

# A RECOVERY ON THE HORIZON?

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**Brief on SME INNOVATION PERFORMANCE**

**2012/2013 Annual Report of European SMEs**

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# 1. Introduction

Innovation is arguably one of the main drivers of economic growth and the capacity to innovate among the most important factors enhancing competitiveness on a global scale (Grossman and Helpman 1991, Nelson 1996, Baumol 2002). Such capacity depends on a series of framework conditions which enable firms to pursue the necessary investments in R&D and enhance the knowledge content of the product and services delivered and hence their productivity.

Recent literature suggest that European SMEs have increased their share of absolute R&D expenditures but such intensity of R&D expenditures is on average low as SMEs tend to engage in less R&D intensity sectors (Moncada Paternò Castello 2011). Latest analyses reported in the Innovation Union Scoreboard (2013) also highlight that in general the innovation divide between the Member States is widening, with less innovative countries no longer catching-up with the most innovative countries. This means that differences in innovation performance in the European Union have started to increase signalling a possible start of a process of divergence in Member States' innovation performance. In this perspective, it has been observed that the framework conditions for business R&D vary considerably across European countries, with the Northern European countries holding top positions on many indicators quite systematically (EU Competitiveness Report on SMEs 2011).

## 2. SME Innovation Performance

This section will focus on innovative SMEs and will investigate investments associated to innovation; expenditures in R&D both internal and external to the firm; and proportion of enterprises cooperation active engaging in product and process innovation. The tables and figures below are sourced from Eurostat available aggregates of the last edition of the Community Innovation Survey (CIS 2010). Data represent SMEs compared to Large firms. In the present analysis we consider sectors defined as “all Core NACE rev 2. - Private, non-financial activities” related to innovation<sup>1</sup>.

The table below (see also Figure 1A in Appendix) shows proportions of product and process innovative enterprises engaged in cooperation divided by size class. As the table shows, small and medium enterprises cooperate on innovation in about the 34 per cent of cases (EU-27 average). In 13 countries SMEs were innovative and cooperating as much on product and process innovation as large firms. Nordic countries (Finland and Sweden) featured strongly within that group as well as the Netherlands and Germany.

**Table 1: Firms cooperating for innovation -  
Proportion of product and process  
innovative enterprises (2010)**

COUNTRY	SMEs	LARGE
<b>Austria</b>	0,4708	0,5531
<b>Belgium</b>	0,4747	0,4692
<b>Bulgaria</b>	0,142	0,2031
<b>Cyprus</b>	0,5515	0,7257
<b>Czech Republic</b>	0,3301	0,4134
<b>Germany</b>	0,4545	0,5405
<b>Denmark</b>	0,3059	0,4023
<b>Estonia</b>	0,3506	0,5075
<b>Spain</b>	0,2721	0,464
<b>Finland</b>	0,4143	0,5105
<b>France</b>	0,3421	0,4154
<b>Hungary</b>	0,1315	0,2608
<b>Ireland</b>	0,4557	0,5199
<b>Italy</b>	0,4676	0,4521
<b>Lithuania</b>	0,1943	0,3587
<b>Luxembourg</b>	0,3889	0,5443
<b>Latvia</b>	0,1084	0,2755
<b>Malta</b>	0,3568	0,4231
<b>Netherlands</b>	0,4678	0,4215
<b>Poland</b>	0,1591	0,3363
<b>Portugal</b>	0,5449	0,6295
<b>Romania</b>	0,1703	0,235

<sup>1</sup> All Core NACE activities related to innovation activities (B, C, D, E, G46, H, J58, J61, J62, J63, K and M71)

<b>Sweden</b>	0,3683	0,4081
<b>Slovenia</b>	0,4167	0,5977
<b>Slovakia</b>	0,2653	0,3079
<b>United Kingdom</b>	0,2326	0,1783
<b>EU-15</b>	0,3904	0,4418
<b>EU-27</b>	0,3474	0,4133

**Source: Eurostat, DIW econ, London Economics, MIOIR**

Overall, recent empirical findings show that the environment for innovation has changed with the importance of new and small firms to the innovation process has increased. However such improvement is balanced by an uneven distribution of small firm innovation between a few highly innovative and high-growth-potential firms and the great majority of SMEs that innovate very little compared to their larger counterparts (OECD 2010). The data suggest that SMEs innovate less than large firms across a range of categories including product innovation, process innovation, non-technological innovation, new-to market product innovations and collaboration in innovation activities.

