Economic impact evaluation challenges posed by new European Union Cohesion policy: The case of the GMR-approach

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Introduction

- Economic impact vs. micro level (project) evaluation
- The role of economic models
- Disappointment in traditional development policies and the emergence of new policy approaches
- The EU's new Cohesion policy follows a place-based approach
- Challenges for impact modeling

Introduction

- Search for new modeling approaches (MASST, GMR-type models (GMR-Hungary, GMR-Europe, RHOMOLO), system dynamic approach)
- This presentation:
  - relates modeling challenges to the emergence of new development policy approaches;
  - classifies the challenges towards economic modeling;
  - illustrates the reflection to the challenges by the GMR- Europe model.

A debate on development policy

- Limited success of traditional approaches in reducing disparities (subsidies to lagging regions in forms of tax reductions to firms, infrastructure investments, uncoordinated R&D and innovation support)
- Disappointment led to the emergence of modern approaches: space-neutral vs. place-based

The new EU Cohesion Policy

- It follows the place-based approach in economic development
  - "smart specialization"
    - integrated policy instruments (human capital, R&D, entrepreneurship)
    - In target: place-specific industrial comparative advantages
    - multi-level governance
    - Participation (industry, universities, local organizations)

Costs and benefits of alternative place-based policy interventions

- Overall policy impact (at the national and EU level) depends not only on the specific **instruments** applied but also on the concrete **geographic patterns** in which these instruments are deployed regionally

- Specially constructed **economic models** could help policymakers to **select a particular geographic and instrumental combination** of projects that seem to utilize most efficiently the available structural policy budget according to the knowledge available at the time of the decision.

Geography and policy effects

- Geographic dimensions determining the growth effects of development policies to be incorporated in modeling:
  - Local specificities (industrial structure, research specialization)
  - Cumulative agglomeration effects
  - Additional impacts (Keynesian demand effects, intersectoral linkages)
  - Interrregional impacts (spillovers, trade)
  - Intervention-specific macroeconomic impacts

Modeling challenges

- Step 1: Modeling policy impact on technological progress
  - Mechanisms discovered in the geography of innovation literature: local / global knowledge flows, different agglomeration effects (MAR or Jacobs, related variety), entrepreneurship
  - Modeling possibilities:
    - knowledge production function (Varga et al 2013)
    - evolutionary techniques (Faggiolo, Dosi 2003)

Modeling challenges

- Step 2: Modeling the transmission of the technology impact to economic variables
  - Productivity and variety impacts (Saviotti, Pyka 2003)
  - What growth theories offer:
    - Romer 1990 – productivity impact at the end
    - Aghion, Howitt 1998: limited variety impact
    - Evolutionary theories get closer to formulating variety effects (Saviotti, Pyka 2003, Faggiolo, Dosi 2003)
  - Technical difficulties, problems with regional data

Modeling challenges

- Step 3: Modeling spatiotemporal dynamics of economic growth
  - Spatiotemporal dynamics modeling: accounting for both the extension of production factors and their changing spatial patterns
  - Spatiotemporal dynamics both modeled at the level of regions
    - Forward looking expectations (Bröcker, Korzhenevych 2011)
    - Alternative investment and saving behavior (Ivanova et al 2007)
  - Spatiotemporal dynamics modeled separately in macro and regional models (Varga et al. 2011)

Modeling challenges

- Step 4: Macro impact integration
  - Impacts of macroeconomic framework conditions
  - New and open area of research (Varga et al. 2011)

The GMR approach: Antecedens and applications

- **GMR: Geographic Macro and Regional models**

- **Antecedents**:
  - Links to theory: Acs-Varga 2002
  - Empirical modeling framework (Varga 2006)
  - The EcoRet model (Schalk, Varga 2004, Varga, Schalk 2004)
  - The GMR-Hungary model (Varga, Schalk, Koike, Járosi, Tavasszy 2008; Járosi, Koike, Thissen, Varga 2010)
  - Dynamic KPF model for EU regions (Varga, Pontikakis, Chorafakis, 2013)
  - GMR-EU (Varga, Járosi, Sebestyén 2011; Varga,Törma 2011)
- **Applications**: Cohesion Policy impact studies for the European Commission (DG Regio) and the Hungarian government; FP6 impact study

