R&D: EU's Progress Towards Europe 2020 Strategy

R&D intensity

Research and Development (R&D) is an investment from a corporate or a government in innovation. Instead of yielding immediate profit, R&D focuses on long-term growth through science and technology. The R&D intensity (RI) for a country is defined as the percentage of gross domestic product (GDP) spent on R&D, and it is used as a measurement for how much a country is investing in future developments. A country's gross domestic expenditure on R&D (GERD) is broken down into four sectors of performance, which are expenditure by the business enterprise sector (BERD), the government sector (GOVERD), the higher education sector (HERD) and the private non-profit sector.

RI comparison for EU, US and Japan in 2013

Figure 1 shows the RI of the EU countries, the US and Japan in 2013. For each country, RI is broken down into BERD and the rest. More information about GERD and each sector of performance can be found in DICE Database (2015a). The country differences in RIs are wide and range from Romania (0.39 percent) to Japan (3.47 percent). The EU's RI (2.01 percent) lagged behind that of the US (2.73 percent) and Japan. Among the EU countries, only the nordic countries (Finland, Sweden and Denmark) spent over three percent of their GDP on R&D. Germany, Austria and Slovenia had an RI close to three percent. On the other hand, ten EU countries (Lithuania, Poland, Malta, Slovak Republic, Croatia, Greece, Bulgaria, Latvia, Cyprus and Romania) spent less than one percent on R&D.

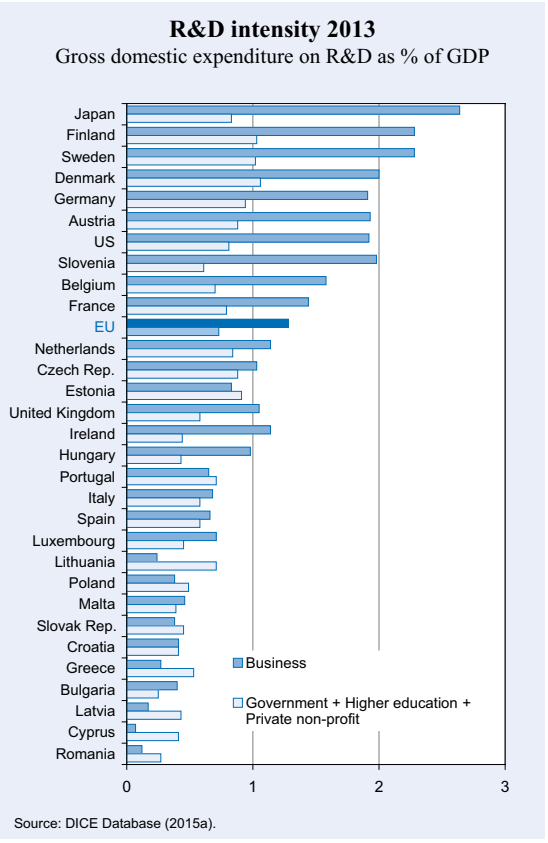
The R&D expenditure in BERD as a percentage of GDP (e.g. EU (1.28 percent), US (1.92 percent) and Japan (2.64 percent)) go a long way to explaining the differences in RI between the countries. Moreover, among the countries in the European Union, the relative share of BERD expenditure is the highest in those countries with high RI. Countries with RI bigger than two percent (Finland, Sweden, Denmark, Germany, Austria, Slovenia, Belgium and France) derived around two-thirds or more of their expenditure on R&D from the business enterprise sector. In contrast, five (Greece, Cyprus, Latvia, Lithuania and Romania) of the ten countries with RI less than one percent had a BERD to GERD ratio of even less than 40 percent. This suggests that business R&D investment is not very attractive, and realising knowledge-based business activities seems more difficult in these countries.

The European Commission also attributes the continued gap in RI between the EU and US, Japan to the low level of investment from the EU's business enterprise sector (European Commission 2010). The Innovation Union Competitiveness report 2011 points out that in the manufacturing sector, from which most of BERD comes, the US' and Japan's high-tech industries are larger and more research-intensive. In particular, the weight of Japan's high-tech sector to its economy is one third larger than that of Europe's (European Commission 2011a).

Europe 2020 Strategy and support from government

In March 2002, the European Council had set the objective of increasing the EU's RI from 1.9 percent to three percent by 2010 (Commission of the European

Figure 1



Source: DICE Database (2015a).

Communities 2003). The negative impact of the recent financial crisis on R&D was not great, as many EU countries maintained and some even increased their expenditure on R&D from 2008 to 2010 (European Commission 2014a). Nevertheless, with the average RI of 1.93 percent in 2010, R&D investments in EU countries were below the target value (Eurostat 2015).

As a continued effort, the European Commission set the expenditure of three percent of the EU's GDP on R&D as one of its five headline targets for the Europe 2020 Strategy (European Commission 2010). Reaching the goal is expected to create up to 3.7 million jobs and increase GDP by EUR 795 billion by 2025 (Zagamé 2010).

The EU Framework Programme (FP) is one of the most significant financial support provided by the European Union. FP7, the seventh Framework Programme that ran from 2007 to 2013, supported research and innovation with EUR 55 billion in funding (European Commission 2011b). The programme notably increased public expenditure on R&D (GOVERD plus HERD) in Slovenia, Estonia, the Czech Republic, Croatia and Malta (European Commission 2013). Horizon 2020, which succeeds FP7, is expected to run with EUR 80 billion in funding (European Commission 2015).

