



Is Europe saving away its future?

European public funding for research in the era of fiscal consolidation

Policy Brief by the Research, Innovation, and Science Policy Experts (RISE)

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HIGHLIGHTS

- Innovation-lagging and fiscally-weak countries have been cutting public R&I budgets, while the innovation-leading and fiscally stronger countries have forged ahead with public R&I spending during the crisis.
- The European Commission, with its growing share of resources for R&I, could only partly redress this increasing divide.
- Understanding the degree to which public R&I budgets in the EU have been used 'smartly' during the crisis requires an assessment of their long-term impact on growth.
- The European Commission should improve its capacity to assess the long term growth impact of public R&D spending in the EU.

1. Background: Public R&I budgets and smart fiscal consolidation

The combination of high debt, deficit burden and low growth calls for *smart* means of fiscal consolidation. Cost-cutting programmes should minimise the potentially negative short-term effect on economic activity, while establishing a foundation for long-term growth. Growth-enhancing public expenditures should be safeguarded from cuts, or even increased.

An area often highlighted as "smart" in the context of shrinking overall public budgets is Research and Innovation (R&I). Identifying government R&I spending as an area of smart specialization requires several issues to be cleared. A first issue is the contribution of R&I to growth. At present, it is widely acknowledged that technology improvements are an important force behind long-run economic growth (see a.o Aghion (2006)). A second issue is whether there is a case for government support for R&I. Government intervention in the area of R&I is typically justified by the classic market failure argument: markets, despite positive private returns to R&I investments, do not provide sufficient private investment in research owing to the non-appropriable, public good, intangible character of knowledge and its risky nature. The evidence on large spillovers and social returns well in excess of private returns (see forthcoming Rise Policy Brief (2015)) would justify a deployment of public intervention to redress this market failure. This holds particularly for more basic research where the scope for spillovers are largest and in recession times to countercyclically support the cyclically sensitive private R&D investments, particularly those of the credit constrained young innovators. This however does not yet make the case for increasing or safeguarding public R&D efforts in times of fiscal consolidation. This also requires an analysis of potential government failure, ie ineffectiveness in reaching the socially optimal levels of R&D efforts.

To assess whether government expenditures on R&D qualify as area of smart fiscal consolidation, we first discuss the evidence on how public expenditure on R&I fared in Europe since the crisis. We then discuss the smartness of the trends in public R&I and conclude with some policy recommendations.

2. Diagnosis: Public R&I expenditures in the EU since the crisis

Did EU countries consolidate their public R&I budgets, more or less than other parts of public expenditures? For this, we update the analysis of the evidence on public R&D budgets in the EU done in Veugelers (2014), Fuest & Licht (2014), Itzak et al (2013), EC (2011) till the most recent available data (2013). Key figures are in Annex.

For the EU as a whole, the share of R&I in total public budgets in 2013 stood at 1.4%, which is a small decline from the pre-crisis 2007 level (1.5% in 2007) (Figure 1 in Annex). There is therefore no strong evidence that EU countries on average sacrificed their R&I budget more than other government expenditures during the crisis. As a share of GDP it currently sits at its pre-crisis level of around 0.7% (EU-28 average 2013). Comparing with previous business cycles, Fuest & Licht (2014) also found no evidence that this crisis has hit the R&D investments more strongly than previous crises.

However, this favourable R&I treatment seems to be part of a one-off stimulus attention. While the share of R&I related expenditures trended upward between 2007 and 2009, it started to decline since 2009, when the stimulus spending stopped. Itzak et al (2013) report that such a drop in public research and innovation public funding has not been observed in previous crisis periods.