Reflections to challenges in the GMR-Europe model

- Step 1: Modeling policy impact on technological progress
  - Spatialized extension of the Romer 1990 knowledge production model incorporating several elements of the findings in the geography of innovation literature (Varga et al 2013, Sebestyén, Varga 2013)
  - Dynamic agglomeration effects
  - Interregional knowledge flows (copatenting, copublication network effects)
  - Interregional spillovers – with no specific mechanisms identified (spatial econometrics)

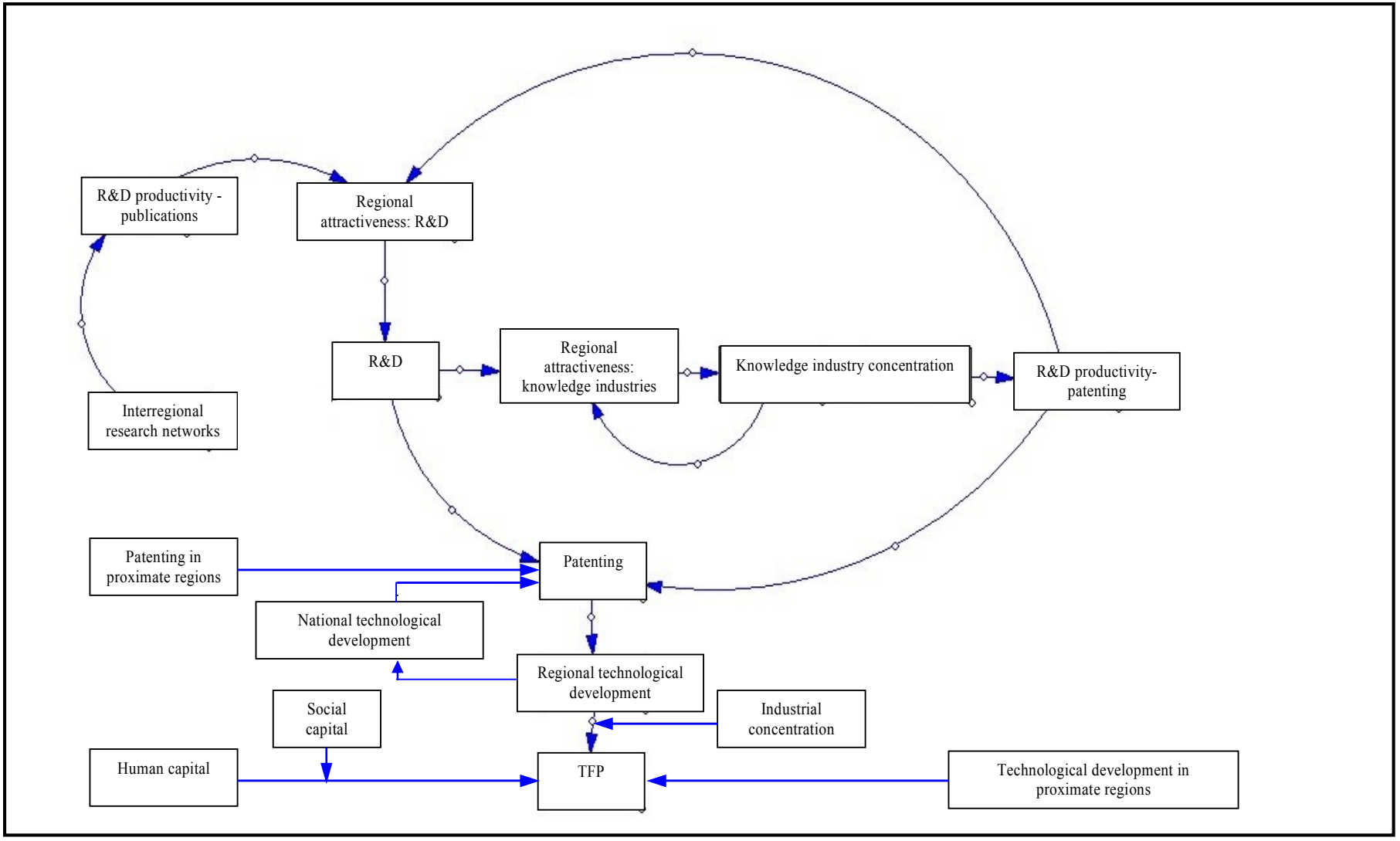


Figure 1: The estimated regional dynamics of innovation policies in the TFP block of the GMR-Europe model

