

Typically region is characterized by some common interest of its subunits to improve the aggregate wealth.
Criteria to Define Regions

Criteria, according to which regions (regional boundaries) can be defined, can be classified in following groups:

- **Physical/ natural** (climate, soils, landscapes, etc.)
- **Political/ administrative** (subordination, partnership)
- **Economic/ social** (employment, economic activity, etc.)
- **Historical/ cultural** (language, religion, nationality, race, etc.)
Historical Development of the Concept of Region

Region as a universal idea

Criteria for defining a region

63 B.C.

- **Physical/Natural**
- **Political/Administrative**
- **Economic/Social**
- **Perceptual/Vernacular**

**Classical Geography**
Region is understood as a “possession” or “zone”

**Regional geography**
“Länderkunde”; “Erdkunde” – region becomes “3D”

**Regional spaces**, “Complex unit”

- **“Natural region”**, divided by mountain chains
- **“Natural region”** defined with physical criteria only

**The New Geography**
“Political administrative unit”

**Erdvinė ekonomika**
“Functional region”; “the Growth pole”

**Human Geography**
“Historical region”; “Cultural region”

- Idea of the Earth as a “Living organism”
- Idea of coexistence of the human and the landscape

Neringa Cepaitiene, Institute of
### Types of Regions According to Classification Criteria

<table>
<thead>
<tr>
<th>Classification of Criteria to define regions</th>
<th>Types of Regions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical/ natural</td>
<td>Natural</td>
</tr>
<tr>
<td>Political/ administrative</td>
<td>Formal/ administrative</td>
</tr>
<tr>
<td>Economic/ social</td>
<td>Functional</td>
</tr>
<tr>
<td>Historical/ cultural</td>
<td>Perceptual/ vernacular</td>
</tr>
</tbody>
</table>
Typology of Regions / Principle of Territoriality

According to principle of territoriality regions may be classified in the following manner:

**Micro-regions** – territorial entities smaller than states (e.g. Euro regions)
  - **Cross-border regions** – special case of micro-region – consist of smaller entities of states (e.g., Cascadia at the US-Canada Western border)

**Mezo-regions** – territorial entities of two or more states (e.g. EU, NAFTA, ASEAN, CARICOM, MERCOSUR, etc.)

**Macro-regions** – big spatially solid territorial entities, consisting of one or more states/ parts of the World (e.g. Pacific region, Mediterranean region, North America).
Also known as World regions.
  - **Sub-regions** – special case of macro-region – smaller territorial entity, consisting of both states and micro-regions (e.g. Swedish, Habsburg Empire, the Baltic Sea Region, Western Europe, etc.)

*EU Regional policy is applied to the micro-regions*
Types of Regions, Distinguished According to Different Criteria: Relation

Types of regions according to principle of territoriality

- Micro-regions
- Cross-border regions
- Mezo-regions
- Macro-regions
- Sub-regions

Types of regions according to groups of criteria for defining regions

- Formal/ Administrative
- Functional
- Perceptual/ vernacular
- Natural
Typology of Regions According to Principle of Territoriality: Scheme

- **Macro-region**
- **Mezo-region**
- **Micro-region**
- **Cross-border region**

- **NUTS III (10 counties)**
- **Lithuania (NUTS I and II region)**

- **EU**
- **BSR**

**NUTS – Nomenclature of Territorial Statistical Units**
Typology of Regions / Regionalisation Criteria

According to regionalisation criteria regions may be classified in the following manner:

- **Homogeneous** – or uniform – having common trait
- **Functional** – identified according to functional interaction and spatial integration
  - **Nodal** – functional interaction takes place vertically with certain notable hierarchy, one dominating core (e.g. town with suburbs)
  - **Non-nodal** – functional interaction takes place horizontally or vertically, there is no clear hierarchy, a few centres dominate, composing certain growth poles – “bananas” (e.g. conurbations: “The Blue Banana”, “The Green Banana”, “The Yellow Banana” in Europe, “The Growing Potato” region around the Baltic Sea, or “The growing Boomerang” (Berlin-Warsaw-Praque-Budapest)}
## Regional typology: combined twofold breakdown matrix

