Matching Innovation Policies and Performance in EU countries

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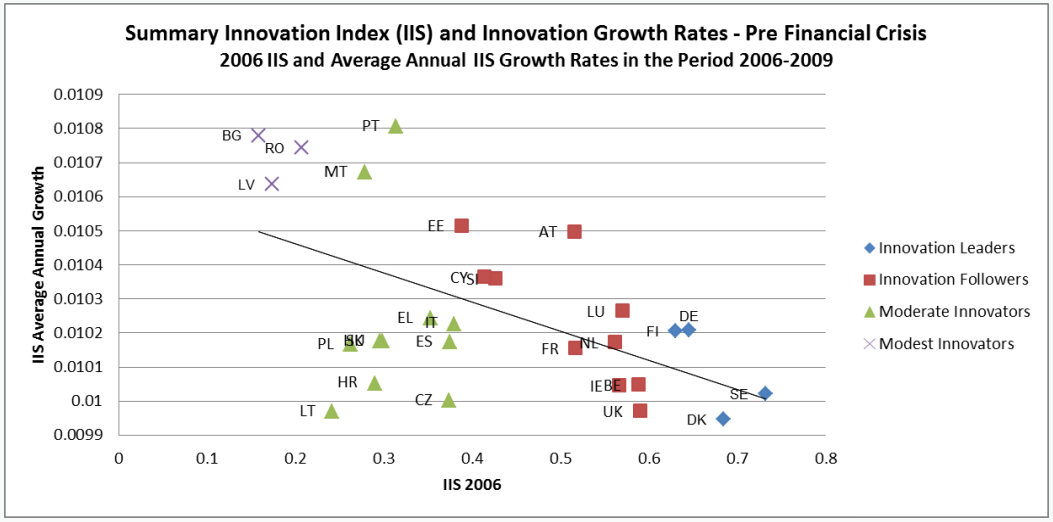
The European innovation landscape

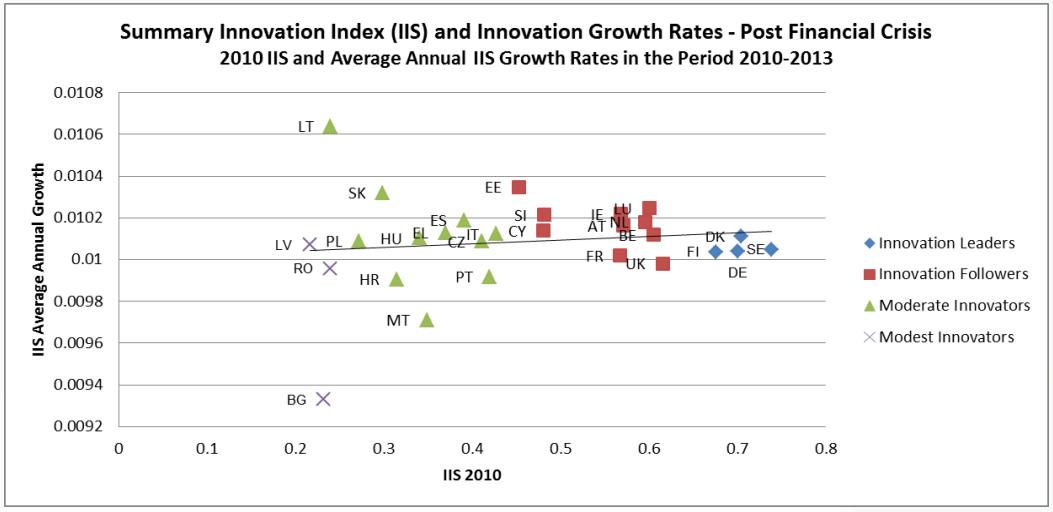
- **Europe maintains lofty ambitions for building its future growth through innovation.**
- **But these policy ambitions have so far not translated into lead performance.**
  - According to the latest (2015) Innovation Union Scoreboard indicator (IUS), relative to the US and Korea who are the leading IUS countries (=100), Europe has a score of 81.
- **Behind the EU's overall weak innovation performance is a growing divergence among its Member States.**
  - Especially the EU South has stopped to converge
- **In terms of the innovation policies used by member states, the evidence shows that the deployment of public budgets and the mix of instruments might have aggravated the divide.**

- **As innovation policies need to address country specificities, there is no one-size fits all innovation policy prescription.**
- **In need of systemic, continuous Monitoring & Evaluation strategy for member states innovation policies.**

Innovation Performance of EU Member States

Convergence halted?





