



Sixth IRIMA Workshop

R&D INVESTMENT AND FIRM DYNAMICS

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SUMMARY REPORT

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Industrial Research and Development (R&D) plays a crucial role as the engine of growth in our modern economies, and remains a key driver of job creation, productivity growth, value creation, and societal well-being. For these reasons, the Europe 2020 strategy seeks to increase the levels of R&D investment to 3% of GDP. However, for policy-making to effectively stimulate firms to invest more in R&D, a better understanding of the determinants and consequences of firm-level R&D investment is needed.

The sixth IRIMA workshop sought to contribute to our understanding of industrial R&D investment by moving one step further down the path initiated by IRIMA workshops. The aims of the sixth IRIMA workshop were two-fold: to present our new results to interested stake-holders (policy-makers, industry representatives, and academics), and to obtain feedback and guidance on how IRIMA's research might better address the needs of policymakers and other stakeholders.

- First, it sought to provide empirical evidence to support policy-making (such as Europe 2020 and the 3% R&D investment intensity target). Furthermore, the workshop focused on other key measures under the Innovation Union and Industrial policy flagships, including support to the design and implementation of new financial support instruments (under Horizon 2020 and cohesion policy, mainly), as well as evaluations of policies to support innovative young firms. Emphasis was also placed on providing evidence for the most recent EU policy agenda on promoting investment, as a means for generating jobs, productivity growth and economic recovery.

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² The views expressed are purely those of the authors and may not in any circumstances be regarded as stating an official position of the European Commission

- Second, the workshop was an ideal platform for obtaining feed-back from policy-makers, industry representatives and experts about how the IRIMA analytical activities are best serving their needs (and could best serve it in future work).

The workshop took a multi-pronged approach to address several distinct yet complementary issues relating to industrial innovation that were arranged into three sessions. The first session, on the **dynamics of R&D investment**, presented an overview of the R&D investment activities of the world's largest innovative companies, by showcasing some of IRIMA's research on the EU Industrial R&D Investment Scoreboard ('Scoreboard') dataset. Scoreboard data remains one of the main data sources for the IRIMA project. The second session, on the **evaluation of R&D&I policies**, focused on providing evidence to policy-makers on how current support schemes for R&D and innovation by (young) innovative firms might be made more effective. The third session, on **stimulating (young) innovative firms**, sought to provide valuable evidence on how to support the leading innovators of tomorrow.

Each of the sessions therefore focused on a different facet of the challenge of bringing up a new generation of young leading innovative firms. A final panel discussion provided a fitting summary of the workshop, as well as guidance for IRIMA's future research efforts. All in all, the workshop shed light on the determinants of R&D investment and firm growth, and the evaluation of innovation policies to support growing innovative firms, as well as highlighting some opportunities for new analysis on the Scoreboard dataset, and pressing research priorities for IRIMA going forward.

SESSION 1. Dynamics of R&D investment: new evidence from the EU Industrial R&D Scoreboard

Marnix Surgeon and **Fernando Hervás** set the context of the workshop with a brief overview of the economic and policy context in which IRIMA's research is situated. The introductory session then focused on presenting the 2015 version of the EU Industrial R&D Scoreboard dataset on the world's top R&D investors,³ that together represent more than 90% of the R&D financed and implemented by the business sector worldwide. **Fernando Hervás** introduced the 2015 Scoreboard dataset, that had been the focus of IRIMA's 2015 Scoreboard report which had been released only days beforehand. This presentation provided some key statistics and indicators on the state of the world's R&D investments, and contained colourful infographics and charts to show how Europe struggles to catch up with the US; also documenting the rise of R&D investments by Chinese companies. The presentation outlined some ongoing research efforts aiming at a more detailed understanding of the processes of innovation by looking for example at inventor locations (using patent information) and at the dynamics of most promising R&D investing companies with headquarters in Europe. **Pietro Moncada-Paternò-Castello** followed through with some evidence on how specific countries have performed in terms of R&D investments, and also investigating the changing age composition of firms in different world regions. Among the main findings were that European R&D leaders are often older