<table>
<thead>
<tr>
<th>PRINCIPLE OF TERRITORIALITY</th>
<th>REGIONAL TOPOLOGY CRITERIA</th>
<th>HOMOGENEOUS REGION</th>
<th>FUNCTIONAL REGION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Micro-region</td>
<td>Homogenous region</td>
<td>Common economic specialisation, e.g. agricultural region</td>
<td>Nodal region, e.g. town and suburbs</td>
</tr>
<tr>
<td>Cross-border region</td>
<td>Homogenous region</td>
<td>Region on the territory of different administrative units, e.g. defined on lingual basis</td>
<td>Region on the territory of different administrative units, with single dominating centre</td>
</tr>
<tr>
<td>Mezo-region</td>
<td>Homogenous region</td>
<td>Region on the territory of two or more states having similar economic performance, etc.</td>
<td>Region on the territory of two or more states, with single dominating centre</td>
</tr>
<tr>
<td>Sub-region</td>
<td>Functional region</td>
<td>Region crossing state boundaries, having similar economic performance, etc.</td>
<td>Region crossing state boundaries, with single dominating centre</td>
</tr>
<tr>
<td>Macro-region</td>
<td>Functional region</td>
<td>Spatially solid territory, defined on e.g. racial basis</td>
<td>Several big nodal regions on a spatially solid territory, with single dominating centre</td>
</tr>
</tbody>
</table>
Regional research: a multidisciplinary approach

- Regional research is performed in the context of many disciplines
Regional research – risk of fragmentary approach

Drawing used:
M.C. Escher. Reliatyvumas. Trent Graphics, 1999
Regional research – holistic approach

M.C. Escher. 
*Relativity*. 
Trent Graphics, 1999
Relation Regional Economics to Macroeconomics and Microeconomics

According to: Schaeffer & Bukenya, 2001

Traditional regional Economics

Traditional Macroeconomics
- International
- Economy

Traditional Microeconomics

Level of Aggregation
High
Low

Spatial Differentiation
None

Highly Differentiated

Neringa Cepaitiene, Institute of Europe, Kaunas University of Technology
Theoretical Framework of Regional Economics

LOCATION THEORY:
- Central Place Theory
- Core-Periphery Theory
- Firm Location Theory
  - For service traders
  - For industry

TRADE THEORY:
- Input-Output Theory
- Comparative Advantage Theory
- Technological-gap Theory
- Product life-cycle Theory

GROWTH THEORY:
- Neo-classical Theories
- Cumulative Causation Theory
- Endogenous Growth Theory
- Dynamic growth Yjeory
- Growth Poles Theory
Wide range of Model Characteristics

- Simple – Sophisticated
- Static – Dynamic
- Short-run impact – Long-run impact
- Deterministic – Stochastic
- Aggregated – Disaggregated in terms of:
  - Geography (county or state: regional (one-region) – interregional (two-region) – multiregional)
  - Industries (from individual behavior multiindustry macroeconomic models: one-sector – two-sector – multi-sector)
Quantitative Regional Modeling Methods: Overview

REGIONAL ECONOMIC MODELLING

- Interregional and spatial micro simulation
- Spatial Statistics
- MPSGE

Gravity and Spatial Interaction
- Computable General Equilibrium Models
- Human Migration

Industrial and Urban programming

- Linear
- Nonlinear
- Social Accounting Matrices

Simple
- Macroeconomic models
  - Export-Base Theory/model
  - Economic-base theory/model

Kaynesian model/multipliers
- Consumption
- Investment
- Imports
- Government taxation

Sophisticated
- Input-Output Modeling
  - MRMI
  - IMPLAN
  - RIMS II

- Regional Econometric Models
  - WPSM
  - NRIES II

- Conjoined (Integrated) Models
  - REMI

Neringa Cepaitiene, Institute of Europe, Kaunas University of Technology
## Comparison of Regional Impact Models:
### Key Criteria

<table>
<thead>
<tr>
<th>Key Criteria</th>
<th>Simple</th>
<th>Sophisticated</th>
<th>Integrated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Export Base</td>
<td>Keynesian Multipliers</td>
<td>Input/Output (e.g., RIMS)</td>
</tr>
<tr>
<td>Cost (in terms of):</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase price</td>
<td>None</td>
<td>None</td>
<td>Low/moderate</td>
</tr>
<tr>
<td>Data</td>
<td>Low/ moderate</td>
<td>Low/ moderate</td>
<td>High</td>
</tr>
<tr>
<td>Training</td>
<td>Low</td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td>Hardware</td>
<td>None/low</td>
<td>None/low</td>
<td>Moderate/high</td>
</tr>
<tr>
<td>Ease of use and flexibility</td>
<td>Easy to use,</td>
<td>Easy to use, low</td>
<td>Difficult to use, moderate/low</td>
</tr>
<tr>
<td>for policy simulation</td>
<td>low flexibility</td>
<td>low flexibility</td>
<td>flexibility</td>
</tr>
<tr>
<td>Level of disaggregation:</td>
<td>County</td>
<td>County</td>
<td>State/county</td>
</tr>
<tr>
<td>Geographic</td>
<td>None/limited</td>
<td>None/limited</td>
<td>500+ industries</td>
</tr>
<tr>
<td>Industry</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Included in purchase price
## Comparison of Regional Impact Models: Key Model Components