Source: Bruegel calculations on the basis of Innovation Union Scoreboard 2014 Database.

A slow process of convergence in innovation capacity among EU countries stopped

IUS score	2006	2008	2010	2013
Average EU	**0.49**	**0.50**	**0.53**	**0.55**
Variation in innovation capacity *	**0.39**	**0.36**	**0.35**	**0.35**
Innovation leaders (Denmark, Finland, Germany, Sweden)	**0.67**	**0.68**	**0.70**	**0.72**
		Performance relative to innovation leaders (=100)		
Innovation followers (NL, BE, UK, IE, AT, FR, LU, SI, EE, CY)	76	79	79	81
Moderate innovators (IT, CZ, ES, PT, EL, HU, SK, MT, HR, LT, PL)	47	48	49	50
Modest innovators (LV, RO, BU):	27	31	33	30
CEE countries	42	44	45	46
Southern EU countries (EL,IT, ES, PT, CY, MT)	52	57	57	57
High fiscal consolidation countries	48	50	51	51

Source: Bruegel on the basis of IUS (2014). Note: The classification of countries into innovation leaders, innovation followers, moderate innovators and modest innovators follows IUS (2014) on the basis of the scoring of countries on the IUS indicator. CEE countries = central and eastern European countries (Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia). High fiscal consolidation countries are countries judged to have weak overall budgetary positions: Bulgaria, Cyprus, Czech Republic, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Slovakia, Spain. Scores for groups of countries are unweighted averages * coefficient of variation

The divide in the components of innovation capacity among EU countries

	ENABLERS			FIRM's ACTIVITIES			IMPACT	
IUS score	**Human re sources**	**Public re search system**	**Finance**	**Invest ment**	**Linkage**	**IP**	**Innov ators**	**Econ omic**
Average EU 2006	**0.46**	**0.40**	**0.57**	**0.45**	**0.50**	**0.51**	**0.51**	**0.53**
Average EU 2013	**0.58**	**0.53**	**0.56**	**0.42**	**0.55**	**0.56**	**0.55**	**0.60**
Variance in innov capacity 2006	**0.32**	**0.64**	**0.49**	**0.35**	**0.46**	**0.65**	**0.51**	**0.36**
Variance in innov capacity 2013	**0.24**	**0.58**	**0.43**	**0.43**	**0.49**	**0.51**	**0.48**	**0.31**
Innovation leaders 2006	**0.64**	**0.53**	**0.69**	**0.63**	**0.79**	**0.72**	**0.78**	**0.61**
Innovation Leaders 2013	**0.74**	**0.67**	**0.71**	**0.62**	**0.77**	**0.78**	**0.76**	**0.66**
Performance relative to innovation leaders (=100)								
Innovation followers- 2006	83	86	72	75	74	59	79	85
Innovation followers 2013	89	91	78	71	90	71	73	84
EU-CEE- 2006	64	26	45	62	40	23	36	52
EU-CEE- 2013	76	29	55	49	41	34	37	55
Southern EU - 2006	55	47	40	61	48	35	56	69
Southern EU- 2013	59	55	41	50	58	50	59	72
High fiscal consolidation- 2006	64	41	43	64	45	29	46	58
High fiscal consolidation- 2013	73	44	48	46	46	38	47	66