³ Annual reports and datasets of the EU Industrial R&D Investment Scoreboard are available at: <http://iri.jrc.ec.europa.eu/scoreboard.html>

than their US counterparts, although this can partly be explained in terms of differences in sectoral affiliation. The presentation by **Nicola Grassano** sought to untangle the complex nexus between firm growth and R&D investment by applying recent developments in econometrics – namely a data-driven Structural Vector Autoregression model. More specifically, this technique analysed the causal relations between five key firm-level variables (growth rates of sales, employment, operating profits, capital expenditures and R&D). Sales growth was observed to kick-start the growth process, having large positive effects on all other variables, closely followed by capital expenditures. R&D growth has a positive influence on employment growth (confirming some of IRIMA's earlier findings).⁴ Profits growth appears to be an outcome (rather than a driver) of the growth process. **Matthias Deschryvere** shed further light on the dynamics of firms' R&D investment decisions by investigating the phenomena of persistence and convergence in R&D investment patterns. In contrast to some theoretical predictions on the topic, firms did not appear to converge to the industry's average R&D/sales ratio over time. Instead, heterogeneity was observed between firms in the same sector, suggesting that policies that are fixed at the sector level might be rather blunt in addressing the needs of particular firms.

The session ended with a panel discussion, which included some alternative interpretations of the data, as well as practical suggestions for making progress with the statistical investigations.

Session 2. Evaluation of R&D&I policies

This session addressed how policy efforts to support innovative activity in firms could be evaluated and potentially made more effective. **Pierre Mohnen** provided some brand new evidence from an evaluation of the Dutch 'Innovation box' policy, which was the follow-up to the 'Patent box' scheme that had previously been analysed by IRIMA research.⁵ Instead of providing tax incentives for patents, 'Innovation box' has now generalized the scheme to include tax incentives for innovation that emerges from R&D investments. Despite the restructuring of Dutch efforts to support firm-level innovation, the amount of additional R&D stimulated by the scheme remains at a (perhaps disappointingly) low level, although the author pointed to other possible effects, occurring through spillover effects. **Daniel Halvarsson** presented similar research, this time relating to the Swedish experience. More specifically, he evaluated the Vinn Nu and the Forska & Vax grant schemes. Although previous evaluations (largely based on the satisfaction reported by recipients) had suggested that these schemes had been successful, nevertheless the application of advanced 'coarse-grained' matching techniques made it difficult to detect any significant benefits between the recipients and a closely-comparable control group (where performance outcomes are measured in terms of (skilled) employment, value-added and

⁴ Ciriaci, D., Moncada-Paternò-Castello, P., Voigt, P. (2016) "Innovation and job creation: a sustainable relation?" Eurasian Business Review 6(1). DOI: 10.1007/s40821-015-0031-3. Available at <http://link.springer.com/article/10.1007/s40821-015-0031-3>

⁵ Alstadsæter A., Barrios S., Nicodeme G., Skonieczna A. M., Vezzani A., 2015. Patent Boxes Design, Patents Location and Local R&D. IPTS Working Papers on Corporate R&D and Innovation – No 6/2015

sales growth). **Daniel Neicu** led the discussion of these papers, which touched on issues such as the wider societal (non-pecuniary) benefits of innovation support schemes, and possible beggar-thy-neighbour consequences between rival countries (e.g. the tax competition accusation that is often brought against the 'Patent box' policy).

Session 3. Stimulating (young) innovative firms

The third and final session continued with the theme of R&D and firm performance from European datasets. New evidence was put on the table to prepare the discussion for how Europe can establish itself as a global innovation leader. Indeed, for Europe to have a thriving high-tech industry (with a larger number of 'yollies' – young leading innovators), what is required is not only innovation by incumbents, but also the entry of high-tech startups, and the (rapid) growth of new entrants. Indeed, the European Commission is showing increasing interest in the framework conditions and support schemes needed to encourage high-growth firms.