In the following tables is presented proportions of innovation expenditures by firm size. Innovation expenditure covers a wide array of input associated to innovation activities at the firm level. As such, they consider all the investments associated to: R&D; acquisition of advanced machinery, equipment and software for innovation; purchase or licensing of patents and non-patented inventions, know-how and other types of knowledge; training for innovative activities; design activities for the development of new products; other market activities (such as: market research, changes to marketing methods and advertising). On average (EU-25) the share of SMEs innovation spending was 36% of total expenditures on innovation. In 2010, SMEs in Greece and Ireland accounted for around the 50% of total expenditures on innovation. In 13 countries SMEs level of expenditures in innovation was more than the overall sample average (see also Appendix: Figure 2A).

**Table 2: Proportion of total expenditures on innovation by SMEs and large firms (2010)**

<b>COUNTRY</b>	<b>SMEs</b>	<b>LARGE</b>
<b>Austria</b>	0,34	0,66
<b>Belgium</b>	0,33	0,67
<b>Bulgaria</b>	0,43	0,57
<b>Cyprus</b>	0,48	0,52
<b>Czech Republic</b>	0,38	0,62
<b>Germany</b>	0,16	0,84
<b>Denmark</b>	0,21	0,79
<b>Estonia</b>	0,67	0,33
<b>Spain</b>	0,33	0,67
<b>Finland</b>	0,22	0,78

<b>France</b>	0,33	0,67
<b>Hungary</b>	0,20	0,80
<b>Ireland</b>	0,49	0,51
<b>Italy</b>	0,44	0,56
<b>Lithuania</b>	0,41	0,59
<b>Luxembourg</b>	0,36	0,64
<b>Latvia</b>	0,39	0,61
<b>Malta</b>	0,47	0,53
<b>Netherlands</b>	0,45	0,55
<b>Poland</b>	0,21	0,79
<b>Portugal</b>	0,45	0,55
<b>Romania</b>	0,25	0,75
<b>Sweden</b>	0,28	0,72
<b>Slovenia</b>	0,41	0,59
<b>Slovakia</b>	0,37	0,63

**Source: Eurostat, DIW econ, London Economics, MIOIR**

In a study employing Community Innovation Survey data over 16 countries, Holzl (2009) found that high-growth SMEs are more innovative and that R&D is more important to high growth SMEs in countries closer to the technological frontier.

The next two tables provide a more specific proxy of the actual expenditures in research and development at the firm level providing a more direct assessment of the investments purely associated to technological innovation.

The tables distinguish between intramural and extramural R&D. The former defined as all creative work undertaken within the enterprise that increases knowledge for developing new and improved goods or services and processes, and the latter considering the same activities as above, but performed by other companies, including other businesses within your group, or by public or private research organisations and then purchased by the enterprise.

In 2010, the EU-25 average proportion of intramural R&D expenditures by SMEs was around the 35 per cent and the countries with a higher quota of SME investment in internal R&D were eleven, among which Lithuania (LT) with the highest levels (74%). Poland, Finland and Denmark respectively these countries recorded the lowest amount of resources invested in internal R&D.

**Table 3: Proportion of total expenditures in intramural R&D by SMEs and large firms (2010)**

<b>COUNTRY</b>	<b>SMEs</b>	<b>LARGE</b>
<b>Austria</b>	0,30	0,70
<b>Belgium</b>	0,29	0,71
<b>Bulgaria</b>	0,45	0,55
<b>Cyprus</b>	0,46	0,54
<b>Czech Republic</b>	0,51	0,49



<b>Denmark</b>	0,19	0,81
<b>Estonia</b>	0,56	0,44
<b>Spain</b>	0,41	0,59
<b>Finland</b>	0,17	0,83
<b>France</b>	0,24	0,76
<b>Hungary</b>	0,29	0,71
<b>Ireland</b>	0,45	0,55
<b>Italy</b>	0,39	0,61
<b>Lithuania</b>	0,74	0,26
<b>Luxembourg</b>	0,28	0,72
<b>Latvia</b>	0,57	0,43
<b>Malta</b>	0,66	0,34
<b>Netherlands</b>	0,29	0,71
<b>Poland</b>	0,15	0,85
<b>Portugal</b>	0,34	0,66
<b>Romania</b>	0,34	0,66
<b>Sweden</b>	0,21	0,79
<b>Slovenia</b>	0,30	0,70
<b>Slovakia</b>	0,38	0,62

