

# Effects of smart specialization on regional economic resilience in EU

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# Motivation

- The term **regional economic resilience** received substantial interest lately (e.g. Bristow, 2010; Hassink, 2010; Christopherson et al, 2010; Simmie & Martin 2010; Martin 2012; Bristow & Healy 2014; Martin and Sunley, 2014).
- Regional economic resilience still stays unexplored.
- **Smart specialization** is one of the cornerstones of the new place-based approach characterising regional development interventions in the European Union (EU) (Rodriguez-Pose et al., 2014).

# Motivation

- Link Regional economic resilience - Smart specialization?
- Regional economic resilience is **“characterized by a fuller and more productive use of its physical, human and environmental resources (Martin and Sunley, 2014)”**
- The **“fuller and more productive use of resources”** has been recognized as significant attribute of the smart specialization concept which **emphasizes issues of economic potential, and the mechanisms whereby such potential is most likely to be realized** (p. 1293, McCann and Ortega-Argilés, 2015).
- However, in the literature there is no (empirical) investigations that tackles this issue (Link Regional economic resilience - Smart specialization).

# Literature review

- **Regional economic resilience?**
- Word resilience comes from Latin “resilire” which means to rebound or leap back and therefore researchers try to imbed in their definitions (e.g. Martin, 2012)
- Literature offers several different definitions of the regional economic resilience (more details in papers: Martin and Sunley, 2014; and Modica and Reggiani, 2015)
- Martin and Sunley (2014) define regional economic resilience as the capacity of a regional or local economy to withstand or recover from market, competitive and environmental shocks to its developmental growth path, if necessary by undergoing adaptive changes to its economic structures and its social and institutional arrangements, so as to maintain or restore its previous developmental path, or transit to a new sustainable path characterized by a fuller and more productive use of its physical, human and environmental resources.

# Literature review

1) Martin and Sunley (2014) definition indicates the importance of effective and efficient use of the regional potentials!

2) Smart specialization concept emphasizes issues of economic potential, and the mechanisms whereby such potential is most likely be realized (p. 1293, McCann and Ortega- Argilés, 2015).

=> 1) + 2) => **Importance of the smart specialization for regional economic resilience.**

# Empirical research

- Empirical analysis is performed for NUTS 2 regions in EU 27 based on a panel data approach on EUROSTAT data, QoG EU Regional dataset, and World Bank dataset for a 14-years period from 2001 to 2014.
- Two group of variables are particularly important for this study: **measure of regional economic resilience and smart specialization.**

# Empirical research

- **Measuring regional economic resilience is not straightforward task** (e.g. Simmie and Martin, Martin, 2012, Fingleton et al., 2012, Cowell, 2013, Sensier et al., 2016)
- As a proxy for **regional economic resilience** we use Sensitivity index (RES) (introduced in papers by Martin, 2012; and Finleton et al., 2012)

$$RES = \frac{\left(\frac{\Delta E_r}{E_r}\right)}{\left(\frac{\Delta E_{EU-27}}{E_{EU-27}}\right)} \quad (1)$$

In equation (1)  $\Delta E_r$  stands for employment loss in region  $i$  in period  $t$  compared to period  $t-1$  while  $E_r$  is employment in region  $i$  in period  $t$ . The symbol  $\Delta_{EU-27}$  stands for employment loss in EU 27 in period  $t$  compared to period  $t-1$ , while  $E_{EU-27}$  represents employment in period  $t$ .

# Empirical research

- For measuring smart specialization we use:
  - **patents application filled to the European Patent Office (EPO) per million inhabitants in region (Rodriguez-Pose et al., 2014)**
  - patent applications to the EPO, per million of active population in region.
- Other control variable:
  - level of GDP (GDPpc), labor force participation(PART), education (EDU), institutional quality (WGI), infrastructure (RAIL) and specialization indexes (SI).



# Empirical model

$$RES_{it} = \mu + \gamma_1 RES_{i,t-2} + \gamma_2 RES_{i,t-1} + \beta_1 \log SS_{i,t-1} + \beta_2 \log GDPpc_{i,t-1} + \beta_3 EDU_{i,t-1} + \beta_4 PART_{i,t-1} + \beta_5 WGI_{i,t-1} + \beta_6 \log RAIL_{i,t-1} + SI_{i,t-1} \delta + \alpha_i + \varepsilon_{it} \quad (3)$$

The model in equation (3) will be tested through 2 different options. In both models all previous mentioned control variables are included (level of GDP - GDPpc, labor force participation - PART, education - EDU, modified institutional quality - WGI, infrastructure quality - RAIL and specialization indexes - SI).

Difference between two options is our proxy variable for smart specialization. Option 1 includes patent per million inhabitant as indicator of SS while in Option 2, as additional robustness check, indicator for SS is per million of active population.

# Empirical findings

**Table 3: Estimation Results (Blundel and Bond GMM System Estimator) for model of regional resilience**

	Option 1	Option 1
Cons.	-70.59	-59.31
L.RES	-0.0693***	-0.0686***
L2.RES	-0.0735***	-0.0727***
<b>L.logSSinh</b>	<b>-4.889***</b>	
<b>L.logSSact</b>		<b>-5.014***</b>
L.logGDPpc	-47.04***	-47.90***
L.EDU	-0.817*	-0.785*
L.PART	-7.235***	-7.221***
L.WGIE	95.08***	94.11***
L.logRAIL	-18.55***	-18.67***
L.AGR	167.3***	165.5***
L.IND	319.1***	320.0***
L.CON	14.08	14.07
L.DIS	505.9***	508.2***
L.ADM	22.06	20.71
Number of observations	908	908
Number of groups	138	138
Number of instruments	88	88
Sargan test (P-value)	0.2689	0.2668
m1-test (P-value)	0.0000	0.0000
m2-test (P-value)	0.7968	0.7819

Standard errors in parentheses

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

Source: compiled by the authors using software Stata 13.0

# Empirical findings

1. Results indicate that **higher level of implementation of smart specialization (SS) decreases sensitivity of regional economy (RES) and therefore increases regional economic resilience.**

# Concluding remarks

- This research is important because it provides for the **first time investigation of the relationship between smart specialization and regional economic resilience**. (=> higher level of implementation of smart specialization increases regional economic resilience).
- This empirical analysis doesn't not have a goal to provide and explain the theoretical background for this relationship, but just to provide the empirical evidence that may stimulate research to pay more attention on theoretical explanation for possible channels through which smart specialization might affect regional economic resilience.

Thank you for your attention

Questions?

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