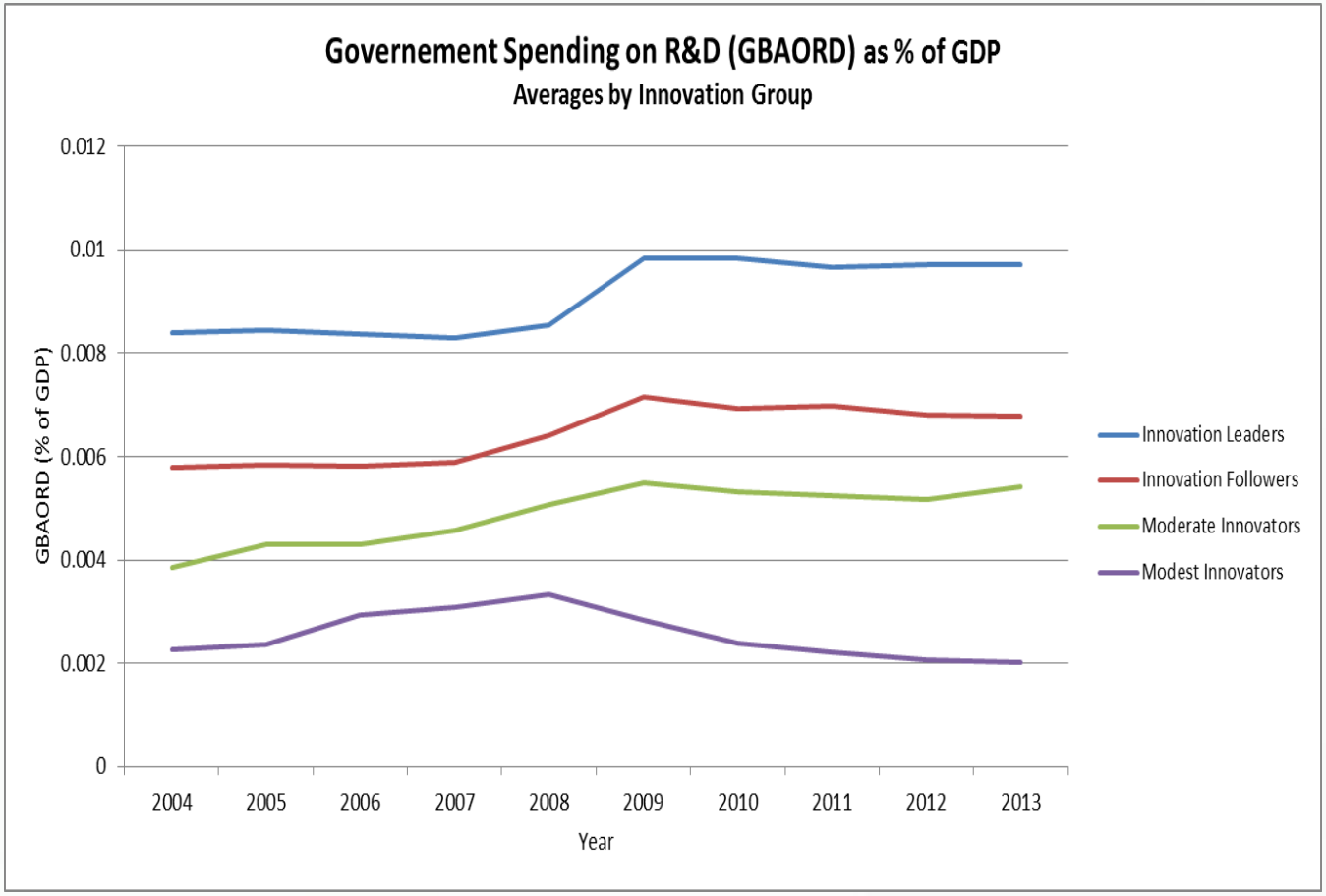
Source: Bruegel on the basis of IUS (2014).

Indicators for the IUS

- *'Human resources:*
  - New doctorate graduates,
  - Population aged 30-34 with completed tertiary education
  - Population aged 20-24 having completed at least upper secondary education.
- '*Open, excellent and attractive public research systems*'
  - International scientific co-publications,
  - Most cited publications
  - Non-EU doctorate students.
- '*Finance and support*'
  - the availability of finance for innovation projects by venture capital investments
  - the support of governments for research and innovation activities by R&D expenditures by universities and government research organisations
- '*Firm investments*'
  - Corporate R&D investment
  - Corporate Non-R&D investments '
- *Linkages*
  - SMEs that innovate in-house and Collaboration efforts between innovating firms and
  - Research collaboration between the Private and public sector.
- '*Intellectual assets*'
  - PCT patent applications,
  - Community trademarks
  - Community designs.
- '*Innovators*'
  - the share of firms that have introduced innovations onto the market or within their organisations, covering both technological and non-technological innovations
  - Employment in fast-growing firms of innovative sectors.
- '*Economic effects*'
  - Employment in knowledge-intensive activities,
  - Contribution of medium and high-tech product exports to the trade balance,
  - Exports of knowledge-intensive services,
  - Sales due to innovation activities
  - License and patent revenues from selling technologies abroad.

