

# Economic impact evaluation of the 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
- Emerging awareness: regional development should be treated as integral part of national level structural policies
- Limited relevance of traditional macroeconomic models

# 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 debate on development policy

- The space-neutral approach (World Bank 2009)
  - Strong influence of the new economic geography
  - Emphasis on the role of agglomeration in economic development
  - Key policy message: agglomeration forces should be strengthened by integration
    - Institutional development (public services)
    - Physical accessibility

# The debate on development policy

- The space neutral approach (cont.)
  - In general: no need to space-specific policies, universal coverage in all territories
  - Agglomeration forces are strengthened by migration and increased market access
  - Policies targeting specific lagging places distract resources from their more efficient use
  - Partial support regarding regional innovation policy

# The debate on development policy

- The place-base approach (OECD 2009)
  - Agglomeration forces are important but their strengths weaken with economic development
  - OECD countries: only one-third of growth is contributed by core regions (Garcilazo et al. 2013)
  - In more developed countries: regional institutional variation is not significantly large anymore
  - Space-neutral policy growth effect is marginal most probably (Barca et al. 2012)

# The debate on development policy

- The place-based approach (cont.)
  - For more developed countries integrated, innovation-based regional development policies are suggested
  - “smart specialization”
    - integrated policy instruments
    - In target: place-specific industrial comparative advantages
    - multi-level governance
    - Participation (industry, universities, local organizations)

# The debate on development policy

- The debate:
  - divergent assumptions
  - different weights on essentially the same instruments
- No theoretical solution seems possible
- Place-based vs. space neutral instruments: their effectiveness tends to vary by concrete country and regional settings
- The key role of correctly developed economic models in the evaluation of concrete policy instrument combinations by measuring their costs and benefits

# New generation development policy impact modeling

- Geographic dimensions determining the growth effects of development policies to be incorporated in modeling:
  - Local specificities (industrial structure, research specialization)
  - Policy impact on local sources of growth (technology, investment, employment)
  - 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