<table>
<thead>
<tr>
<th>Key Criteria</th>
<th>Simple</th>
<th>Keynesian Multipliers</th>
<th>Input/Output (e.g., RIMS)</th>
<th>Econometric (e.g., NREIS II)</th>
<th>Integrated (e.g., REMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of sources of economic growth</strong></td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Demand for factor inputs</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>(number of factors)</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes (2)</td>
<td>Yes (3)</td>
</tr>
<tr>
<td>Supply of factor inputs:</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>Includes factors affecting supply of labour?</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Models population growth and migration?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Prices, profits, and market shares. Include factors affecting:</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>capital cost?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>consumer prices?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>market share of local industries?</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

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*Neringa Cepaitiene, Institute of Europe, Kaunas University of Technology*
Key Components of the REMI Integrated Regional model

Source: Duncombe and Wong, 1998)
Regional Division of the Republic of Lithuania

• Four ethnic regions
• Soviet times – 98 rayons in the three Baltic States
• 1994 - Lithuania was reorganized into 10 apskritis (counties)
• Further reforms: emergence of 3 levels of country regions
• 2001 - regional classification corresponding to the NUTS principles introduced and applied in Lithuania.
  ➢ NUTS I and II level - the whole country;
  ➢ NUTS III level – 10 counties (apskritis);
  ➢ NUTS IV level – 60 municipalities (savivaldybes);
  ➢ NUTS V level – 446 neighbourhoods (seniunijos).
• Since 1999 Lithuania reports Eurostat statistical data of regions at NUTS II and NUTS III levels.
Regional Division of the Republic of Lithuania
Territories and population in counties at the beginning of 2003

- Taurage
- Telsiai
- Utena
- Alytus
- Marijampole
- Siulai
- Klaipeda
- Panevezys
- Kaunas
- Vilnius

**Values in thousands**

- Territory (thousand hectares)
- Population (thousands)
Unemployment by municipalities on 1 October, 2003
Country GDP change during the period of 1994 – 2003

- Total GDP in actual prices, millions LTL
- GDP change comparing to previous year in comparative prices of 1995, %
GDP per capita in Counties of Lithuania 1996 – 2000, thousands LTL

<table>
<thead>
<tr>
<th>Year</th>
<th>Taurage</th>
<th>Marijampole</th>
<th>Siauliai</th>
<th>Alytus</th>
<th>Panevezys</th>
<th>Telsiai</th>
<th>Utena</th>
<th>Kaunas</th>
<th>Klaipeda</th>
<th>Vilnius</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>7.0</td>
<td>9.0</td>
<td>11.0</td>
<td>13.0</td>
<td>15.0</td>
<td>17.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1997</td>
<td>7.5</td>
<td>9.5</td>
<td>11.5</td>
<td>13.5</td>
<td>15.5</td>
<td>17.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1998</td>
<td>8.0</td>
<td>10.0</td>
<td>12.0</td>
<td>14.0</td>
<td>16.0</td>
<td>18.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999</td>
<td>8.5</td>
<td>10.5</td>
<td>12.5</td>
<td>14.5</td>
<td>16.5</td>
<td>18.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000*</td>
<td>9.0</td>
<td>11.0</td>
<td>13.0</td>
<td>15.0</td>
<td>17.0</td>
<td>19.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Foreign direct investment per capita in counties of Lithuania 1996 - 2000 m. (LTL)
Strategic Planning System Model

- **Long-term goals (vision)**
  - (more than 7 years)

- **Medium-term goals**
  - (from 3 to 7 years)

- **Short-term Goals**
  - (from 1 to 3 years)

**Geopolitical traits**
- Long-term priorities
- Long-term sectoral visions

**Long-term strategic planning documents**
- Long-term strategy for economic development
- General Plan of the Territory of the Republic of Lithuania, etc.

**Inter-sectoral planning documents**
- National development plan
- Regional development plans
- Programme of Lithuania’s preparation for the EU membership
- Medium-term economic programme, submitted to the Commission
- Programme of Lithuania’s preparation for NATO membership, etc.

**Sectoral strategy**

**Strategic Activity Plan**
- Programme (No. 1)
- Programme (No. 2 and t.t.)

**Programme**
- Programme (No. 1)
- Programme (No. 2 and t.t.)
Thank you for your attention!