Europe’s (Green) Innovation for Growth Challenge:

Discussing Luc Soete and Carolyn Fischer

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ARC 2011
Innovation for Growth?

- Where to look for growth for Europe?
  - Can innovation deliver? In which time frame?
    - Innovation Political Disadvantage: benefits long-term, uncertain and skewed
  - Will innovation deliver in Europe? For all (inclusive)?

- Even before crisis:
  - Europe’s innovation deficit (on average), but heterogeneity in innovation and its contribution to growth: beyond simple “distance to frontier” or “catching up”
    - Persistent innovation leaders in North (SE, FI, DK, DE)
    - Some of the catching up countries using innovation (IE, EST)
    - Persistent innovation followers (FR, UK)
    - Absence of innovation-growth nexus in South (EL, PT, ES, IT)
    - Non-innovation based growth (LV..)
  - Convergence in innovation much smaller than convergence in GDPpc
    - $\beta$-coefficient for GDPpc EU27 (93-08): -0.317 (0.057)***, $\beta$-coefficient for GERD(as%GDP) EU27 (98-06): -0.178 (0.07)**; $\beta$-coefficient for BERD(as%GDP) EU27 (98-06): -0.134 (0.08)ns
Intra-European Heterogeneity on Innovation Capacity

Source: Innovation Union Scoreboard (IUS) 2010
The sources of EU’s average innovation deficit

- Persistent Business R&D gap
- The nature of EU’s industrial structure is a major reason for the business R&D investment deficit

- EU is specialized in medium-tech (rather than high-tech, high-growth sectors)
- EU has less Young Leading Innovators (« Yollies ») in Innovation Based Growth Sectors (ICT an health)

Europe’s problem with
« creative destruction », « capacity for structural change »

Veugelers & Cincera (2010) Bruegel Policy Brief, Europe’s missing Yollies
Why Europe is missing Yollies in new sectors (compared to US)?

- Risk-taking financial markets
- Segmented product and service markets
  - Early users/lead markets
- (Re-)entry & exit costs
- Flexible labour markets
- Insufficient linking in “innovation system”
  - Industry science links
  - Large incumbents and small new entrants
  - Public Private partnerships
- Government policy
  - Funding, Procurement, Competition policy
- IPR regime

Problem is “Systemic”
Will pre-crisis business-as-usual policy agenda be sufficient?

IN NEED OF A COMMITMENT TO A GAME-CHANGING INNOVATION POLICY AGENDA

multilevel: EU/MS/regional short run/long run
Luc’s proposals

- Mission oriented green innovation policy
- Single Market
- 3% target
- Public services innovation
  - Best practice diffusion
  - PPP in procurement
Is there scope for green innovation based growth?  

Avoid stimulus version

• How to implement green technologies without jeopardizing growth?
• How to implement green technologies without jeopardizing existing competitiveness positions?
• How to turn green innovations into a new source of growth?
• How to turn CC challenge into competitiveness: green European Yollies?
  • Green competition
    • Many “slots”: multiple clean technologies; multiple applications;
    • Room for “new” players
    • Room for “national” dimension
• Can green be a GPT like ICT?
  • Beyond creation of new green innovations, also strong positive effects from “use”/uptake/diffusion of green innovations
Caroline’s suggestions for policy to minimize negative effects on growth and competitiveness

- **Carbon leakage**
  - Importance of GLOBAL carbon pricing
  - Output based rebating
  - Border carbon adjustment

- **Green technology policies**
  - Overlapping goals: Crowding out other innovations?
    - Evidence suggests no, on the contrary;
  - Overlapping instruments: pricing and/or subsidies
    - Evidence suggests complementarity
      - Cf Aghion et al., own CIS work
  - Targeting, picking winners
    - How to target?
      - Early stage, temporary, multiple technology paths, open transparent selection criteria, LT stable programs, evaluation
### Who’s who in green patenting

