



European
Research Area

EUROPEAN POLICY BRIEF

SPINTAN – Policy Brief No. 12



Public Investment in R&D in Reaction to Economic Crises – A Longitudinal Study for OECD Countries*

October 13, 2016

SUMMARY

Objectives of the research

How does government R&D spending change in economic crises? To what extent do we observe country differences? Are different types of public R&D spending affected differently?

Scientific approach / methodology

Longitudinal analysis of government R&D spending in 26 OECD countries over the period 1995-2015. Government R&D spending is measured by government budget appropriations and outlays (GBAORD) and public R&D expenditures. Static and dynamic panel estimation methods are employed.

New knowledge and/or European added value

R&D behaves pro-cyclically, but there is compelling evidence for heterogeneity along a country's innovation capabilities. European Innovation Leaders pursue a counter-cyclical strategy, while Innovation Followers and Moderate Innovators behave pro-cyclically. Economic crises, however, do not affect the composition of public R&D spending along thematic areas or beneficiaries.

Key messages for policy-makers, businesses, trade unions and civil society actors

The recent financial and economic crisis had a severe and lasting impact on government's ability to invest in R&D. The difference between Innovation Leaders and Followers/Moderate Innovators could lead to a widening of the European innovation gap.

* This Policy Brief is based on the SPINTAN Working Paper No. 16: Pellens, M., Peters, B., Rammer, C., Licht, G. (2016): "Public Investment in R&D in Reaction to Economic Crises – A Longitudinal Study for OECD Countries", available on the SPINTAN website. <http://www.spintan.net/c/working-papers/>.

Objectives of the research

R&D is an important driver of long-run economic growth through productivity enhancement. Cuts in government R&D spending in the light of fiscal consolidation, for instance during economic crises, hence risk jeopardizing long-term growth potential. Therefore, governments have an incentive to maintain R&D spending in crisis periods, either by stimulating the private sector through tools such as R&D subsidies or R&D tax credits or by increasing R&D activities in the public sector.

These incentives are challenged by a pressure for fiscal consolidation. When governments need to cut R&D budgets due to austerity measures, they might choose to focus on cuts in those fields in which they feel the cut might have the least negative impact. Likewise, they might choose to cut R&D in those sectors, fields and programmes in which they can be achieved the easiest.

This study aims to answer two main questions related to the effects of economic crises on public R&D expenditures. First, how do economic crises influence the level and growth of public R&D expenditures? Second, do economic crises lead to shifts in the composition of public R&D expenditures in terms of thematic spending area and the sectors (private sector, higher education, government) in which R&D is performed?

Scientific approach / methodology

This study applies a longitudinal analysis of government R&D expenditures in 26 OECD countries over the period 1995-2015. Government R&D spending is measured by two variables. Government budget appropriations and outlays (GBAORD) contain all government R&D spending in central or federal government budgets. Public R&D expenditures are constructed as the sum of publicly financed R&D in the business, higher education and public sector. Business cycle effects are examined using static and dynamic panel estimation methods. Real annual GDP change, budget surplus, and government debt are used to capture business cycle dynamics. Analyses are presented on the level of government outlays and expenditures, government outlays for each thematic area, and public R&D expenditures by beneficiary sector.

New knowledge and European added value

The study presents four main findings.

- First, public R&D investments behave pro-cyclically. Figure 1 compares average annual growth rates of government financed R&D expenditures by country-specific business

cycle phases. The average annual growth is about 4 percent for both indicators in non-recession periods, but only about 1 percent in the recession period for public R&D and even below for GBAORD.