Innovation policies in EU countries:
Public Spending on Innovation

a persistent and growing divide in public spending on innovation



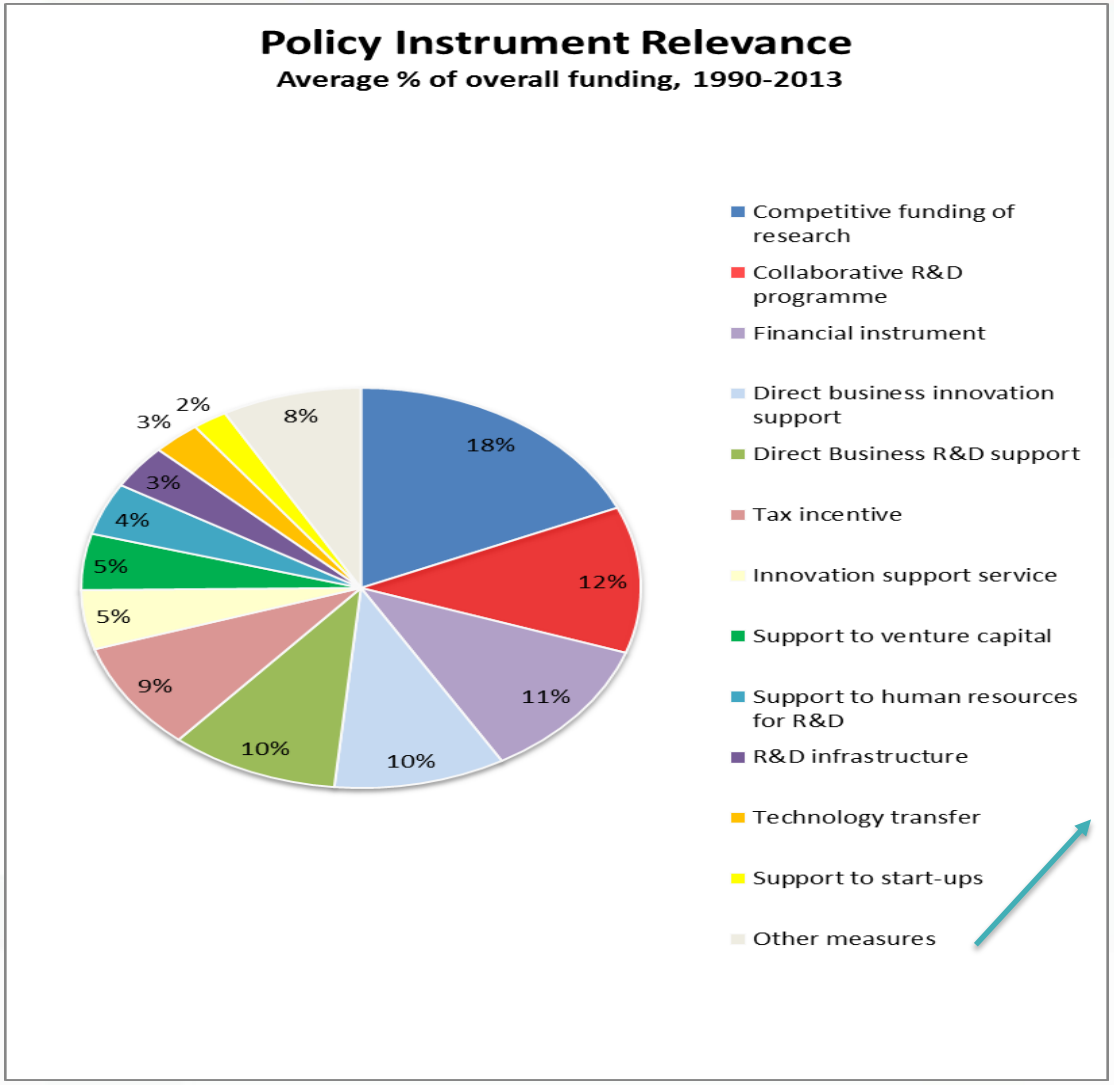
Source: Bruegel calculations on the basis of Eurostat.