Reflections to challenges in the GMR-Europe model

- Step 2. Modeling the transmission of the technology impact to economic variables
  - Technological ideas channeled through their TFP effects

$$TFP_{i,t} = \alpha_{TFP0} HCAP_{i,t-k}^{\alpha_{TFP1}} SOCKAP_{i,t-k} A_{i,t-k}^{\alpha_{TFP2} \ln(L_{i,t-k}/AREA_i)} W\_A_{i,t-k}^{\alpha_{TFP3}}$$

Reflections to challenges in the GMR-Europe model

- Steps 3 and 4: Modeling spatiotemporal dynamics of economic growth and macro impact integration
  - Step 3a: Short run effects (given K and L, no migration) – system of regional CGE models
  - Step 3b: Spatial dynamics with constant aggregate K and L but with their migration across regions – in the system of regional CGE models
  - Step 3c: Dynamic regional and macro impacts – in a macro model

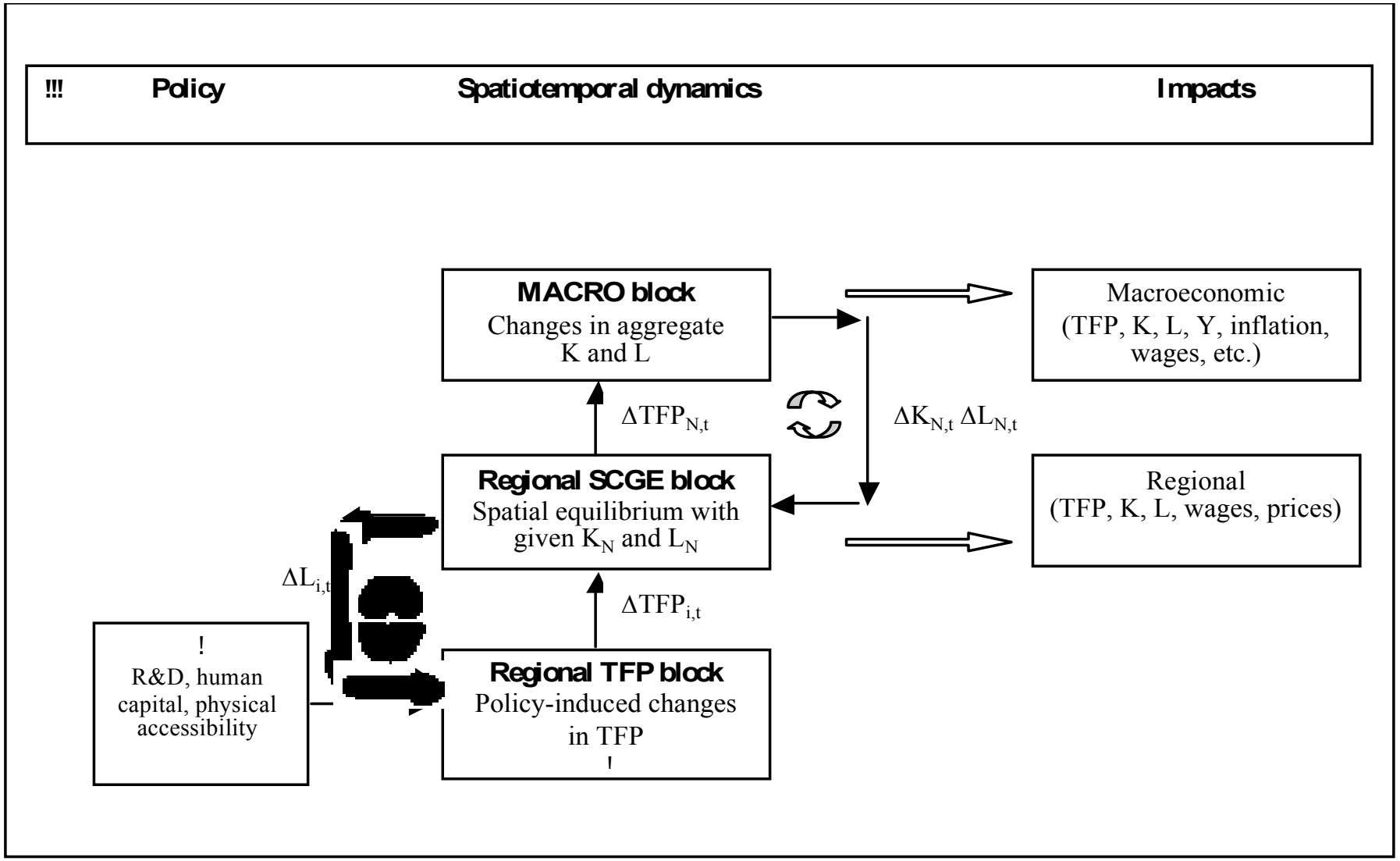
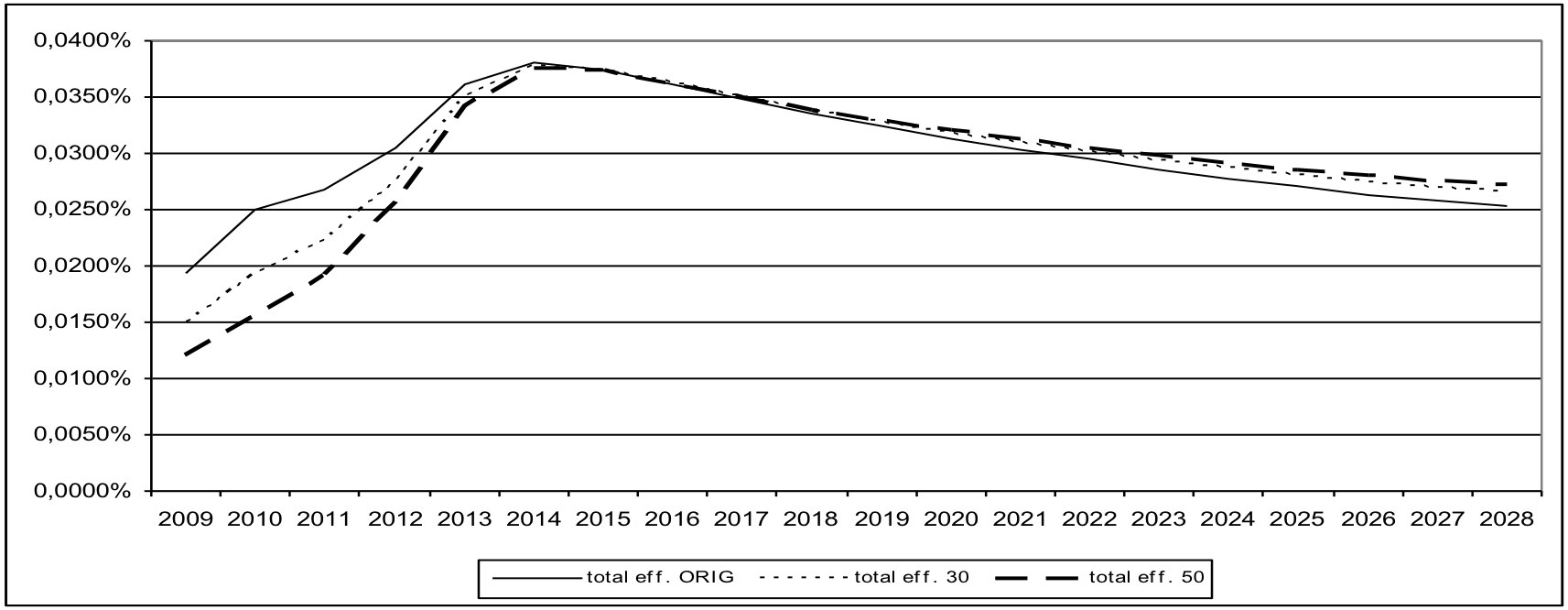
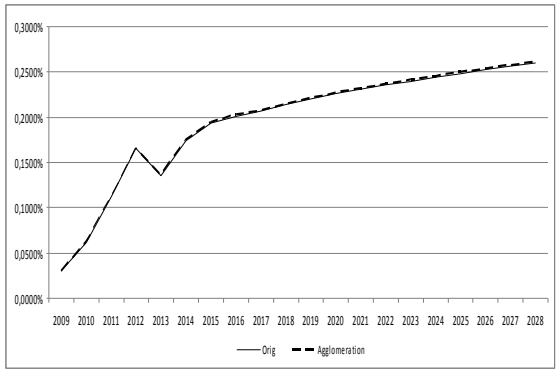


Figure 2: Regional and macro impacts of regionally implemented innovation policies in the GMR-Europe model