Figure 1: Average Annual Growth Rate of Government Financed R&D Expenditure by Country-specific Business Cycle Phases, 1995-2015

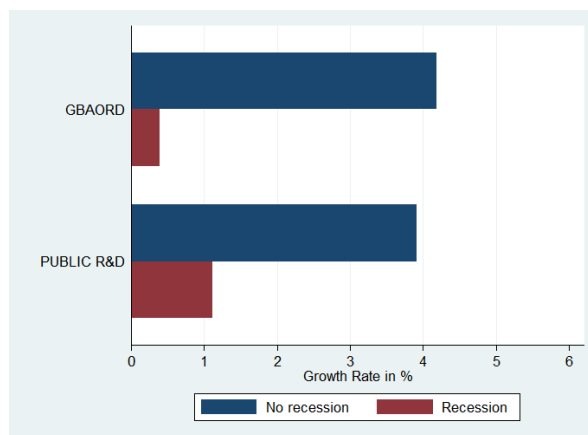
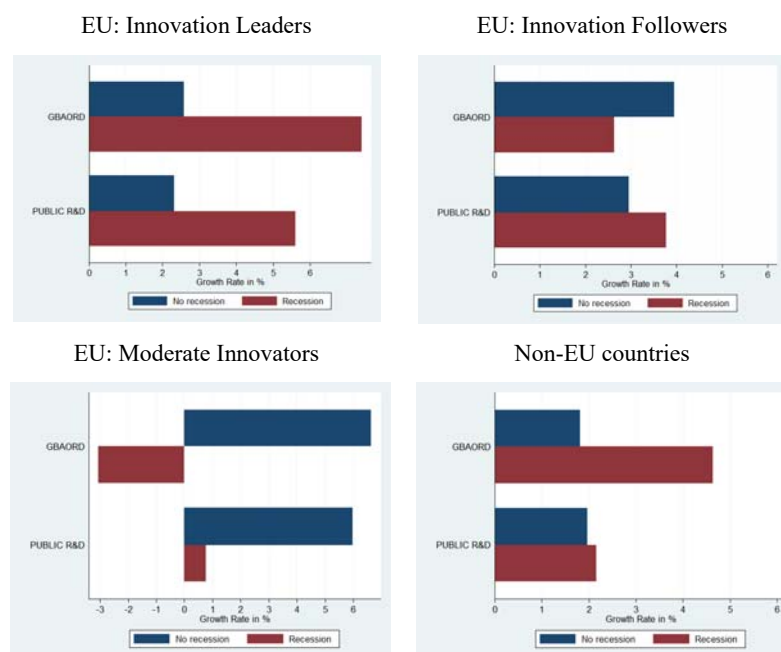


Figure 2: Average Annual Growth Rate of Government Financed R&D Expenditure by Business Cycle Phase and Innovation Performance, 1995-2015



The panel data estimates reveal that a 1% increase in real GDP relates to a 0.15-0.20% increase in public R&D outlays. Government outlays are on average 0.25 pp lower during

recessions. However, countries seem to pursue different strategies: European Innovation Leaders and non-EU countries pursue a counter-cyclical strategy, stimulating R&D expenditures during economic downturns. In contrast, Moderate Innovators show a strong pro-cyclical behaviour.

- Second, the evidence shows that short-run (budget surplus) and long-run (government debt) financial conditions also affect public R&D. An increase in the surplus to GDP ratio by 1 pp (or a reduction in the deficit to GDP ratio by 1 pp) fosters government appropriations and outlays for R&D in the subsequent period by 0.6 to 0.8%. In contrast, an increase in the debt to GDP ratio by 1 pp forces governments to subsequently cut public R&D spending by 0.03 percent on average.
- Third, while the level of public R&D expenditures is affected by business cycle effects, this does not lead to a particular change in terms of areas in which R&D outlays are focused.
- Fourth, business cycles also do not relate to differences in terms of the beneficiaries of public R&D expenditures along economic sectors.

**Key messages for
policy-makers,
businesses,
trade unions and
civil society actors**

Taken as a whole, the results of this study corroborate that the economic crisis of 2008-2009 has severely and lastingly impacted governments' abilities to invest in R&D. Hence, governments failed to economize on the pro-cyclical nature of the opportunity cost of R&D in most countries.

The fact that leading innovators (and non-European countries) pursue a counter-cyclical R&D spending strategy, whereas innovation followers weakly and modest innovators strongly behave pro-cyclically leads to a worrying implication of a widening innovation gap and hence increasing long-run productivity differences and growth differentials across European countries.

SPINTAN – Smart public intangibles

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