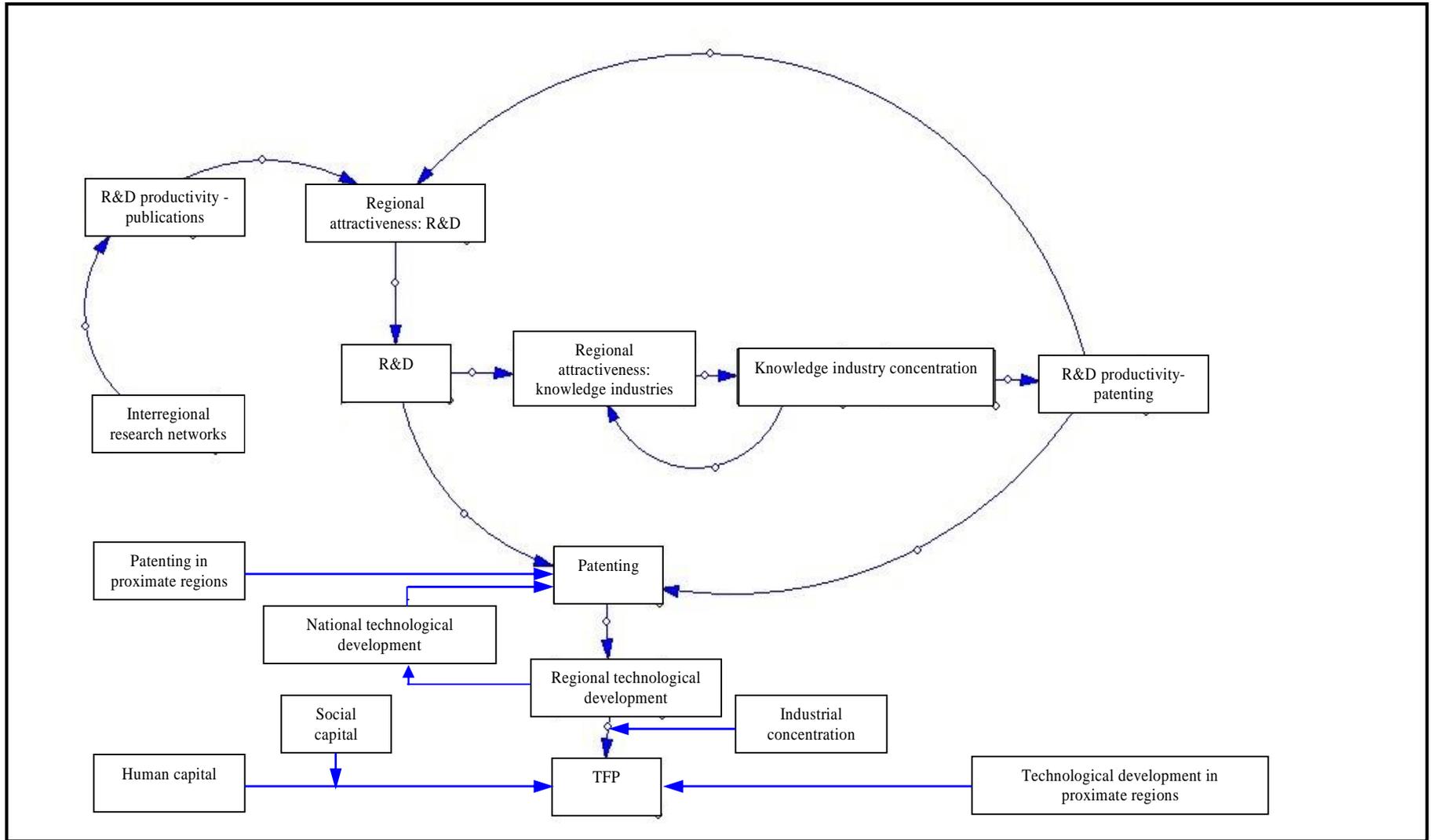
- Step 4: Macro impact integration
  - Impacts of macroeconomic framework conditions
  - New and open area of research (Varga et al. 2011)

# The GMR approach: Antecedens and applications

- **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, 2009)
  - GMR-EU (Varga, Járosi, Sebestyén 2009; 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

