



“Evaluation of research and innovation policies” - Final SIMPATIC Conference in Brussels

Thursday 26 February and Friday 27 February, 2015

Power Point presentations are available on SIMPATIC website (www.simpatic.eu).

Friday 27 February 2015

9.00 - 9.15 Welcoming remarks

Reinhilde Veugelers, Scientific Coordinator of SIMPATIC, Bruegel

Domenico Rossetti, DG RTD, European Commission, SIMPATIC project officer

Since the foundation of the European Union to today, research and innovation has moved from a piece of industrial policy to a genuine EU strategy. As stressed by Domenico Rossetti, R&I is a key EU pillar for several priorities of President Juncker’s agenda: growth and jobs, digital single market, Energy Union, and strengthened industrial base. The budget to R&I has never been so large: €80 bn in H2020 and €220 bn in ESIF. However, there is still a lot to do if Europe wants to be a global R&I leader, and due to the crisis, budget competition for different purposes has become fiercer. Therefore, Domenico mentioned how critical it is right now to rigorously assess the impact of funding from a socio-economic perspective, this being the main objective of the SIMPATIC project.

The main key conclusions and policy implications from this project were summarized by Reinhilde Veugelers. A substantial heterogeneity in RTD policies across countries was found, meaning that transferring best practices across EU member-states should be handled with care. In the presence of diminishing private returns to R&D investment, rather than stimulating R&D active firms to do more R&D, firms that are currently impeded from being R&D active to develop R&D projects should be the main target of subsidies, as initial R&D has higher social rates of return. With the current low application rates for public R&D support programs, applications costs must be reduced and other policies need to be put in



place to improve the quality of ideas and projects – the framework conditions for innovation.

In terms of macro effects, there are few macro-models applied in policy evaluation that have an explicit modelling of the R&D growth process (the NEMESIS and QUEST III). These models are significantly different with respect to the long-term effects on GDP growth and jobs. Results depend on how R&D is modelled and calibrated. Beyond estimating the macro-effects from R&D policies, these models should be used more to analyse which framework conditions are more relevant to improve the impact of public R&D funding, namely product market reforms, labour market and education reforms.

Finally, more research is needed in order to assess which framework conditions are more important for different countries and hence which structural reforms are of first order importance. More micro-econometric impact assessment, preferably of the (quasi-) experiment type is also needed, and used to calibrate the parameters of macro models.

9.15 - 10.15 **Jobs & Innovation**

Joze Damijan, Institute for Economic Research (Ljubljana)

Jordi Jaumandreu, Boston University

Since the 1970, labor markets in advanced countries have been showing a shift in demand towards more educated workers. However, the shift of employment from low-skilled to high-skilled labor is not uniform. Indeed, an U-shaped evolution of employment evidences a polarization effect in the labor markets, with decreases in employment in middle-skilled labor. This phenomenon can be explained by the effect of technological progress in replacing “routine” labor, which is in the middle of the wage distribution, and also by a progressive offshore to lower-wage countries. Some tasks can be codified as routines, computerized and carried out by machines, or offshored, while some either abstract tasks or simple tasks cannot. As explained by Jordi Jaumandreu, 3 effects can be taking place: (1) a displacement effect coming from technological change for a given output, (2) a compensation effect arising from the reduction in marginal cost thanks to technological



progress, and (3) a demand effect. The compensation effect is expected to dominate the displacement effects, and the demand effect can add positive impacts of innovation.

Using data from the Labor Force Survey (eurostat) Jože Damijan, Črt Kostevc and Mojca Lindič study the effects of innovation and offshoring on employment for three broad wage groups. They find that innovation and R&D expenditures contribute to polarization in the higher end of the wage spectrum. Moreover, general imports seem to accelerate polarization at the lower end of the wage spectrum, this being the effect of globalization and offshoring. Finally, inward FDI seems to foster polarization by increasing demand for labor at both sides of the wage spectrum, while the relocation of production abroad via outward FDI moderates these polarization effects by reducing the demand for labor.

10.30 - 11.30 **Climate & Energy**

Ralf Martin, Imperial College Business School

Georg Zachmann, Bruegel

Adam Jaffe, Motu Economic and Public Policy Research (videoconferencing)

To keep temperatures down, it is necessary to cut greenhouse gas emissions decisively. But it is also clear that this could affect the economy negatively. Ralf Martin discusses if climate change policies are not an unbearable burden on the economy but even good for growth. The idea is policy intervention can boost growth because of knowledge spillovers. Firms don't invest in R&D enough because they don't consider the positive effects of their investment on others. He further mentioned that climate policy induces clean but depresses dirty innovations. So to have a growth effect we need that innovation spillovers in clean are larger than in dirty areas. Ralf Martin compares the relative degree of spillovers between different technology types. Spillover is measured by patent citations. He finds that research in clean innovations generate significantly more spillovers. This can justify specific support for clean technology development.

Georg Zachmann began with the question "Who does green innovation", explaining it with some statistical analysis of patents. He mentioned that 9 % of patents by private companies



in 2011 are 'green technology patents' according to OECD definition. The majority of the green patents are held in the manufacturing sector, even if the highest share of green patents is found in sectors less prone to innovate like agriculture, mining, utilities. Zachmann also indicated that companies that fall under EU Trading System feature a significantly higher share of 'green patents' (9.7%) than the other companies (8.7%). Also when it comes to cross country analysis, Denmark(16 %) is an outlier. He further discussed the benefits from combining deployment and RD&D. The benefit increases if deployment follows RD&D. He also highlighted the importance of a credible long-term carbon price signal.

Adam Jaffe, joining the discussion with videoconferencing, indicated that energy technology should change in the same way digital communication technology changed during the last 30 years. Industry should commit itself to develop green technologies, but there should be a clear understanding of the specific role of climate policy and technology policy and its interactions.