The average EU trend masks widely different trends across Member States (Figures 2 & 3 in Annex). *Innovation leaders*, more particularly **Sweden**, **Germany** and **Denmark**, increased public expenditure on R&I during the crisis, by more than their increase in other public expenditure. In **Finland** the increase has remained flat since 2011. The **UK** began to cut its public R&I budgets already in the early years of the. Among the *innovation followers*, **Austria** has increased its public

R&I budget substantially, by more than its overall public budget. **France** has increased its public R&I budget on average, but not consistently. In the **Netherlands**, there was a decline in the R&I share of the public budget. *Innovation laggards*, which are also typically under high *fiscal consolidation pressure*, substantially cut public R&I expenditure, even more so than other parts of their budgets, resulting in a considerable drop in the share of R&I in public expenditure, which was already below the EU average. Most notable cases are **Spain, Italy** and **Greece**. The exception is **Estonia**, which continued to expand its R&I budget so substantially that it is now the EU's highest public R&I spender, in relative terms. **Portugal** has expanded its public R&I budget and has only made cuts in recent years.

Public budgetary support for business R&I includes direct support through grants, but also indirect support, predominantly through **tax incentives**. This indirect support is not visible in the GBAORD data. Tax incentives have become the main channel of government support for business R&I in countries such as Belgium, France, Ireland, the Netherlands. In all of these countries, use of tax credits increased much faster than grants during the crisis (Itzak et al (2014), OECD (2013)).

The trend is therefore that of the crisis exacerbating the R&I divide in the EU between innovation leading and fiscally weak innovation lagging countries. Also Fuest & Licht (2014) found an increasing gap between Northern and Southern Europe and differing debt levels explaining the country heterogeneity in public R&D trends: countries with higher debt being significantly more likely to have decreases in GBAORD (as %of GDP).

The crisis did not only affect the public budgets allocated to R&I. Also R&I policy mixes were affected, be it not substantially (yet). Itzak et al (2014) analysed member states policy statements using the Erawatch and INNO Policy TrendChart country reports and concluded that policy measures show a slight changing trend towards more targeted R&I policies. More attention is devoted to increase the leverage of public R&D funding on private R&D funding, with amongst others a more extended use of R&D tax incentives, as already mentioned supra. More public attention is being directed towards public-private partnerships, particularly in areas such as energy, environment and health. Support for commercializing research results, improving links between public and private research through instruments such as cooperative programs and via cluster policies moved higher on the agenda, as well as improving conditions for entrepreneurship and the supply of public venture capital, especially for 'high growth enterprises'. This higher attention is important as particularly the access to funding for young, small, innovating companies is acerbated during crises, especially crises with financial market roots.

With national public research and innovation funding under pressure especially in the countries with high fiscal consolidation pressure, other sources of funding were sought for in these countries, particularly funding from the EU (Itzak et al (2014)). The major sources of EU R&I funding are the Structural Funds (from 2007-13, about a quarter of Structural Funds went to R&I) and the Framework Programme research funding/Horizon 2020. The importance of EU funds in the total public R&I funds available is much higher in innovation-lagging countries with low national R&I budgets (Figure 5 in Annex). In some countries, EU funds for research and innovation are even of the same magnitude as national R&I budgets¹. And this importance of EU funds may become even more important in future: with **Horizon 2020**, EU funding for R&I will increase by 30 percent compared to its FP7 predecessor. The share of R&I in the total EU budget is now about 8%, much higher than the share of R&I spend in member state budgets (1.4 percent in 2013). In addition, a greater share of the **Structural Funds** is earmarked to be spent on Europe 2020 challenges during 2014-20: from 50 to 80 percent. The growing EU budget for R&I may thus serve to somewhat ease the growing public R&I divide in Europe.

A further means by which the Commission could promote R&I investments in EU member states is through the so-called '**investment clause**'. This allows member states that are in deep recession, but that have budget deficits below the three percent of GDP threshold and that respect the public debt reduction rule, to temporarily deviate from the fiscal targets of the Stability and Growth Pact (SGP), to the extent of their national co-funding of EU-funded investments. The Commission proposed this in summer 2013 in response to the request of the European Council (2013). The investment clause, which extends beyond R&I, has however so far not been activated, as reported by Barbiero and Darvas (2014).

¹ This is the case for Estonia, Hungary, Lithuania, Poland and Slovakia. In Latvia, Structural Fund allocations even triple the public R&I budget. But also in Portugal, Structural Funds represent 31 percent of total public R&I; in Greece, 40 percent.