**Source: Eurostat, DIW econ, London Economics, MIOIR**

Finally, the last table looks at the proportion of R&D expenditures from companies outside the enterprise. The average level of outsourced investment for SMEs was slightly lower than the average internal expenditures: 32 per cent (against 35 per cent), suggesting that SMEs mildly tend to carry their R&D in house rather than purchasing it from other firms. Eleven of the considered countries had a level of extramural expenditures higher than average, with Lithuania's SMEs (LT) having up to the 86 per cent of their R&D purchased from other companies.

**Table 4: Proportion of Total Expenditures in  
Extramural R&D, SMEs and large firms  
(2010)<sup>2</sup>**

<b>COUNTRY</b>	<b>SMEs</b>	<b>LARGE</b>
<b>Austria</b>	0,26	0,74
<b>Belgium</b>	0,14	0,86
<b>Bulgaria</b>	0,39	0,61
<b>Cyprus</b>	0,47	0,53
<b>Czech Republic</b>	0,15	0,85
<b>Denmark</b>	0,15	0,85
<b>Estonia</b>	0,54	0,46
<b>Spain</b>	0,21	0,79
<b>Finland</b>	0,20	0,80
<b>France</b>	0,34	0,66
<b>Hungary</b>	0,05	0,95
<b>Ireland</b>	0,27	0,73
<b>Italy</b>	0,26	0,74
<b>Lithuania</b>	0,86	0,14

<sup>2</sup> All Core NACE activities related to innovation activities (B, C, D, E, G46, H, J58, J61, J62, J63, K and M71)

<b>Luxembourg</b>	0,45	0,55
<b>Latvia</b>	0,57	0,43
<b>Malta</b>	0,52	0,48
<b>Netherlands</b>	0,25	0,75
<b>Poland</b>	0,08	0,92
<b>Portugal</b>	0,43	0,57
<b>Romania</b>	0,14	0,86
<b>Sweden</b>	0,18	0,82
<b>Slovenia</b>	0,43	0,57
<b>Slovakia</b>	0,41	0,59

**Source: Eurostat, DIW econ, London Economics, MIOIR**

Although increasing institutional efforts to harmonize data for the understanding of the relationship between innovation and SMEs performance, comparative exercises at the EU level still provide controversial results because of sampling selection issues (Criscuolo et Al. 2010), and for the difficulty to separate the effect of context dependent factors (such as firm's age, or type of innovation or culture context) in the analysis (Rosenbush et Al. 2011).

However, recent literature on the relationship between R&D intensity and productivity found that firm size and R&D intensity, along with investment in equipment, enhances the likelihood of having both process and product innovation. Both these kinds of innovation have a positive impact on firm's productivity, especially process innovation. Among SMEs, larger and older firms seem to be less productive. Finally, product innovation seems to have a positive impact on firms' labour productivity (Hall et Al. 2009). These results hold across four large EU economies with a high SMEs intensity such as Italy, France, Germany, Spain and UK (Griffith et al. 2006).

### 3. SME Innovation Performance: final remarks

In the previous section we looked at key innovation inputs such as broad investments associated to innovation and expenditures in R&D; and at the innovation output in terms of the proportion of enterprises engaging in product and process innovation.

Despite our analysis was bounded by data availability, it is relevant to remember that to increase SMEs competitiveness other elements should be considered. Such elements are defined according to the idea that innovation occurs within a wider framework which is identified by the environmental conditions enabling the innovation process and that ecosystem factors play a crucial role in determining direction and opportunities to innovate (Allman et Al. 2011).

In particular, key enablers of the innovation process rest on the interplay between available resources and knowledge creation, a relationship shaped by factors such as human capital, infrastructures, access to finance and knowledge exchange between public research base and entrepreneurs.