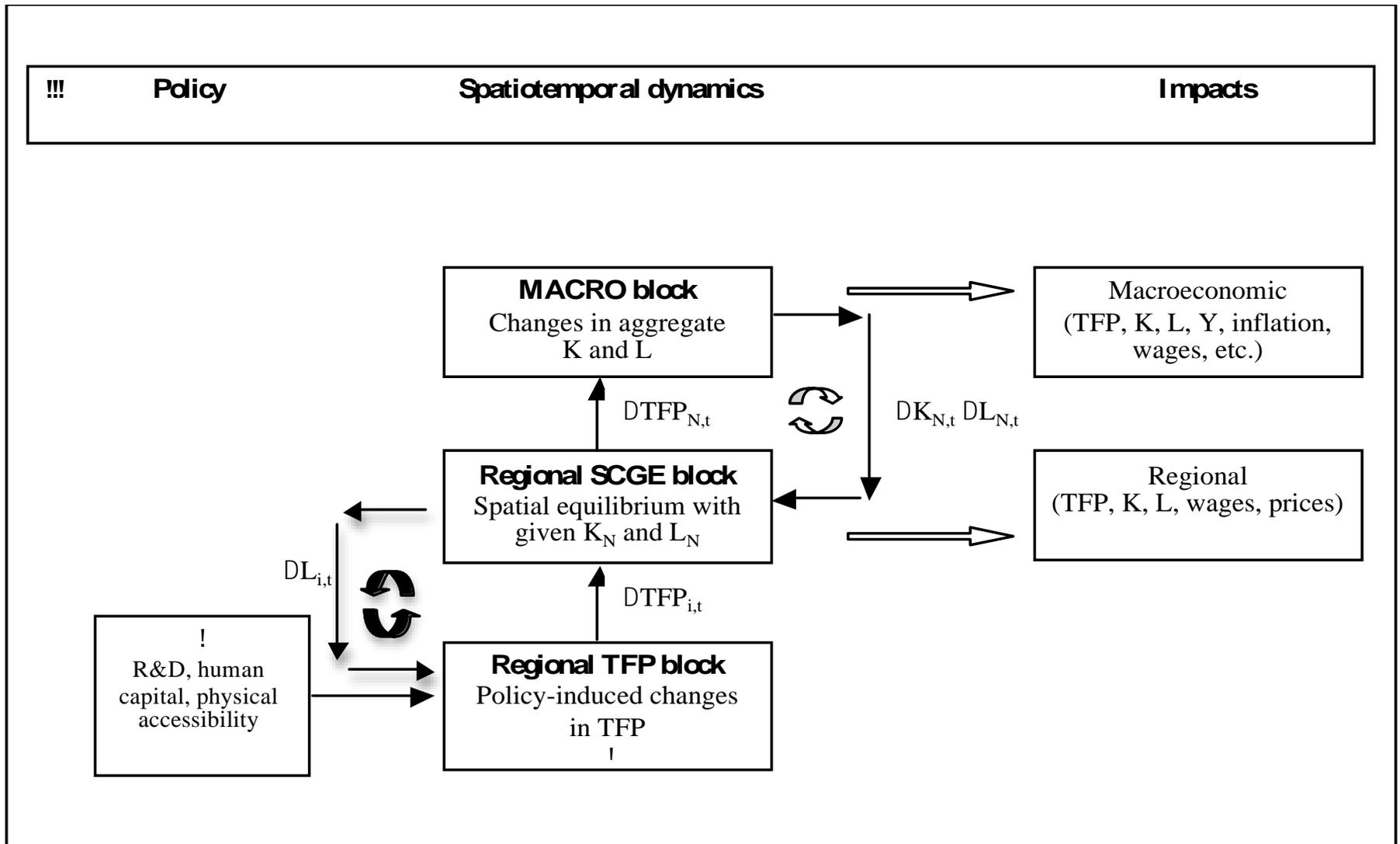
# Reflections to challenges in the GMR-Europe model

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

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

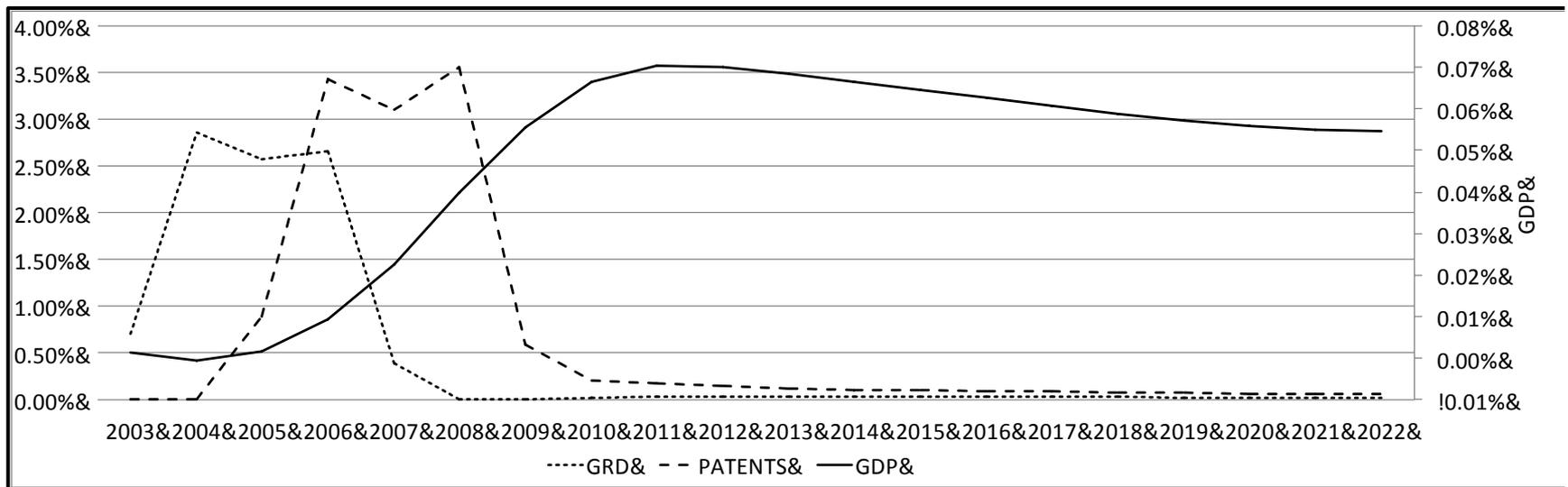
# Reflections to challenges in the GMR-Europe model

