

# Benchmarking of R&D procurement and Innovation Procurement Investments In countries across Europe

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## Executive Summary

Evidence shows that the slow adoption of innovative solutions, in particular ICTs, is Europe's Achilles heel on the road to economic recovery<sup>1</sup>. Over the past years, European industry has repeatedly called on Europe and Member States to create ambitious action plans with clear ambitious targets for innovation procurement spending (ERAB<sup>2</sup>, Startup Community<sup>3,4</sup>).

As highlighted in EC guidance<sup>13</sup>, innovation procurement concerns the first 20% customers on the market for innovative solutions; A healthy economy needs 3% of innovator type customers and 17% of early adopter type customers, to encourage more conservative customers to also adopt innovative solutions widely afterwards. It needs thus 20% of public procurement to be innovation procurement (3% public procurement of R&D and 17% public procurement of innovation solutions).

Mid 2015, the European Research Area and Innovation Committee of the European Council (ERAC)<sup>5</sup> called on the European Commission to establish an EU wide monitoring framework that enables to measure how much innovation procurement is happening in Europe. Mid 2017, an EU funded study was appointed to measure how much public procurement of innovative solutions took place in 2018 (study SMART 2016/0040<sup>6</sup>). This document adds the amount of R&D procurement that took place in 2018, to create the full picture about how much innovation procurement takes place across Europe.

The conclusion of the findings is that Europe is still underinvesting with a factor 2 on innovation procurement. For the R&D procurement component, the underinvestment is the largest (factor 5).

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<sup>1</sup> 'A key factor in engineering economic turnaround will be the adoption of innovations... Europe's focus should be primarily on ICT-using sectors because ICT-producing sectors alone are unlikely to provide significant productivity increases to the economy... The EU and governments can do this through their own procurement.', [Report for EU Parliament](#), Oct 2018

<sup>2</sup> The European Research Advisory Board (ERAB) recommends to dedicate 3% of public procurement to R&D, 2010

<sup>3</sup> [Startup Europe Summit recommendations](#)(recommendation 3), March 2019

<sup>4</sup> [Scale-up Europe manifesto](#) (recommendation 4.3d), 2016

<sup>5</sup> [ERAC opinion on innovation procurement](#), June 2015

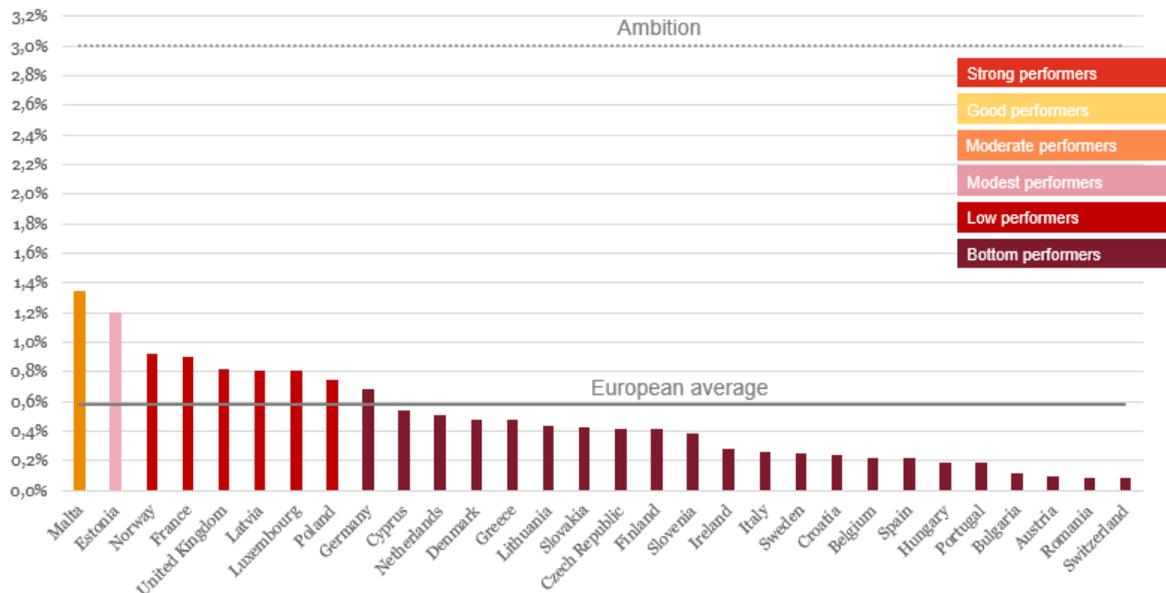
<sup>6</sup> [SMART 2016/0040](#) benchmarked for the first time the investments in public procurement of innovative solutions (PPI procurement) around Europe

# 1. Results

## 1.1 Public procurement of R&D

The following graph shows the benchmarking of R&D procurement investments across Europe:

### Share of R&D procurement out of total procurement



#### Distance from the ambition level

The total amount of R&D procurement across the 30 countries amounts to €16,6Bn, which equals 0,58% of total public procurement or 0,1% of GDP. In the EU-27, this amounts to €12.2Bn, which equals 0,54% of total public procurement or 0,09% of GDP (see Table 1).