Research into human capital has suggested that innovation-driven growth in small and medium sized firms is fostered by a broad range of capabilities both managerial and entrepreneurial (Kakaki 2003; Macpherson and Holt 2007). Moreover, a recent study highlights how skills are very relevant enablers of SMEs capacity to export (Love and Roper 2013). Human and social capital in turn also activate networking opportunities and increase firms' absorptive capacities, defined as the capacity of make use of external knowledge.

Institutional, physical and financial infrastructures such as the normative framework stimulating trade and competition; an increasing communication and digitalization accessibility; as well as smooth lending technologies augmenting credit availability are all historically tested keys to pursue the expansion of productivity (Mokyr 2008).

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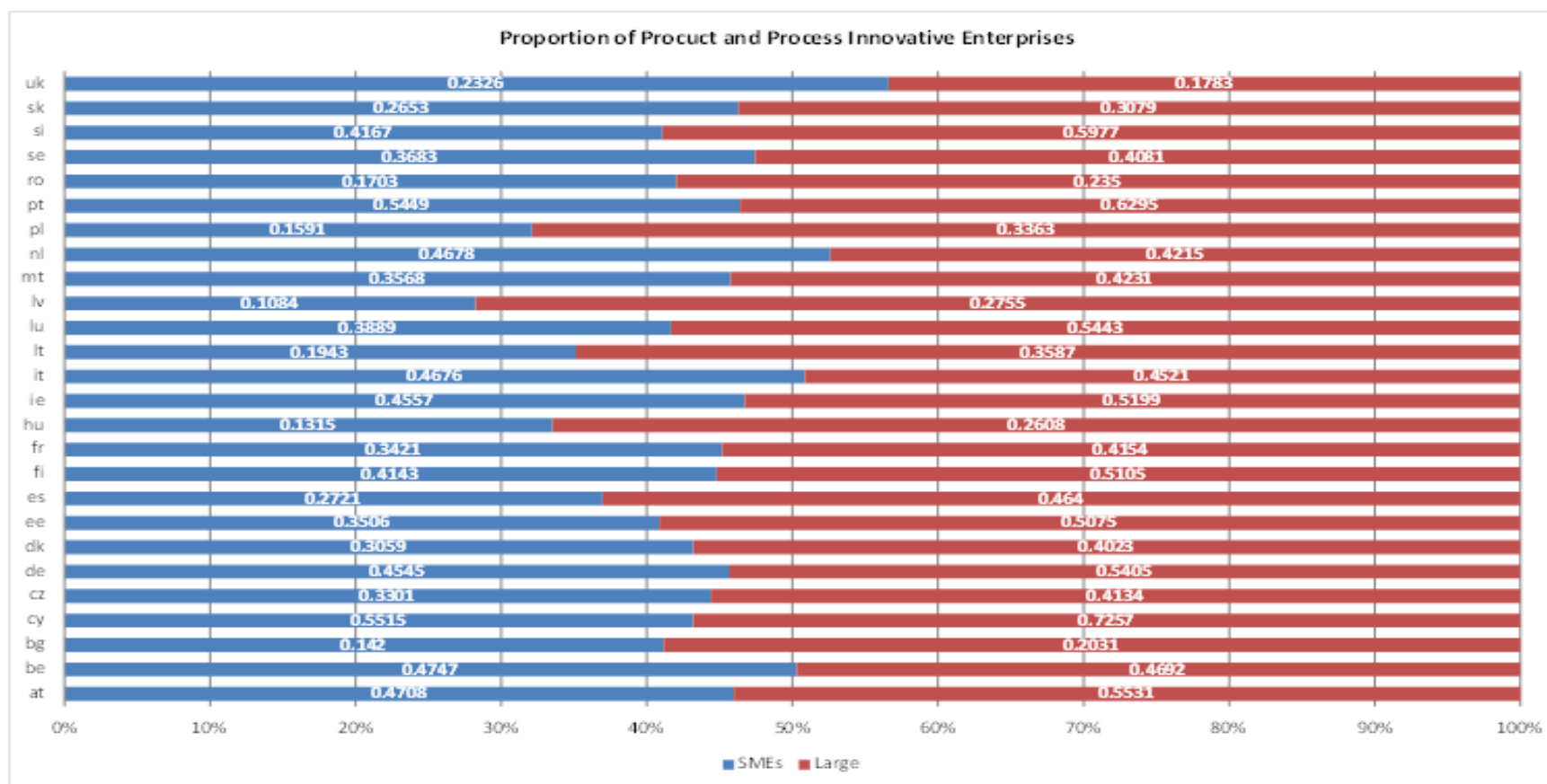
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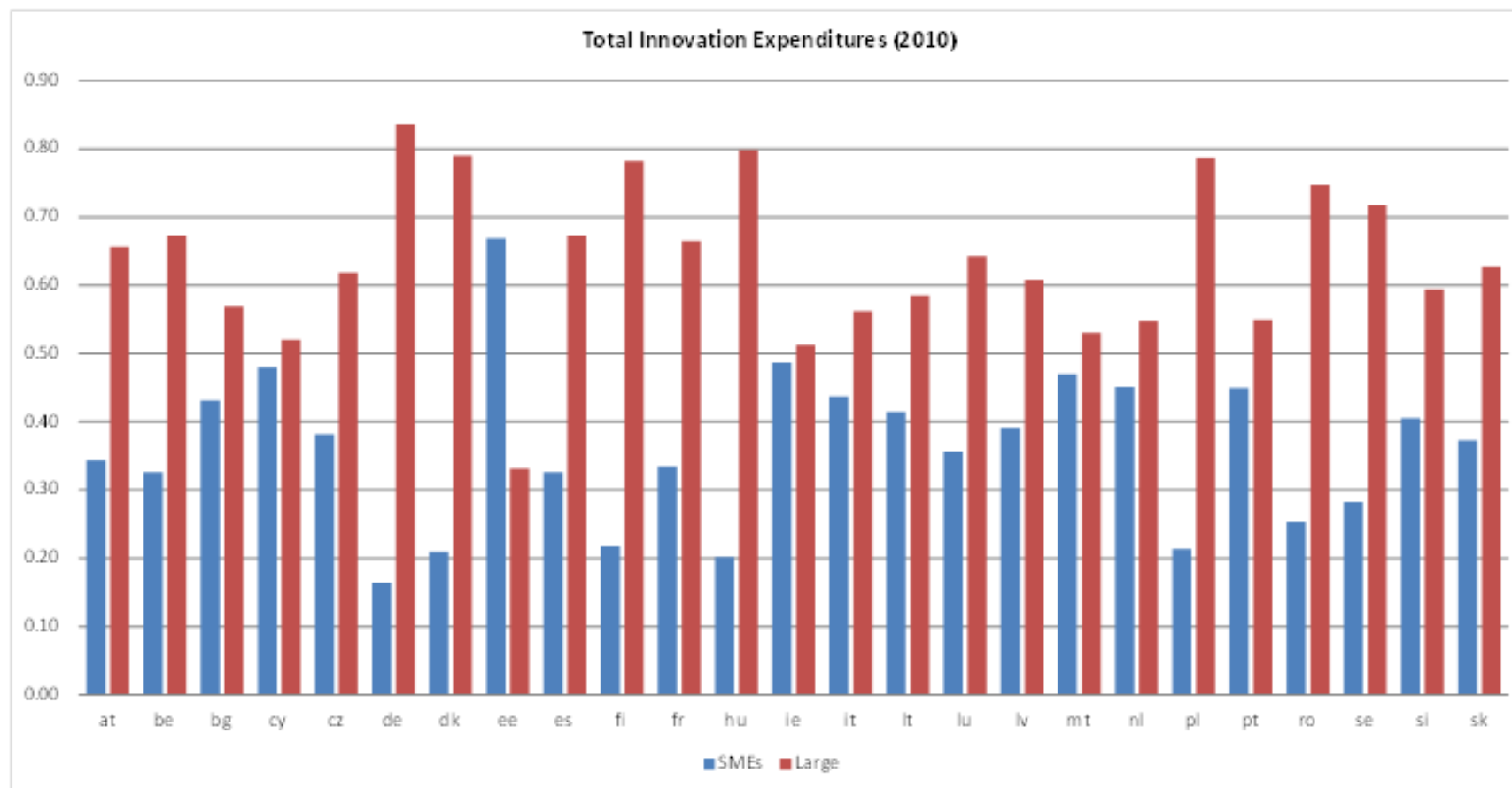
## ANNEXES