- 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



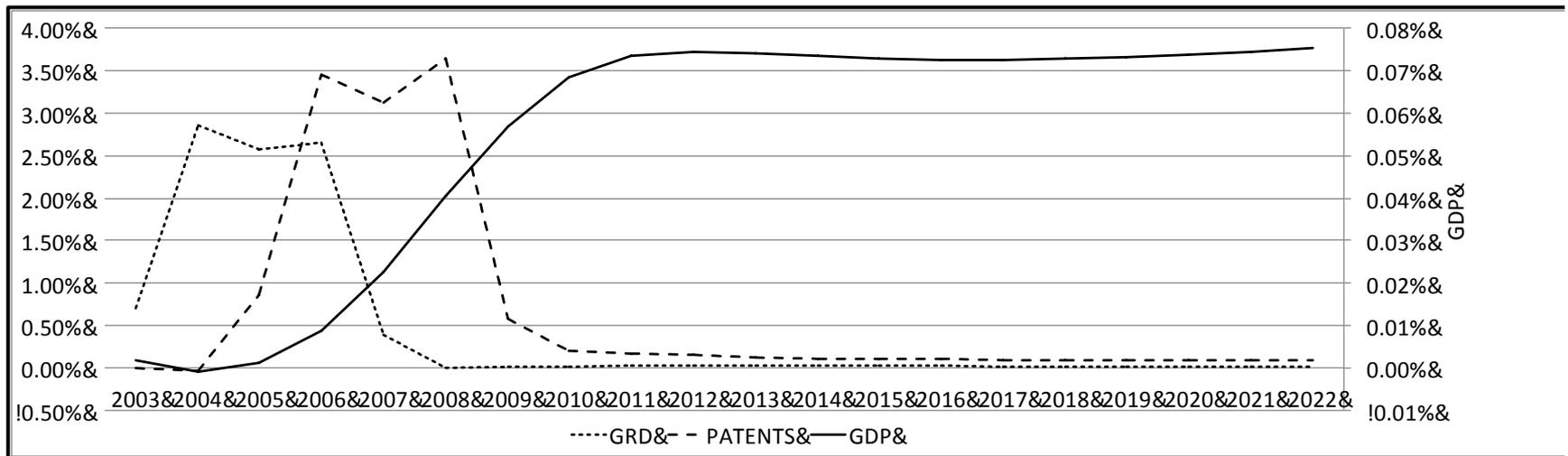
**Figure 2:** Regional and macro impacts of regionally implemented innovation policies in the GMR-Europe model

# A policy impact analysis example: A place-based policy mix for a sustained aggregate GDP impact of the EU Framework Programs



**Figure 3:** The impact of FP 6 research subsidies (GRD) on patents (both on the left vertical axis) and GDP (right vertical axis) at the aggregate European level

# A policy impact analysis example: A place-based policy mix for a sustained aggregate GDP impact of the EU Framework Programs



**Figure 4:** The impact of FP 6 research subsidies (GRD) on patents (both on the left vertical axis) and GDP (right vertical axis) at the aggregate European level: Quality redistribution of 5% of national research expenditures following the geographic patterns of FP 6 research support and a compensatory 0.5% annual increases of human capital over the period of 2003-2022