Europe is thus underinvesting with a factor 5 compared to the ambition of allocating 3% of public procurement to R&D. Boosting R&D procurement investments across Europe to this ambition level, could close Europe's total R&D investment gap. Indeed, in 2018, the EU invested 2,18% of GDP in R&D (without counting R&D procurement), which is 0,82% below the EU 3% target<sup>7</sup>. If investments in public procurement of R&D would increase from 0.1% to 0,5% of GDP, this would also generate additional private investment that could equal roughly the same level 0,5% of GDP<sup>8</sup>, and the total effect could lift up total R&D investment in the EU with 1% from 2,19% to 3,19% of GDP.

R&D procurement is important not only for public sector modernisation but also for industrial competitiveness, EU strategic autonomy and resilience against supply chain shocks. When R&D services are procured separately from commercial scale deployment, as is the case in pre-commercial procurement, these procurements fall outside the EU's international public procurement agreements with third countries. These procurements can thus be limited to suppliers from the EU Member

<sup>7</sup> ESTAT, [R&D expenditure data](#)

<sup>8</sup> Demand driven innovation doubles the commercialisation success rate of businesses: Source: Hippel, E(2005), [Democratizing Innovation](#), The MIT Press Cambridge, Massachusetts, USA

US R&D procurements generate a return of 30 times the initial investment (after 15 years, 85% of firms were still in business and their nr of company employees raised 20 times): [Analysis Roland Tibbets of US SBIR R&D procurements](#)  
In EU funded pre-commercial procurements, companies give on average a 50% price reduction for performing the R&D to the public procurers, meaning that each euro invested through the public procurement generates at least another euro of private investment in R&D, [Impacts of EU funded PCPs](#), EU DSM website

States and/or they can contain place of performance conditions to ensure that most R&D takes place in Europe<sup>9</sup>. This reinforces EU strategic autonomy in strategic technologies. When combined with multiple sourcing (buying the R&D services from several suppliers in parallel to bring several competing solutions to the market) this creates a future competitive supply chain, which improves EU resilience against supply chain shocks (e.g. shocks like we experienced in the COVID-19 crisis).

As shown in the graph above, the underinvestment in R&D procurement is a general issue across all European countries. There are no countries that are strong performers (that reach 65% of the ambition) or good performers (that reach 55% of the ambition level) on R&D procurement in Europe. There is very small group of modest and moderate performing countries, followed by a large group of low performing countries and a very large group of bottom performing countries.

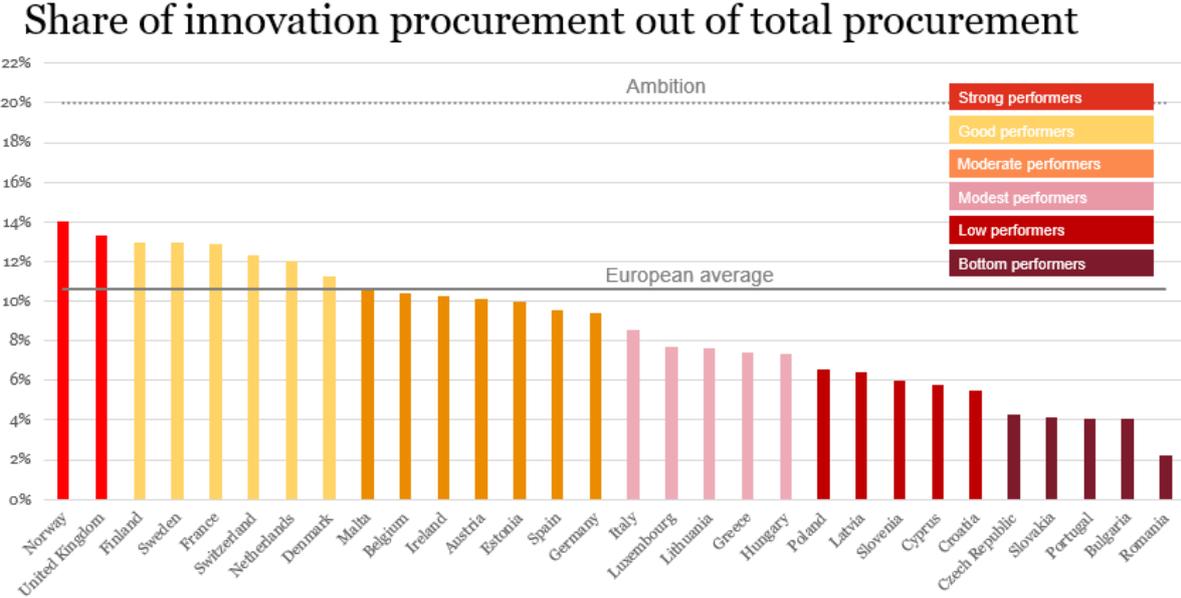
For comparison on the international stage, in 2018 the US federal government on its own spent 3 times as much as Europe on R&D procurement (0,26% of US GDP). South Korea aims to spend 5% of total public procurement on R&D procurement, which equals 0,63% of its GDP.

