Research & Innovation in Southern Europe
2007-2016: a troubled decade

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“EU cohesion”

- Dynamics center-periphery (…or EU North - EU South)
- Convergence, catching up… or divergence?
- What are the factors behind these dynamics?
- Economic structure; International Specialization and trade patterns; Institutional setting; Accumulation patterns (choices: resources allocation, intensity, orientation)
- R&I activities; S&T accumulation
- Outcomes (Growth, Social Cohesion, Welfare, Economic and environmental sustainability…)
- How did the “Great Recession” interfere with the EU convergence/divergence dynamics?
- How big was that impact? Will it have a lasting effect or just temporary?
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We will focus on R&I activities:

• R&D investment

• Scientific publications

• Patent applications
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- R&D investment (EUROSTAT: Gross Expenditure on R&D as a % of GDP)
- Scientific publications (SCIMAGO: “Documents published”)
- Patent applications (EPO: patent filings per country of residence of first applicant)
Sigma-Convergence in R&D (GERD/GDP)...

GERD to GDP (%) 2004-2015 EU28
EU 28
Sigma-Convergence in R&D (GERD/GDP)...
...but not in Patents or Publications

GERD to GDP (%) 2004-2015 EU28

Scientific Output 1997-2016 EU28

EPO Patents 2007-2016 EU28
2016 EU28
Y = Publications per $10^6$; X = Log Patents per $10^6$

From L to R: Greece, Portugal, Spain, Italy

Scientific publication and Patenting not linearly related!
2016 GLOBAL

$Y = \text{Publications per } 10^6; \quad X = \text{Log Patents per } 10^6$

From L to R: RU; TK; CN; Southern Europe; EU28; US; SK; JP
• We saw sigma convergence on EU’s GERD/GDP
• However Southern Europe doesn’t account for that
• Possibly East Europe is catching up
• GERD/GDP evolution was countercyclical in Greece
• Though remains low (<1%)
• The EU Southern country where the Great Recession impacted most in R&D was PT
BERD to GDP % 2004-2015

- EU (28 countries)
- Cyprus
- Greece
- Italy
- Malta
- Portugal
- Spain
Average yearly values over one decade (...not implying causality)

<table>
<thead>
<tr>
<th></th>
<th>GERD/GDP 2006-15</th>
<th>BERD/GDP 2006-15</th>
<th>Patents per m. 2007-16</th>
<th>HERD/GDP 2006-15</th>
<th>Publications per m. 2007-16</th>
</tr>
</thead>
<tbody>
<tr>
<td>EU</td>
<td>1.93</td>
<td>1.22</td>
<td>165</td>
<td>0.45</td>
<td>1839</td>
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<tr>
<td>GR</td>
<td>0.70</td>
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<td>0.27</td>
<td>1442</td>
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<tr>
<td>IT</td>
<td>1.23</td>
<td>0.66</td>
<td>84</td>
<td>0.36</td>
<td>1538</td>
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<tr>
<td>PT</td>
<td>1.33</td>
<td>0.64</td>
<td>16</td>
<td>0.51</td>
<td>1746</td>
</tr>
<tr>
<td>SP</td>
<td>1.27</td>
<td>0.68</td>
<td>51</td>
<td>0.35</td>
<td>1653</td>
</tr>
</tbody>
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### Average values, two 5-years periods

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</thead>
<tbody>
<tr>
<td>EU SE</td>
<td>1.85 / 2.02</td>
<td>1.16 / 1.28</td>
<td>163 / 167</td>
<td>0.43 / 0.47</td>
<td>1659/2019</td>
</tr>
<tr>
<td>GR</td>
<td>0.61 / 0.80</td>
<td>0.20 / 0.27</td>
<td>13 / 14</td>
<td>0.24 / 0.31</td>
<td>1538/1704</td>
</tr>
<tr>
<td>IT</td>
<td>1.16 / 1.30</td>
<td>0.61 / 0.71</td>
<td>87 / 81</td>
<td>0.35 / 0.37</td>
<td>1336/1710</td>
</tr>
<tr>
<td>PT</td>
<td>1.33 / 1.35</td>
<td>0.64 / 0.64</td>
<td>14 / 18</td>
<td>0.46 / 0.56</td>
<td>1348/2144</td>
</tr>
<tr>
<td>SP</td>
<td>1.28 / 1.27</td>
<td>0.69 / 0.67</td>
<td>49 / 53</td>
<td>0.35 / 0.36</td>
<td>1456/1851</td>
</tr>
</tbody>
</table>
Some conclusions from the last two tables

• Recession impacted on both GERD/GDP and BERD/GDP in Spain and Portugal, which remained flat over the decade
• Italy and Greece progressed well on those two indicators (like the EU) – though Greece’s GERD still < 1% of GDP
• However the former two improved their patenting performance, while the latter two didn’t – but all 4 remained too far of both the EU’s patenting average and international ‘best practice’
• All the 4 countries progressed well in publications (specially Portugal)
• The gap between S.E. and the EU much bigger for patenting (gap going up!) than for publications (gap going down)

What are the policy implications?
Simplistic analysis ← R&D, patenting, publications...

We didn’t discuss neither the quality of the publications nor the economic relevance of patenting activities

Determinants of scientific impact (Confraria et al 2017):

• Impact of publication not linearly related to GDP per capita
• Others factors seem more relevant, including international and industrial co-authorships and existence of minimal critical mass in different areas
How to connect S&T?

EU Southern countries have a relatively good scientific performance

(at least much better than some countries which are patenting a lot more)

How to get the return from existing “scientific knowledge stock”?  

Arqué-Castells et al (2016) show that for Spain and Portugal university researchers do not respond to higher royalty shares for patent licensing; most university patents have low commercial value; TTOs not enough focused on patent licensing
The structural disadvantage
Godinho & Mamede (2016), Southern Europe in crisis: industrial policy lessons from Italy and Portugal

• Lucchese, Nascia & Pianta (2016) argue that deindustrialization in Italy stems partially from the shortcomings of industrial policy.

• Our assessment of industrial policy in Portugal indicate that the absence of structural change does not seem to stem from the absence of adequate industrial policy measures.

• We concluded that despite existing room for improvements in the industrial policies, overcoming the current crisis in Southern Europe will require changes in macroeconomic policies.
To finalise

• Keep open the channels to absorb external S&T knowledge
• Need of institutional change and adaptation
• Improvements in the macroeconomic setting