A growing divide in Public R&I spending among EU countries

GBOARD as % of GDP	2006	2008	2010	2013
Average EU	**0.51**	**0.56**	**0.58**	**0.58**
Variation in Public R&I spending *	**0.41**	**0.37**	**0.41**	**0.42**
Innovation leaders (Finland, Sweden, Denmark, Germany)	**0.80**	**0.82**	**0.94**	**0.94**
		Performance relative to innovation leaders (=100)		
Innovation followers	68	73	68	66
Moderate innovators	54	60	55	56
Modest innovators	36	39	25	21
EU-CEE:	48	52	47	48
Southern EU	56	65	58	55
High fiscal consolidation countries	52	59	52	50
Variation within high fiscal consolidation*	0.37	0.38	0.45	0.42
Variation within low fiscal consolidation*	0.36	0.33	0.34	0.35

Source: Bruegel on the basis of Eurostat (2014). Note: * coefficient of variation;

Innovation Policy in EU countries:
Mix of Innovation Policy Instruments



Innovation skills development	1,35%
Centres of Excellence	1,35%
Cluster initiatives	1,04%
Regional programmes	0,71%
Innovation networks and platforms	0,70%
Science and technology parks	0,59%
Mobility schemes	0,43%
Competence centres	0,41%
Incubators	0,30%
Public procurement	0,30%
Spin-off support	0,24%
Awareness raising	0,17%
Public sector innovation	0,15%
E-society	0,14%
Innovation vouchers	0,13%
IPR measures	0,07%

Source: Bruegel calculations on the basis of Trendchart

Major R&I policy instruments deployed in EU countries

Major Instruments	Average share of total R&I budget reported by Trendchart	Variation among EU countries *
Funding for specific public research programmes allocated in a competitive manner to universities and public research organisations	18.4%	1.01
Measures to foster collaboration between public organisations and businesses, referred to as 'collaborative RDI programmes'	11.8%	1.36
Financial instruments (loans)	11.3%	1.89
Direct business innovation support	9.9%	1.05
Direct business R&D support	9.8%	1.12
Tax incentives	8.1%	1.72

Source: Bruegel on the basis of Trendchart. Note: * coefficient of variation in shares in total R&I budget;

This six-pack of innovation policy instruments takes up the bulk of the R&D budget in all EU countries, irrespective of their innovation performance:

76% for Innovation Leaders, 71% for Innovation Followers, 64% for Moderate Innovators and 70% for Modest Innovators.

Most heterogeneity on tax credit instrument and loans

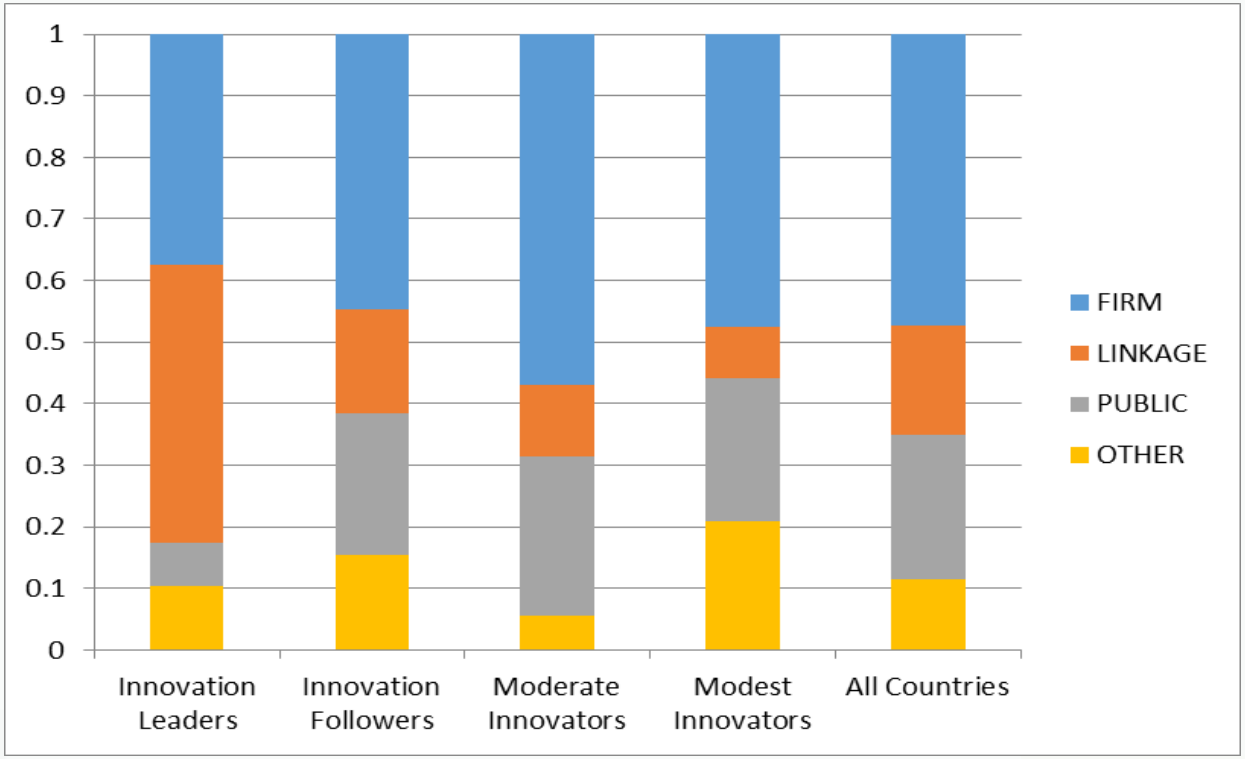
We group all the innovation policy instruments reported in TrendChart into five areas