National governments are also implementing various strategies in order to encourage R&D activities. DICE Database (2013) lists some of the strategies adopted by EU members. For example, in Germany, which has the largest economy in the EU, the new High-Tech Strategy 2020 identifies five societal and global challenges and aims to be a key leader in each field in the next 10–15 years. The Czech Republic's International Competitiveness Strategy aims to place the country in the top 20 by 2020, with a focus on infrastructure, institutions and innovation. In Portugal, a new Science and Technology National Council was formed in 2011, and Portugal 2020, the national reform programme, focuses on business R&D and sets entrepreneurship and innovation as the nation's priorities. A lot of policies adopted by these governments are in line with the Europe 2020 Strategy.

Japan and the US are implementing their own policies to improve R&D even further. The Japanese government has identified five goals to achieve by 2030 and aims to increase RI to four percent, at least quarter of which is invested by the government (Tang 2015). The US government is expected to spend USD 145.2 billion on R&D in 2016, an increase of 6.4 percent in nominal dollars from 2015, with a focus on creating knowledge and technology that will generate businesses and jobs in the future (White House 2015).

Trend towards R&D tax incentive in the EU

As Figure 1 suggests, BERD takes the largest proportion of GERD in most countries. Governments also directly invest in BERD, but recently their indirect support on BERD, which mostly consists of tax incentives, has substantially increased (European Commission 2013). Policies relating to R&D tax incentives are often mixtures of several types and vary among countries, but currently most EU countries have some sort of tax policy aimed at supporting innovation (only Germany and Estonia currently do not have a tax policy aimed directly at stimulating innovation). The most common scheme is R&D tax credits, used in 21 countries, followed by enhanced allowances (16 countries) and accelerated depreciation (13 countries) (see DICE Database 2015b for more details).

From 2007 to 2010, according to the Innovation Union Competitiveness report 2013, tax reliefs aimed at fostering R&D activities have increased significantly in France, Portugal, Ireland, the Netherlands, Austria, Denmark, Italy and the Slovak Republic. 13 EU members have also announced new or updated R&D tax incentives by 2012. The report also argues that tax incentives should be applied to expenditure that brings about strong knowledge spillovers, and one of the best ways to achieve that is to provide wage-related incentives for researchers.

Daniel Chung

References

Commission of the European Communities (2003), *Investing in Research: An Action Plan for Europe, COM(2003) 226 final/2*, Publications Office of the European Union, Luxembourg.

DICE Database (2015a), "Gross Domestic Expenditure on R&D by Sector, 1981 - 2013", Ifo Institute, Munich, online available at http://www.cesifo-group.de/DICE/w/4LFFzM7R4.

DICE Database (2015b), "R&D Tax Incentive Schemes, 2013/14", Ifo Institute, Munich, online available at http://www.cesifo-group.de/DICE/w/36fAL7Xcy.

DICE Database (2013), "Science and Innovation: Country Profiles, 2012", Ifo Institute, Munich, online available at http://www.cesifo-group.de/DICE/w/3NXZhPWgk.

European Commission (2010), *Europe 2020: A strategy for smart, sustainable and inclusive growth, COM(2010) 2020 final*, Publications Office of the European Union, Luxembourg.

European Commission (2011a), *Innovation Union Competitiveness Report 2011*, Publications Office of the European Union, Luxembourg.

European Commission (2011b), Development of Community research – commitments 1984-2013, http://ec.europa.eu/research/fp7/pdf/fp-1984-2013_en.pdf. (accessed 15 July 2015).

European Commission (2013), *Innovation Union Competitiveness Report 2013*, Publications Office of the European Union, Luxembourg.

European Commission (2014a), *Research and Innovation as Sources of Renewed Growth, COM (2014) 339 final*, Publications Office of the European Union, Luxembourg.

European Commission (2014b), A Study on R&D Tax Incentives, http://ec.europa.eu/DocsRoom/documents/8032

Eurostat (2015), Database: Research and Development Expenditure, by Sectors of Performance, http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsc00001&plugin=1, (accessed 15 July 2015).

European Commission (2015), What is Horizon 2020?, http://ec.europa.eu/programmes/horizon2020/en/what-horizon-2020, (accessed 20 July 2015).

OECD.Stat (2015), Main Science and Technology Indicators, http://stats.oecd.org/Index.aspx?DataSetCode=MSTI_PUB, (accessed 15 July 2015).

Tang, J. (2015), "Pro-Science Stimulus to Revitalize Japan's R&D", *Science Careers,* 27 March, Online Edition, http://sciencecareers.sciencemag.org/career_magazine/previous_issues/articles/2015_03_27/science.opms.r1500154.

White House (2015), "Investing in America's Future through R&D, Innovation, and STEM Education: The President's FY 2016 Budget", Blog of the White House, https://www.whitehouse.gov/blog/2015/02/02/investing-america-s-future-through-rd-innovation-and-stem-education-president-s-fy-2.

Zagamé, P. (2010), *The Costs of a non-innovative Europe: What Can we Learn and What Can We Expect From the Simulation Works*, European Commission Publication, http://ec.europa.eu/research/social-sciences/pdf/demeter-costs-non-innovative-europe-zagame_en.pdf.