Werner Hölzl opened the session by providing an overview of the characteristics and behaviour of high-growth firms by presenting his chapter from the up-coming Science, Research and Innovation Competitiveness Report 2016. **Max Rolfstam** took a demand-side (rather than supply-side) perspective by exploring the role of public procurement for stimulating young innovative firms. **Alex Coad** presented evidence from the UK that fast growth is associated with higher death rates (above a certain point), which led to a discussion about whether high-growth firms might improve their overall economic contribution by 'putting the brakes on' and slowing down their fast pace (Matthias Deschryvere suggested that the emphasis on high-growth firms be replaced with a focus on 'nice-growth firms'). **Sven-Olov Daunfeldt** investigated the 'Schumpeterian' conjecture that high-growth firms are to be found in high-tech sectors, and, interestingly, observed that high-growth firms are actually *under*-represented in R&D-intensive sectors (although they are relatively frequent in knowledge-intensive business services). **Mercedes Teruel** closed the session by showing that the R&D investments undertaken by young firms are riskier than those undertaken by larger firms, which bolsters the need for providing support for these firms in the hour of need. This led to a discussion on whether innovation policy should be made conditional on firm age (i.e. aimed specifically towards younger innovative firms instead of their older counterparts), but the participants did not seem to reach a consensus (Ken Guy in particular voiced his skepticism).

A final round table brought the workshop to its conclusion, featuring **Ken Guy, Pierre Mohnen, Mark Nicklas, Agnieszka Skonieczna and Colin Wolfe**. The panellists began with a statement of their overall perspectives on the issues raised during the workshop, before engaging in a more interactive discussion with the floor. Main points that arose in relation to the current EU policy agenda included:

- The crucial importance of firm's investments in intangible assets and physical capital, as a means to modernise Europe's industrial base. This is a need across sectors and companies (large and small, old and young).

- The need to focus on creating the right environment, including eliminating remaining barriers in the internal market, for the emergence and growth of innovative companies.
- The relevance of the renewed cohesion policy to support innovation investments and to serve as test-beds for new policies and instruments that take into account the systemic and inclusive nature of innovation. In order to be effective, such test-beds need to incorporate proper data and analytical support.
- Experimentation has also spread at Member State level, particularly in the area of tax based support instruments to innovation. Again, proper analysis and evaluation of new schemes is very important, particularly regarding its impact on young innovative firms.
- The dilemma of horizontal versus vertical/targeted innovation support instruments is far from solved. Targeting technologies might be one option, but there is always the danger of picking the wrong ones or being blind to emerging ones. Regarding horizontal policies, demand-side support – e.g. through the use of public procurement – remains promising and still relatively unexploited.
- More research is needed to better understand the dynamics of place-based innovation ecosystems (e.g. clusters) and to relate such dynamics to broad societal challenges, such as environmental sustainability.

In his closing remarks, **Marnix Surgeon** confirmed that most of the topics and analytical needs raised along the workshop will be addressed by the next stage of the IRIMA project. The main underlying challenge is to get a better understanding of the main factors determining firm's innovation investments and analyse what role public intervention can play. This will require the use of novel and more sophisticated analytical tools (e.g. to better understand causal relations), and presentations at this workshop show very promising and interesting avenues to be pursued in the context of this project.

Conclusions

Despite a few last-minute cancellations (e.g. from Bart Verspagen, Gabriele Pellegrino and Alex Tuebke) due to concerns about security in Brussels (late November – early December 2015), the workshop contained a large number of presentations, and (as observed in the closing remarks by Marnix Surgeon) the room remained full even though the workshop lasted for longer than usual. The cracks between the presentations and the pauses for coffee breaks provided a fertile soil for spontaneous discussions and lively exchanges. Among the many ideas that circulated, some of them were voiced repeatedly such that it is worth mentioning them more specifically:

- Instead of focusing narrowly on either large firms or small firms, research should be aware of the symbiotic relations between the two. More specifically, the need for an **ecosystems approach** was mentioned by several of the participants.

- A focus on the products emerging from individual firms may miss the role of **global value chains**, which blur the boundaries of firms and create problems for analyses undertaken at the national level.
- Throughout the workshop, participants reflected on the **challenges for data collection**. National level datasets are of limited interest if firms are globalized. IRIMA's Scoreboard data has the potential to provide valuable coverage of global leaders, although the distribution of a firm's activities across regions deserves further investigation. More data on global value chains (possibly involving collaboration with the OECD) would be welcome.