<table>
<thead>
<tr>
<th></th>
<th>Size</th>
<th>Specialization</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1988-2007</td>
<td>Share of country in World CET patents</td>
<td>RTA in CET patents</td>
<td>Herfindahl across CET technologies</td>
</tr>
<tr>
<td>TOP 6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>29.7%</td>
<td>0.99</td>
<td>0.72</td>
</tr>
<tr>
<td>US</td>
<td>15.9%</td>
<td>0.87</td>
<td>0.33</td>
</tr>
<tr>
<td>Germany</td>
<td>15.2%</td>
<td>1.05</td>
<td>0.28</td>
</tr>
<tr>
<td>Korea</td>
<td>5.6%</td>
<td>1.21</td>
<td>0.82</td>
</tr>
<tr>
<td>France</td>
<td>3.9%</td>
<td>0.70</td>
<td>0.26</td>
</tr>
<tr>
<td>UK</td>
<td>3.6%</td>
<td>0.98</td>
<td>0.28</td>
</tr>
<tr>
<td>EU</td>
<td>32.0%</td>
<td>1.01</td>
<td>0.25</td>
</tr>
<tr>
<td>BRICs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>China</td>
<td>0.9%</td>
<td>1.11</td>
<td>0.36</td>
</tr>
<tr>
<td>India</td>
<td>0.3%</td>
<td>1.44</td>
<td>0.45</td>
</tr>
<tr>
<td>Russia</td>
<td>0.2%</td>
<td>1.11</td>
<td>0.27</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.2%</td>
<td>1.51</td>
<td>0.41</td>
</tr>
</tbody>
</table>

Source: Own calculations on the basis of UNEP/EPO/ICTSD, 2010,
A multipolar green technology space?

<table>
<thead>
<tr>
<th>1988-2007</th>
<th>Share of largest country</th>
<th>Herfindahl</th>
<th>Countries with RTA in technology (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Solar PV</td>
<td>44 (JP)</td>
<td>24</td>
<td>JP, KR, TW</td>
</tr>
<tr>
<td>Solar Thermal</td>
<td>27 (GE)</td>
<td>10</td>
<td>DE, IT, NL, CA, CH, ES, AT, AU, IL</td>
</tr>
<tr>
<td>Wind</td>
<td>29 (GE)</td>
<td>12</td>
<td>DE, UK, NL, CA, DK (!), ES, NO, SE</td>
</tr>
<tr>
<td>GeoThermal</td>
<td>18 (US)</td>
<td>8</td>
<td>DE, IT, NL, CA, CH, CN, AT, SE, NO, FI, IL, HU</td>
</tr>
<tr>
<td>Hydro</td>
<td>20 (US)</td>
<td>9</td>
<td>US, UK, IT, CA, CH, ES, AT, SE, NO, AU</td>
</tr>
<tr>
<td>Biofuels</td>
<td>18.5 (US)</td>
<td>10</td>
<td>US, DE, FR, UK, IT, NL, CA, CH, CN, AT, FI, BE</td>
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<tr>
<td>CCS</td>
<td>32.5 (US)</td>
<td>16</td>
<td>US, FR, UK, NL, CA, NO</td>
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<tr>
<td>All CET</td>
<td>30 (JP)</td>
<td>14</td>
<td>DE, KR, NL, TW, DK, ES, CN(3)</td>
</tr>
</tbody>
</table>

Source: Own calculations on basis of UNEP/EPO/ICTSD, 2010

Notes: (1) Only countries with at least 1% of world patents in technology;
(2) although relative positions vary across technologies, the top 3 countries are always JP, US, GE;
(3) If taken as one aggregate, the EU would hold a RTA in all CETs excl Solar PV
Some characteristics of the private green innovation machine (as measured by CET patents)

- **Countries specialize in different technologies:**
  - Solar PV for Japan, Korea; Germany: Wind, Solar & Geo Thermal; France in Biofuels & CCS, Denmark in Wind...US more diversified

- **High concentration of patents in top countries (Japan, Germany, US), but concentration differs across technologies**
  - High concentration in the more mature Solar PV; also CCS
  - Lower concentration in Hydro, Biofuels, Geo Thermal

**Although Europe specializes on average on CET, member states positions differ across technologies;**
Combining policy instruments for eco-innovations

Probit results on policy mixing regulations & taxes with subsidies

<table>
<thead>
<tr>
<th></th>
<th>ECO-innovations</th>
<th>CO2 reductions</th>
<th>EN Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>REG/TAX &amp; SUBSIDIES</td>
<td>.371</td>
<td>.283</td>
<td>.253</td>
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<tr>
<td></td>
<td>.046</td>
<td>.051</td>
<td>.051</td>
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<tr>
<td>ONLY SUBSIDIES</td>
<td>.343</td>
<td>.183</td>
<td>.158</td>
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<tr>
<td></td>
<td>.045</td>
<td>.054</td>
<td>.055</td>
</tr>
<tr>
<td>ONLY REG/TAX</td>
<td>.445</td>
<td>.214</td>
<td>.138</td>
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<tr>
<td></td>
<td>.023</td>
<td>.023</td>
<td>.029</td>
</tr>
</tbody>
</table>

Marginal effects reported (discrete change of dummy variables from 0 to 1) (Dprobit (robust) command in STATA). All coefficients are significant at 1% level ***

Source: On the basis of CIS-VI data for Belgium. Veugelers (2011), forthcoming Research Policy Special Issue on Mission Oriented R&D