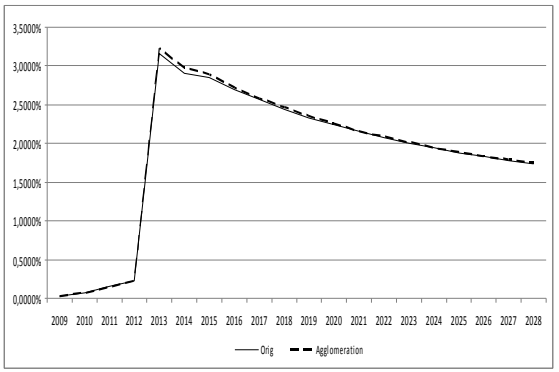
Figure 3.2: The Europe 2020 scenario: redistribution of Cohesion Funds subsidies from "hard" to "soft" instruments. Percentage differences between scenario and baseline GDP values for three cases: no redistribution, 30 percent of hard subsidies are redistributed, 50 percent of hard subsidies are redistributed



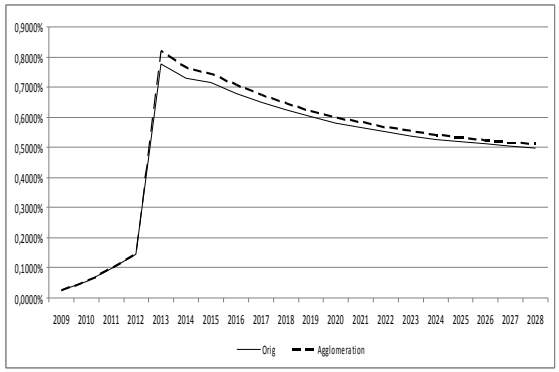
Note: The extended GMR Europe model system was run for the analysis



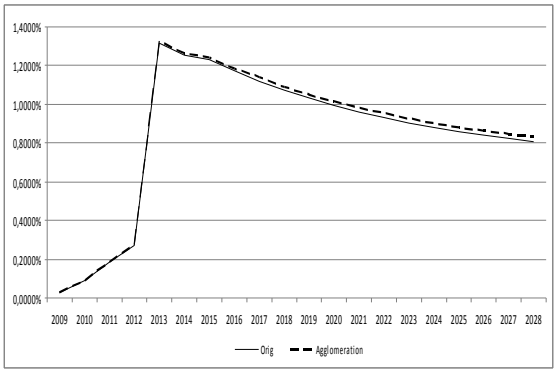
The Agglomeration effect: Greece



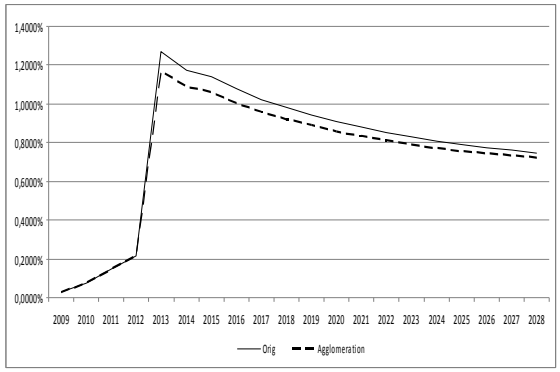
The Agglomeration effect: Portugal



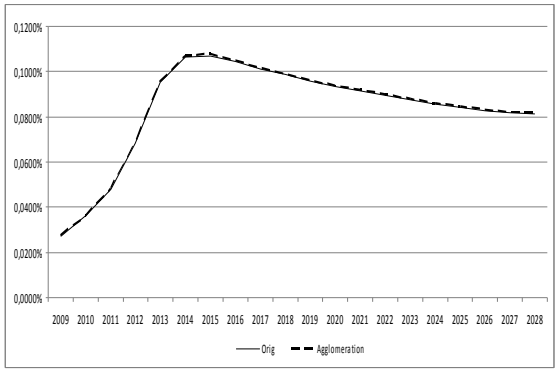
The Agglomeration effect: Czech Republic