- **Skills**: support for human resources for R&D; innovation skills development;
- **Support for public R&D**: R&D infrastructure: competitive funding for research (for higher education institutes and public research organisations); centres of excellence; public sector innovation;
- **Support for firm R&I investment**: tax incentives; loans; direct business R&D support; direct business innovation support; innovation support services; support for start-ups; innovation networks and platforms; innovation vouchers;
- **Linkage support**: incubators; technology transfer; collaborative R&D programmes; mobility schemes; science and technology parks; cluster initiatives; spin-off support; competence centres;
- **Other**: awareness raising; support for venture capital; E-society; IPR measures; public procurement; regional programmes.

(Note: the six main instruments are underlined).

Heterogeneity in the innovation policy instruments deployed in EU countries

Trendchart budget allocation to various areas; by IUS groups of countries;
Share in total reported trendchart budget (1990-2013)



Source: Bruegel calculations on the basis of Trendchart and Innovation Union Scoreboard 2014 Database.

Heterogeneity in the innovation policy instruments deployed in EU countries

	Share of reported budget allocated to				
	SKIL	PUBLIC R&D	FIRM INV	LINKAGE	OTHER
Average EU	**5.5%**	**23.1%**	**47.7%**	**17.7%**	**4.2%**
Average EU weighted	3.9%	14.1%	56.3%	21.4%	4.2%
Variation *	**1.09**	**0.85**	**0.45**	**0.96**	**1.82**
Innovation leaders	6.8%	7.0%	45.1%	37.5%	3.4%
Innovation followers	6.3%	23.1%	44.8%	16.8%	9.0%
Moderate innovators	4.6%	23.3%	57.0%	11.6%	1.0%
Modest innovators	6.1%	23.5%	47.4%	17.6%	5.9%
EU-CEE	5.3%	29.0%	47.2%	8.0%	10.4%
Southern EU	4.5%	22.0%	51.4%	21.0%	1.2%
High fiscal consolidation	5.8%	19.6%	54.6%	14.7%	5.2%