3. Are EU public R&I budgets being consolidated smartly?

The critical question that still needs to be addressed is whether the diverging trends on public R&I that have emerged since the crisis in the EU are good or bad news, evidencing or on the contrary refuting smart fiscal. Are the cuts in the weaker countries evidence of smart use of public R&I investment, ie are they eliminating inefficiently spent public resources? Or have the public R&I cuts been too aggressive, jeopardising long-term growth? Are the increased EU funds for public R&I spend smartly, stimulating growth, in subsidiarity with national funding? Is the Commission right to not allow members states in weak fiscal positions, which also happen to be weak innovators, to shelter their public R&D budgets from fiscal exigencies? Or should the Commission be more lenient and exercise the investment clause option?

Understanding the degree to which public R&I budgets in the EU, both at the EU and the Member States level, have been used 'smartly' during the crisis and whether the EU has made 'smart' recommendations on public R&I in the European Semester requires an assessment of their long-term impact on growth².

Assessing the smartness of the current trends in public R&I in the EU requires the appropriate methodologies to evaluate the causal impact of public R&I on long-term growth. Although the number of studies evaluating public R&I programmes have grown substantially, they are still grappling with the causal link between public intervention and its impact on growth, and establishing proper counterfactuals to assess what the outcome would have been in case of no support. Various methodological improvements to assess causality are increasingly being used, but still require a cautious interpretation of the results. In addition, most evaluation studies only look at the immediate impact of public support on private research and development and innovation, checking whether it crowds out or generates additional private investment (the so-called 'additionality') (for more on this, see an upcoming RISE policy brief). There are few assessment exercises that pin down the longer-term social returns and growth impact of R&I, which is the impact that matters for smart fiscal consolidation. Assessing social returns and the growth impact is a much more complex exercise requiring a longer-term macro-economic perspective, including an analysis of the diffusion effects from R&I across institutions, sectors and countries and an assessment of the interactions with labour, financial and product markets.

4. Policy Recommendations

When one considers the potentially substantial growth dividend and social rates of return from R&I investments, at least in the long-run, and the risk of market failure before these social rates of return can be secured, public support for R&I investment should be a priority in the midst of smart fiscal consolidation. But smart consolidation featuring R&I investment needs to take a long-term perspective and to have sound evaluation frameworks in place to assess whether the potential for high growth returns from public R&I are being realised.

Evaluating the effectiveness of public R&I budgets should go beyond assessing short-term additionality impacts on private R&I investments. Smart fiscal consolidation by EU member states should include assessments of the longer-term social rates of return in excess of private rates of return. Assessing the long-term impact of public R&I on economic growth, requires a blending of the results from micro-evaluation exercises of public R&I programs into macro-economic models that fully encompass the growth enhancing power of R&I. Such an integrated approach will allow an assessment of the complementary framework conditions needed to realise the growth dividend from own public R&I, as well as from R&I investments made elsewhere. It will allow when needed to identify which structural reforms (in product markets, labour markets, financial markets) are needed to generate innovation-based endogenous growth.

In what follows we list a number of specific recommendations for the EU level to improve the implementation of its support for public R&I investments for smart fiscal consolidation.

- The EC should improve its analytical capacity underpinning the deployment of its own R&I resources, as well as its recommendations and support for the public R&I interventions by the Member States.
- The EC should use in its own micro-evaluation exercises of its R&I funding the latest state-of-the-art methodologies best able to grapple with the causality effect of public instruments on growth. It should promote the use of these methodologies among MS. The conditions specified

² The impact and hence justification for public funding of science and innovation goes beyond its economic effects on GDP growth; it also encompasses societal challenges such as health and a clean environment. Here we look at a more narrow question, namely the justification for public R&I budgets as areas of smart fiscal consolidation, which is why the discussion concentrates on the growth-enhancing impact of public R&I.

for the evaluation strategies required in the new State Aid guidelines for clearance by DG COMP of R&I schemes proposed by Member States are a good instrument for diffusing best practices.