### I. PROPORTION OF PRODUCT AND PROCESS INNOVATION (ENTERPRISES)



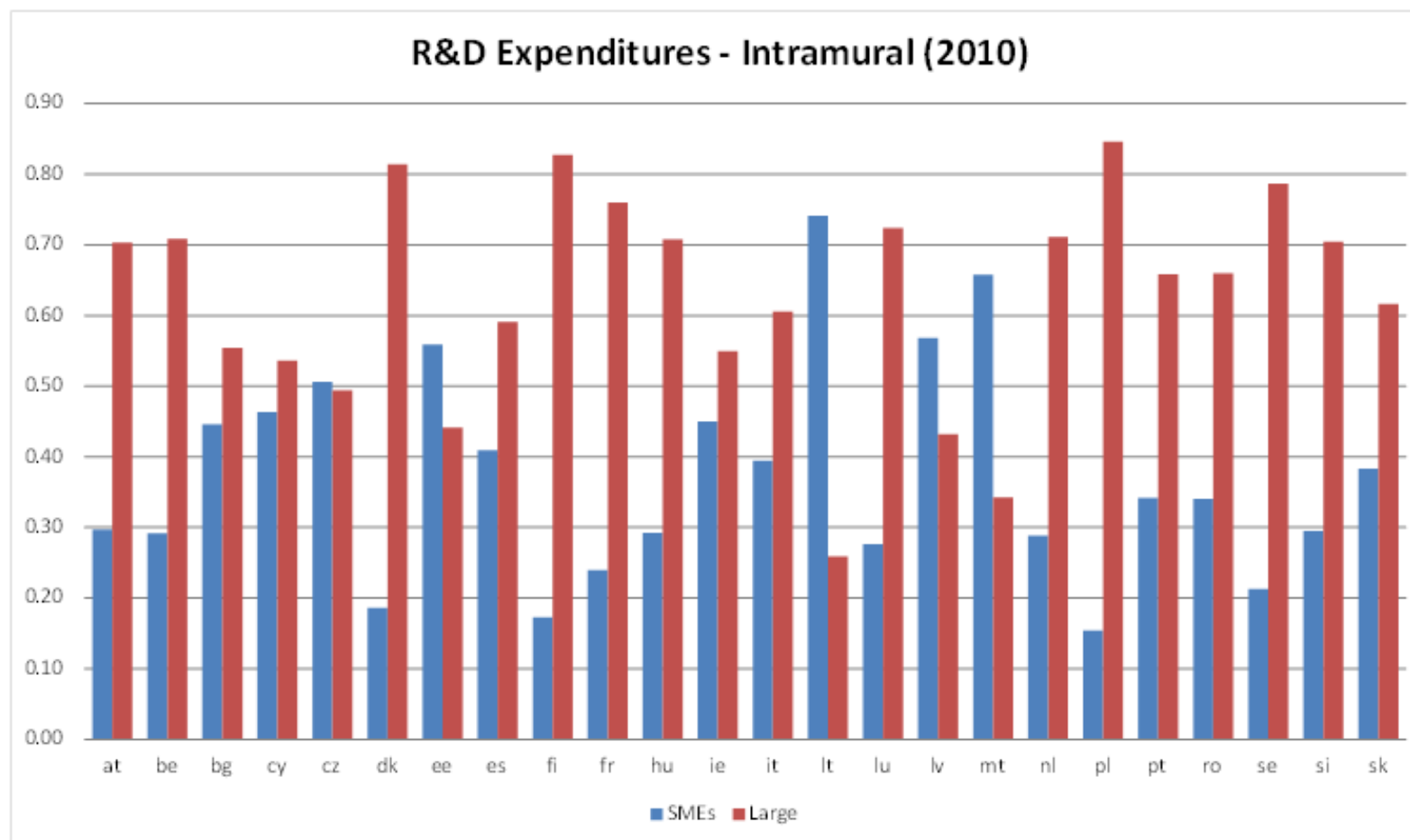
Source: Eurostat, DIW econ, London Economics, MIOIR