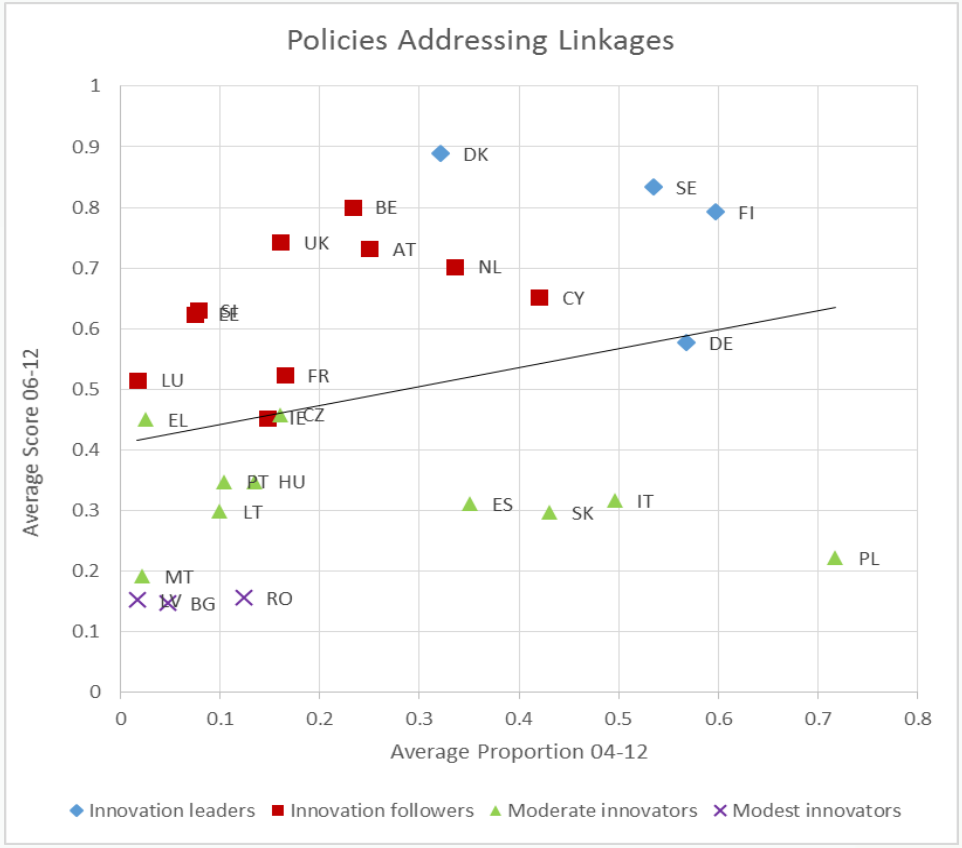
Source: Bruegel on the basis of Trendchart. Note: weights are the country's reported budget reported by TrendChart.
* coefficient of variation

Mapping innovation policy instruments and innovation performance on Linkages

Innovation Policy Instruments to address Linkages (Trendchart)	Performance on Linkages (IIS score)
Collaborative R&D programmes Technology Transfer Innovation networks and platforms Cluster Initiatives Mobility Schemes Science & Technology Parks Innovation vouchers Competence centers	Innovative SMEs collaborating with others Co-publications between private and public innovation actors

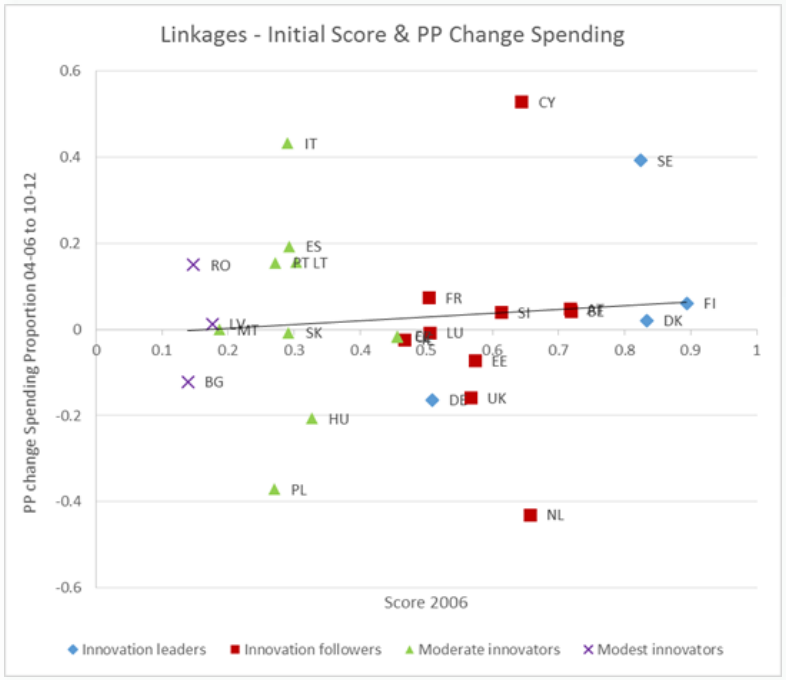
NB: Poor indicators on linkage performance in IIS

