European Commission

ANNUAL RESEARCH CONFERENCE 2022

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DIRECTORATE B: GROWTH AND INNOVATION – JOINT RESEARCH CENTRE – EUROPEAN COMMISSION

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HOW TO MAXIMISE R&D FUNDS EFFECTS? ANALYSING DIFFERENT SCENARIOS FOR SPAIN IN A GREEN DEAL CONTEXT

INTRODUCTION

R&D investments play a key role in supporting the European Green Deal. The maximisation of EU funds effect is one of the main concerns of public bodies. Smart Specialisation Strategy (S3) is an example of a policy approach for a more effective use of EU funds. The identification of most effective innovation priorities for investment is one of its key features. Understanding how to maximise the effects of R&D funds can support the design and implementation of S3.

From a theoretical perspective, expenditures in Research and Development (R&D) are directly related to technological progress and economic growth. Since R&D expenditures explicitly seek to generate innovation and create knowledge, the bigger they are the larger the differences among industries can be. For this reason, it is of utmost importance to allocate R&D investment funds to accelerate the twin transition (green and digital) efficiently across industries, in order to make the most of the subsequent businesses R&D expenditures and their related spillover effects throughout the whole economy.

With such purpose, we suggest a new approach (SAM-FIDELIO model) based on robust and long-standing input-output techniques (Dietzenbacher and Los, 2002; Pedauga et al., 2021) to support policy makers in the most efficient allocation of R&D funds. Since the seminal work of Schumpeter (1934), a vast body of literature have provided evidence that investing in R&D contribute to increase economic growth (see e.g. Aghion and Howitt, 1998; Falk, 2007). However, we should not be satisfied with just that statement but rather go beyond and search for new data and quantitative methods to assess different allocation scenarios and make the most of the public budget. For instance, besides the standard information on gross and businesses expenditures on R&D , we have also used data on the turnover generated by R&D expenditures per activity reported by the Community Innovation Survey (CIS) (Eurostat, 2022).

Our preliminary analysis, based on the case study of Spain for the year 2018, allows to identify clusters of industries where the value added generated by R&D expenditures in an industry (or a group of industries) would drive the largest spillover effects over the R&D related value added in other industries (backward effects). Likewise, cost savings in industries with high forward effects thanks to the accumulation of R&D investments may contribute to higher price competitiveness of the products sold by R&D investors.

RESULTS

This paper proposes to **identify the key industries with the largest backward and forward effects for strategic policy support in terms of R&D investment** and further **assesses various allocation scenarios,** where the overall total amount of R&D investment increases by 10% and it is distributed:

- Uniformly across industries proportionally to their gross value added (scenario 1);
- Across the top-3 industries with highest R&D expenditures (scenario 2);
- Across the top-3 industries with highest R&D expenditure intensities (scenario 3);
- Across the top-3 industries with the highest government funding in R&D investment (scenario 4).
- Across the top-3 industries with the highest growth potential in terms of its economic complexity (scenario 5).

Shock 1 — Overall increase of 10% of the total BERD, proportionally distributed across all sectors: **1,477 Mio Eur** (based on the observed structure), which will be used as a reference impact for the subsequent shocks.

Shock 2

Top three Manufacturing Sectors with the highest R&D spending

Shock 3

Top three Manufacturing Sectors with the highest R&D Intensity over Value Added

Shock 4

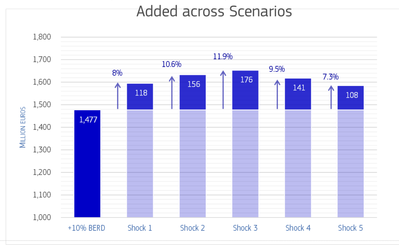
Top three Manufacturing Sectors with the highest GOV Funding on R&D

Shock 5

Top three Sectors with the highest complexity potential

Sectoral Shocks on R&D spending: Summary

Comparison of the impact on R&D Value Added across Scenarios



CONCLUSIONS

Our analysis **provides evidence about to what extent the value added associated with expenditure in R&D differs across industries** depending on where the R&D investment funds have been allocated.

The results show that the manufacturing of **computer and electronics, other transport equipment and the pharma industry** are the sectors most reactive to an **increase of 10% in the overall amount of business R&D spending in ES for 2018**, distributed proportionally to the current distribution of business R&D expenditures. The overall return rate would be **8%.**

However, should the same amount be **allocated to the top-3 sectors with the highest R&D expenditure intensity**, then the 1,477 million EUR invested in R&D would generate a **return rate of 12%** (+50%), mostly in the same most reactive industries mentioned earlier.

We propose a **new approach** based on **robust and long-standing input-output techniques** (Dietzenbacher and Los, 2002; Pedauga et al., 2021) to **inform policy makers** in their **decisions on R&D investment funds allocation**.

Besides the standard information on **gross and businesses expenditures on R&D**, we have also used Eurostat (2022) data on the **turnover associated to R&D expenditures by industry** under the guidelines of the **Community Innovation Survey** (CIS) and its corresponding breakdown between labour and capital.

Next steps? national pilot studies (2022-23); FIGARO tables (2023-24) – **inter-country and inter-industry allocation of EU R&D funds** (cross-country comparison);and central and regional sources of funds.

ACKOWLEDGEMENTS

We thank Xabier Goenaga and Mikel Landabaso for their comments on previous versions of the article.

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