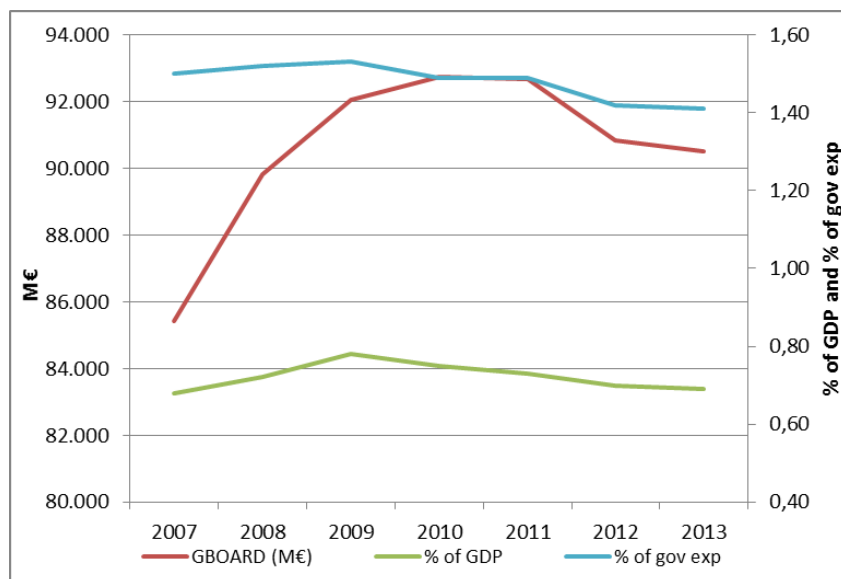
- The EC should devote more resources to further develop the R&I component of the applied macro-economic models in use at the Commission (like QUEST and the regional RHOMOLO model). The modelling of how public R&I can induce growth and jobs in these models need to be brought as closely as possible to the state-of-the-art of our understanding of the growth potential of technology. These applied macro-models need to be calibrated with the results from the latest micro-economic exercises on the assessment of RTD policies on additionality and social rates of return.
- The EC should deploy these macro-models for the impact assessment of its own R&I spending, as well as for the recommendations it issues on the Member States planned R&I spending. The advantage of deploying macro-models at the EU level compared to a country-by-country approach is that EU wide modelling allows to assess the spillovers from policy proposals across countries. This would also allow to identify areas for EU level R&I policy coordination to further the European Research Area in order to optimize positive spillovers among member states from public R&I policies as well as to avoid possible negative effects from member states policies, such as R&I tax credit or patent box competition traps.
- With the proper evaluation strategies in place, the “investment clause” exemption for the R&I component of national co-investment of structural funds can be consummated. The “investment clause” exemption for national co-investment should also include national R&I funding as co-investment with other EU investments, including H2020 and EIB/EIF funding.
- Conditional on having received clearance from DG EC COMP, the budgets spent on MS programs for R&I grants and R&I tax credits can be included in the “investment clause” exemption.

REFERENCES

- Aghion, P. (2006). A primer on innovation and growth, Bruegel Policy Brief, issue 2006/06.
- Barbiero, F. and Dalvas, Z. (2014) "In sickness and in health: protecting and supporting public investment in Europe", *Bruegel Policy Contribution*, Brussels.
- EU Commission (2012) Innovation Union Competitiveness Report, Brussels.
- Fuest, C. and G. Licht (2014), The impact of the financial and economic crisis on public R&D spending, Report produced for the I4G expert group.
- Izsak, K., Markianidou, P., Lukach, R., Wastyn, A. (2013). The impact of the crisis on research and innovation policies. Study for the European Commission DG Research by Technopolis Group Belgium and Idea Consult.
- OECD (2013), Science, Technology and Industry Outlook, 2013, Paris.
- Veugelers, R. (2014), Undercutting the future? European research spending in times of fiscal consolidation, Bruegel Policy Contribution 2014/06, Bruegel, Brussels. And Veugelers, R. (2014) "Public R&I budgets for smart fiscal consolidation", *SIMPATIC working paper*, presented at the second annual SIMPATIC conference, The Hague, April 2-4, 2014, available at <http://www.simpatic.eu>