11.30 - 12.30 **Macro evaluation of R&D funding impact**

Paul Zagamé, SEURECO

Leonidas Paroussos, E3M-Lab/ ICCS

Paul Zagame started his speech by mentioning some macroeconomic feedbacks. He indicated that the internal demand and competitiveness will be enhanced by process innovation and product innovation. In the labour market, the rigidity of high skilled supply can lead to the R&D efforts inducing wage increase and inflationary pressures, at least in the short run. He discussed in more detail the scenario of an increase in R&D effort up to 3%, which is the Lisbon target. What would be the results in terms of competitiveness, growth, employment and what would be the need for high skilled personnel? More high skilled personnel for research means less for other sectors, so in the short run the GDP may decrease. But if the supply of high skilled researchers is increased, the GDP decrease vanishes. Zagame concluded that R&D investments are always a major



factor explaining the TFP growth and investment policies are important for competitiveness, growth and employment. The way to increase the incentives of R&D policies is to accompany them by measures favourable to ICT and intangible asset development. In addition, these measures would also enhance R&D efficiency.

Leonidas Paroussos tried to give answers to the main policy question “Can the EU economy get a First Mover Advantage from pioneering strong climate action?”. He looked at the current energy production types (wind ,solar, electric vehicles, biofuels) by country groups (North America, OECD, China, EU-28). He discussed the learning by doing and learning by research rates to develop equipment for the clean energy producing sectors. With three different scenarios, Leonidas Paroussos gave a forecast on GHG emissions reduction and the RES share in power generation by 2020 and 2050 for the different countries. He identified conditions under which first mover advantages for EU were more likely, among which (i) a sufficiently large and unified European internal market to allow for achieving full learning by doing potential for clean energy technologies, and (ii) ambitious GHG emission reduction targets eventually adopted by other regions of the world thus developing a large market for such technologies.

13.30 - 14.00 **Micro evaluation of R&D funding impact**

Otto Toivanen, KU Leuven

Otto Toivanen, as a start to his presentation, gave some facts on the justifications for R&D support. He mentioned the impacts of financial market imperfections and institutional structure, when it comes to success of R&D support. He highlighted the correlation between education level/type and invention(in terms of patent numbers), giving an example from Finland. Toivanen emphasized that institutional background matters and that it is important to understand the different policies across countries. R&D support is not uniform at all, since small fraction of firms apply for subsidies, and there exist a lot of heterogeneity in subsidy rates, as well as government decision rules differ substantially. He also discussed how EU-level policy may be more effective than national policies.



14.15 - 14.45 **Implications from research evaluating R&D funding**

Philippe Aghion, Harvard University & Bruegel non-resident scholar (videoconferencing)

While developing economies can increase productivity growth catching up through imitation, advanced economies have to rely in innovation. Aghion argues that there are 4 key framework conditions that are critical for innovation.

Firstly, product markets needs to be liberalized allowing for more competition/entry. This seems to be more growth-enhancing for countries or sectors that are closer to the technological frontier. Moreover, a serious investment in higher education is needed, complementing funding for universities with good governance and greater autonomy. The third pillar is labor market flexibility, which is more growth enhancing the closer a country is to the technological frontier. One needs to combine labor market flexibility with reasonable unemployment benefits conditional upon training for new jobs, the so called flexsecurity. The final pillar is the availability of finance. As a country moves closer to frontier, it needs to rely more on equity finance and stock markets, as innovative investments are more risky and therefore investors require both, to get a share of upside returns and to get control rights.

In conclusion, enhancing innovation in Europe requires structural reforms in exchange for more macroeconomic flexibility and the use of structural funds to encourage structural reforms. A new European industrial policy must be defined, redirecting technical change toward clean technologies, making growth more inclusive and with strong investments and good governance in higher education.

14.45 - 16.30 **Policy Panel. Bringing it all together: the impact on growth and jobs**

Panel discussion chaired by **Reinhilde Veugelers**, Bruegel



Panel Members: **Andre Sapir**, Bruegel; **Roman Arjona**, DG RTD, EC ; **Werner Roëger**, DG ECFIN, EC ; **Frédérique Sachwald**, Ministère de l'Education nationale, de l'Enseignement Supérieur et de la Recherche

This panel focused on the discussion of SIMPATIC's main results for better addressing the main challenges ahead of Europe's R&I.

There was a clear acknowledgement in regard to the existence of diminishing returns to R&D. Therefore, given that only a minority of firms apply for R&D subsidies, it is critical to find a way to increase applications, fostering more firms to pursue new R&D, and improve the quality of ideas. In terms of policy making, this requires not only subsidies and new ways of reaching firms, but also a holistic approach focusing on framework conditions that emphasises, for example, education and pure academic research.

However, it is also consensual that there exists a substantial level of heterogeneity across countries on the behaviour of firms towards innovation and on the effects of subsidies. A critical challenge for policy makers is to adapt instruments to take into account this heterogeneity, understanding the specifics each member state faces.

European R&I was not immune to the European crisis, so this was, of course, a topic of discussion. Austerity has increased public budget competition making it critical to assess the impact of funding from a socio-economic perspective. Besides the public debt problem, the high levels of private debt is also a key concern. Indeed, innovation is a risky activity, so innovative SMEs will be affected if financial agents become more risk averse. The capital market union aims in part to ease this problem.

In a period of slow growth and slow productivity, macro models suggest that structural reforms, for example in terms of labour skills and flexibility, are more important to foster growth than R&D. However, after these reforms the power of R&D could probably be way larger. In this regard, it is important to further explore the transmission mechanisms between R&D and other factors affecting growth.