The Agglomeration effect: Hungary

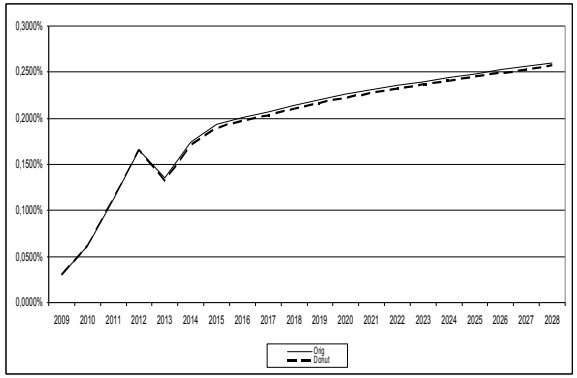


The Agglomeration effect: Slovak Republic

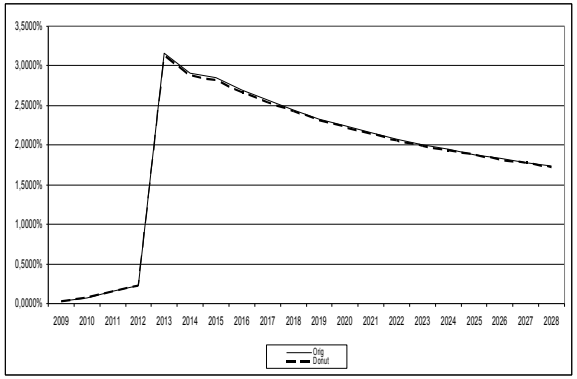


The Agglomeration effect: Euro zone + CZ, HU, SK

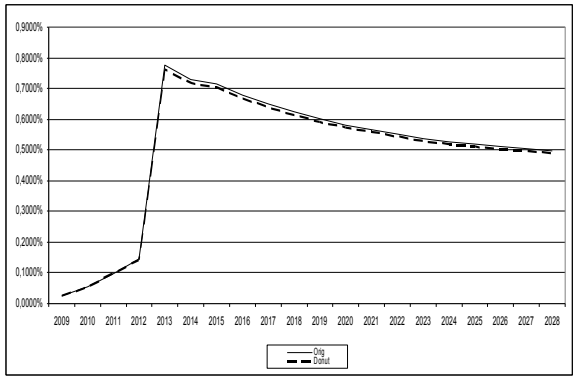
Figure 6: Results of the Agglomeration and concentration scenario
Percentage differences between scenario and baseline GDP values.



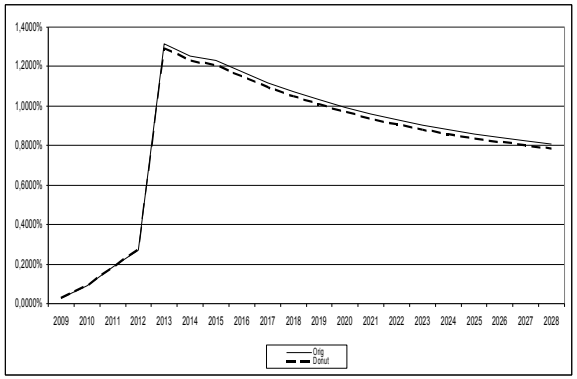
The Donut effect: Greece



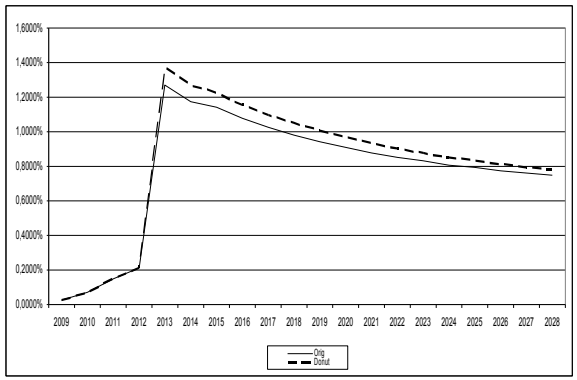
The Donut effect: Portugal



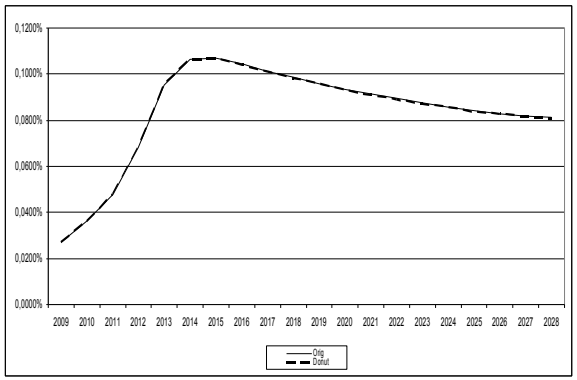
The Donut effect: Czech Republic



The Donut effect: Hungary



The Donut effect: Slovak Republic



The Donut effect: Euro zone + CZ, HU, SK

Figure 5: Results of the Donut scenario
Percentage differences between scenario and baseline GDP values.