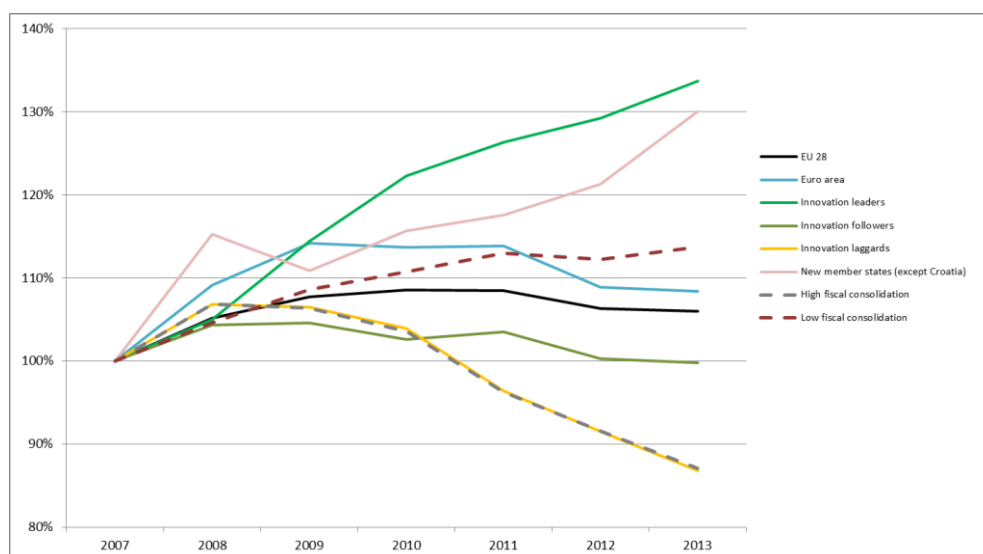
ANNEX: Some key figures on public R&D spending in the EU since 2007.

Figure 1: Trends in Government Expenditures on R&I; EU total (2007-2012)



Source: Bruegel calculations on the basis of EUROSTAT data on **GBOARD (government budget appropriations or outlays for research and development) data**³

Figure 2: Trend in Government expenditures on R&D as % of total Government Expenditures EU countries 2007-2012 (GBOARD)

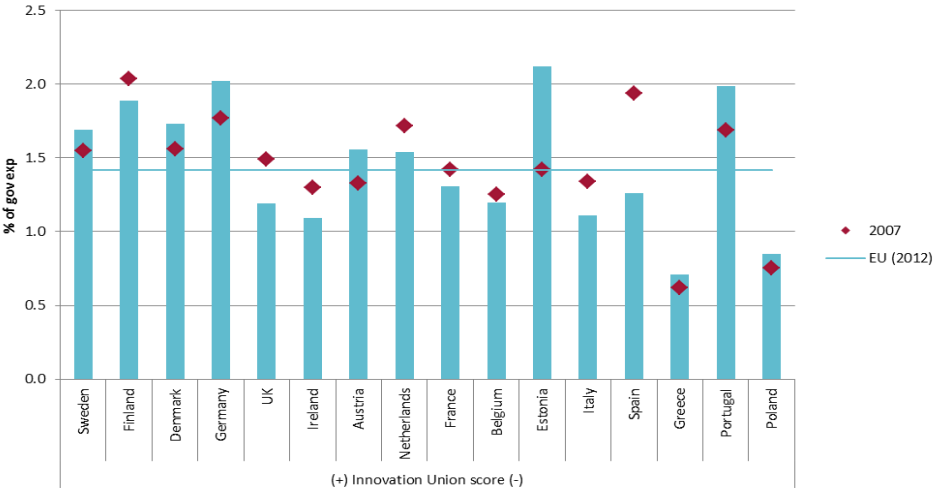


Source: Veugelers (2014) on the basis of Eurostat and Ameco⁴

³ Source: Eurostat. An alternative source to look at is the government financed part of GERD (Gross Expenditures of R&D) (Source: OECD). Both series have their strengths and weaknesses. GBAORD covers budgeted items, while GERD covers actual expenditures. GBAORD allows direct comparison with the other budgeted items. GBAORD data is more recently available compared to GERD. Trend results are similar when using GERD rather than GBAORD (see Veugelers (2014))