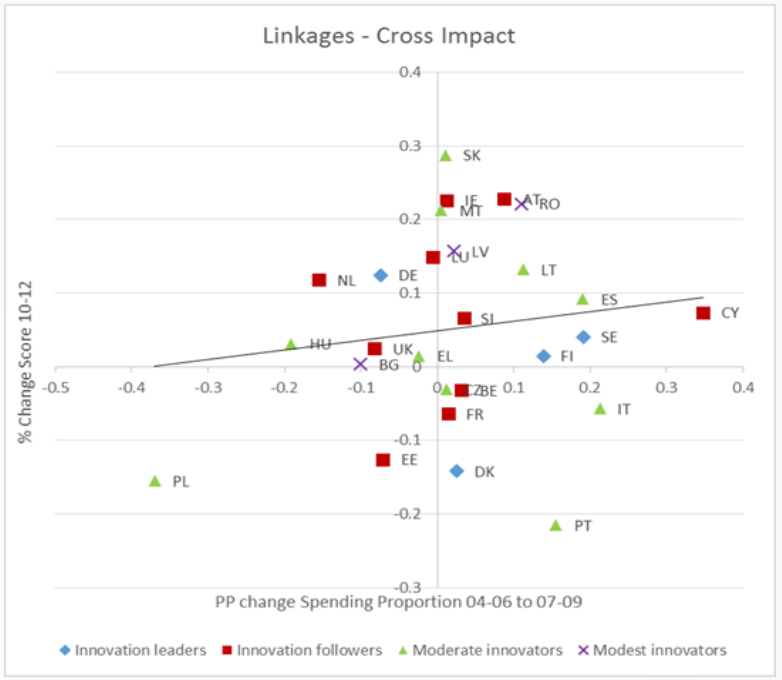
Mapping instruments and performance on linkage



Source: Bruegel calculations on the basis of Trendchart and Innovation Union Scoreboard 2014 Database.

Mapping instruments and performance on linkages





Association between initial performance and subsequent increase in budget: weakly positive , but heterogeneity

Association between increase in budget share and subsequent increase in performance: weakly positive, but heterogeneity

Source: Bruegel calculations on the basis of Trendchart and Innovation Union Scoreboard 2014 Database.

Wrapping up and concluding

On heterogeneity in innovation capacity

- **The EU's slow overall improvement in innovation performance can be related to a growing innovation divide between its member states.**
  - The process of convergence, which was already very slow before 2008, has since stalled, and has more recently moved into reverse, especially in terms of the inability of the southern EU countries to catch up.

- **Among the various components of innovation capacity, Europe's weakest spot is *investment by firms in R&I*.**
  - The persistent failure of lagging EU countries to catch up in this area provides much of the explanation for the EU's slow pace of catching up with other economies.
- **On the *quality of the public research system*, despite overall EU improvement relative to the US, the differences within the EU, despite slow convergence, remain substantial.**
- **In terms of *linkages* between the public and private sectors, the divide between EU member states is substantial and has increased over time.**

Wrapping up and concluding

On heterogeneity in innovation policy deployment

- **Since the crisis, the divide between EU countries in public spending on R&I relative to GDP has increased.**
  - The innovation-leading countries have forged ahead but the followers have not been able to keep up
- **When looking at the various innovation policy instruments deployed by EU countries, member states deploy a relatively similar mix of policies.**
- **The type of support that most differentiates innovation-leading countries from other EU member states is their significantly greater deployment of policy instruments that support linkages in innovation between the public and private sectors.**
- **Overall, the innovation policies that have been deployed do not seem to have been able to address the growing innovation divide in the EU: too much "one-size-fits-all" approaches in innovation policy?**

Wrapping up and concluding

Mapping innovation policy and performance

- **Overall the analysis illustrate that the relationship between innovation policy deployment and performance is a complex one, which needs a good understanding of country specificities.**

- **The heterogeneity in innovation policy deployment and improvements in innovation capacity calls for a more in-depth evaluation of innovation policy deployment, in order to better understand how to tailor innovation policy mixes**
- **The way forward for improving innovation policy in Europe is better analysis and diagnosis to guide policy design *ex ante*, more experimentation with new instruments and combinations of instruments, and better evaluation *ex post*.**

In need for better data & indicators for monitoring and evaluation

Thank you for your attention

See also:

Veugelers, R., 2016, *The European Union's growing innovation divide*, **Bruegel Policy Contribution** 2016/08.
Veugelers, R., 2015, *Matching research and innovation policies in EU countries*, **Bruegel Working Paper** 2015/16
Veugelers, R., 2015, *Too much or not enough heterogeneity in innovation policies among EU member states*, European policy brief n°8, wwwforeurope.

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