Europe's (Green) Innovation for Growth Challenge:

Discussing Luc Soete and Carolyn Fischer

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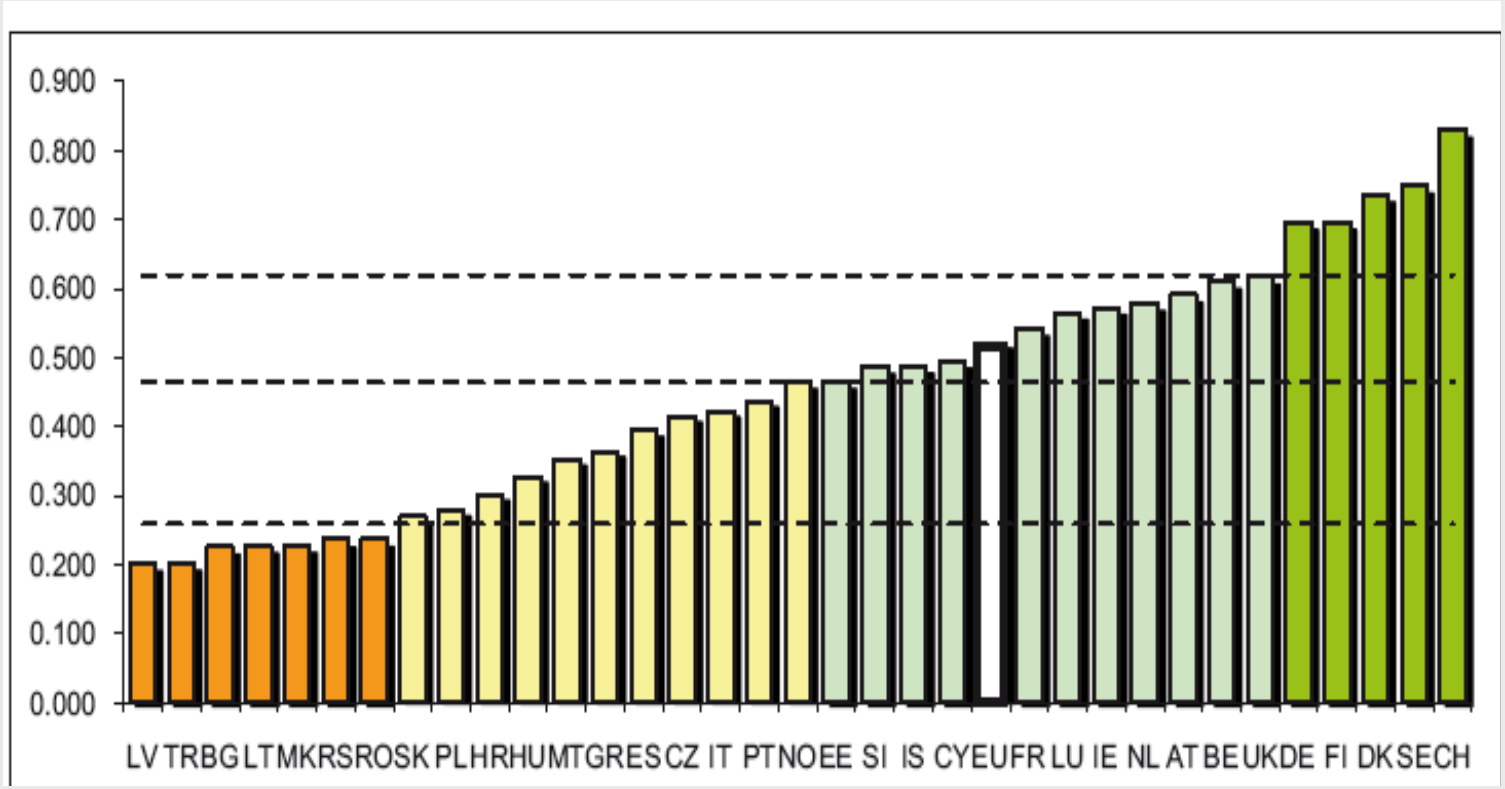
Innovation for Growth?

- **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**
    - B-coefficient for GDPpc EU27 (93-08): -0.317(0.057)***; B-coefficient for GERD(as%GDP) EU27 (98-06): -0.178 (0.07)**; B-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 jeoparding growth?**
- **How to implement green technologies without jeoparding 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

	Size	Specialization	Concentration
1988-2007	**Share of country in World CET patents**	**RTA in CET patents >< 1**	**Herfindahl across CET technologies**
TOP 6			
Japan	29.7%	0.99	0.72
US	15.9%	0.87	0.33
Germany	15.2%	1.05	0.28
Korea	5.6%	1.21	0.82
France	3.9%	0.70	0.26
UK	3.6%	0.98	0.28
EU	*32.0%*	*1.01*	*0.25*
BRICs			
China	0.9%	1.11	0.36
India	0.3%	1.44	0.45
Russia	0.2%	1.11	0.27
Brazil	0.2%	1.51	0.41

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

A multipolar green technology space?

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

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

	ECO-innovations	CO2 reductions	EN Efficiency
REG/TAX & SUBSIDIES	.371 .046	.283 .051	.253 .051
ONLY SUBSIDIES	.343 .045	.183 .054	.158 .055
ONLY REG/TAX	.445 .023	.214 .023	.138 .029

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