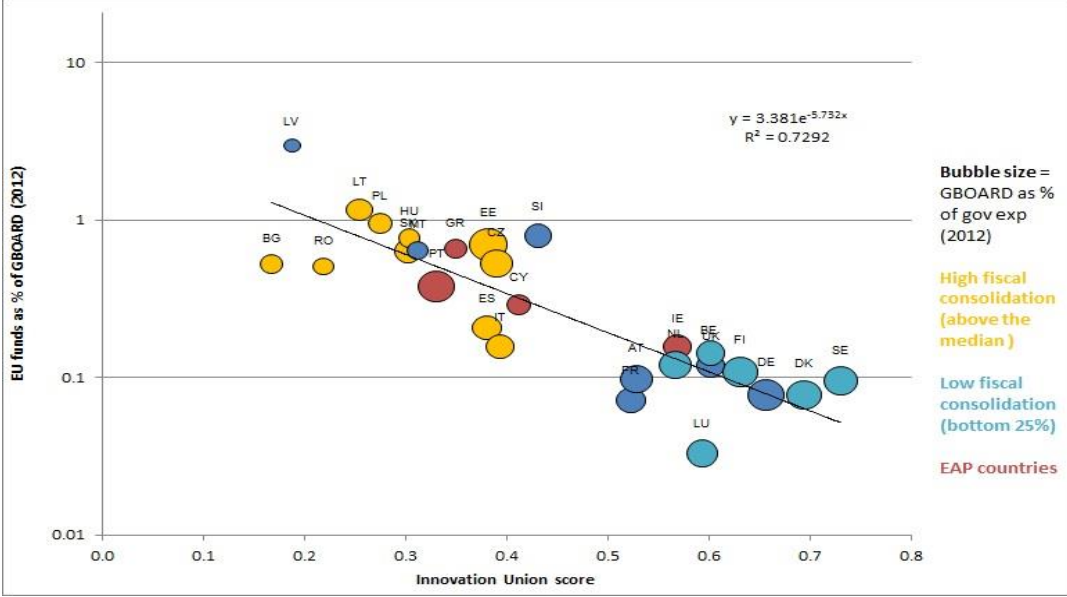
⁴ **Innovation leaders** (Denmark, Finland, Germany, Sweden and the UK), **innovation followers** (Austria, France, Ireland, Luxembourg and the Netherlands) versus the rest (**innovation laggards**) based on the European Commission's Innovation Union Scoreboard indicator for innovative performance pre-crisis (2007). **High fiscal consolidation** countries are Bulgaria, Cyprus, the Czech Republic, Estonia, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovakia and Spain; based on budgetary consolidation position: countries with an above-median cumulative change in their structural primary balance since the year in which consolidation started (the year with the lowest negative structural primary balance in the period 2008-10). Source: EUROSTAT and AMECO. Also included in the high fiscal consolidation group are the **Economic Adjustment Programme countries**.

Figure 3: Trends in government expenditure on R&I;(GBORD data), 2007-12; Individual countries



Note: Countries are reported in decreasing order of Innovation Union Score; Innovation Union Scoreboard 2007. Source: Veugelers (2014) on the basis of Eurostat

Figure 4: EU research and innovation funds and Innovation Union scoring



Note: EU funds are both the structural RTDI funds as well as the FP7 funds. EU funds as expressed in logs. Source: Bruegel calculations on the basis of IUC 2007, Eurostat and AMECO.

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Innovation-lagging and fiscally-weak countries have been cutting public R&I budgets, while the innovation-leading and fiscally stronger countries have forged ahead with public R&I spending during the crisis. The European Commission, with its growing share of resources for R&I, could only partly redress this increasing divide. Understanding the degree to which public R&I budgets in the EU have been used 'smartly' during the crisis requires an assessment of their long-term impact on growth. The European Commission should improve its capacity to assess the long term growth impact of public R&D spending in the EU.

Studies and reports