## II. TOTAL INNOVATION EXPENDITURES (2010)



Source: Eurostat, DIW econ, London Economics, MIOIR

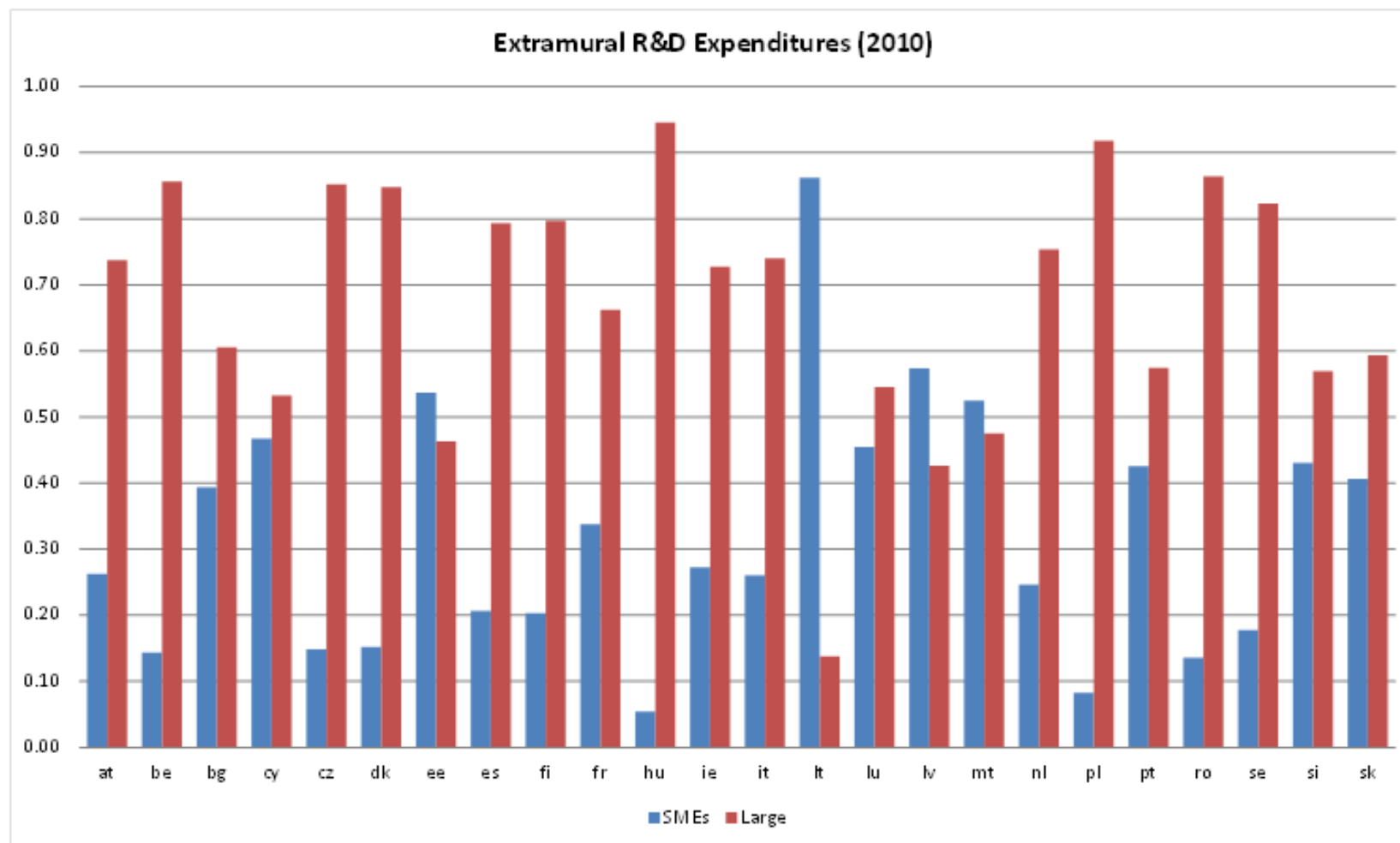
### III. R&D EXPENDITURES – INTRAMURAL (2010)



**Source:** Eurostat, DIW econ, London Economics, MIOIR



#### IV. R&D EXPENDITURES – EXTRAMURAL (2010)



Source: Eurostat, DIW econ, London Economics, MIOIR