Breakdown across classical, utilities and defence sectors

Out of total €16,6Bn of R&D procurement in the 30 European countries, €8,8Bn (53,4%) is performed by public procurers in the classical sector, €1,3Bn (7,7%) by public procurers in the utilities sector and €6,4Bn (38,9%) by public procurers in the defence sector. In absolute values, the defence sector contribution is therefore not the main determinant of the total amount of R&D procurement in Europe. However, the R&D procurement intensity is the largest in the defence sector: across the 30 countries, defence procurers spend 5,7% of the total defence procurement budget on R&D procurement, whereas classical and utilities sector procurers spend respectively 0,4% and 0.2% of the total classical respectively utilities procurement budget on R&D procurement.

**1.2 Innovation procurement**

The following graph shows the benchmarking of innovation procurement investments across Europe:



<sup>9</sup> EC [Notice C\(2019\)5494](#), 'Guidance on the participation of third-country bidders and goods to the EU market', 2019

### Distance from the ambition level

The total amount of innovation procurement across the 30 countries amounts to €304,6Bn, which equals 10,6% of total public procurement or 1,8% of GDP. In the EU-27, this amounts to €226,1Bn, which equals 9,9% of total public procurement or 1,7% of GDP (see Table 2).

Europe is thus still underinvesting with a factor 2 in order to reach the ambition where 20% of public procurement (or 3,6% of GDP) is allocated to innovation procurement.

It is important to address this underinvestment because innovation procurement because it has a direct impact on economic growth. It determines the pace of public sector modernization. It enables the public sector to challenge industry to tackle societal challenges (e.g. climate change). It helps companies grow their business in new emerging markets and it encourages them to increase private investment in innovative technologies. And meanwhile, it creates high quality jobs, tax incomes and European exports. It is therefore also logical that public sector modernization is one of the key flagships in the Commission's Annual Growth Strategy for 2021 and the Recovery Package. Boosting innovation procurement could thus contribute significantly to EU recovery.

As shown in the graph above, the underinvestment in innovation procurement is a general issue across all European countries, however overall the level of underinvestment is smaller than was expected. There are strong performing countries that are already within reachable distance from the 20% ambition. The group of bottom level performing countries (that has not reached 25% of the ambition level yet) is relatively small, and in these countries there is a basis of ongoing innovation procurement activity - across most sectors in which the public sector is active - that could be scaled up. All countries that had set targets for innovation procurement have already reached them. There is thus room to increase ambitions on innovation procurement and scale up efforts across Europe.

Doubling innovation procurement efforts in Europe is possible. For comparison on the international stage, the US spends twice as much on the adoption of ICTs in the public sector as in Europe, which helps to reach 20% of procurement going to innovation. South Korea aims to spend even 25% of total public procurement on innovation procurement (5% on R&D procurement and 20% on public procurements of innovative solutions to crease adoption of innovations in the public sector).

### **1.3 Role of ICT**

It is well known that digital technologies are catalysers for productivity, modernization and economic growth. As key enabling technologies, ICTs are "fueling" quality and efficiency improvements across all sectors of economic activity, including in all areas where public buyers are actively investing their procurement budgets: health, public transport, energy, environment, education, security...

According to the ECB, the lack of first buyers (early adopters) is the number one barrier for company growth, in particular SMEs and startups<sup>10</sup>. The ECB finds also that the slower pace of public sector modernization in Europe compared to other parts of the world is significantly undermining public sector efficiency and effectiveness. The ECB specifically identifies also the slow adoption of ICTs as the key problem that is undermining public sector efficiency and competitiveness in Europe<sup>11</sup>.

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<sup>10</sup> [ECB survey on 'Access to finance in the euro area'](#), November 2014

<sup>11</sup> [ECB report on 'Public sector efficiency: an international comparison'](#), 2006

Adoption, and thus public procurement of ICT-based solutions is in other words a key driver for public sector modernization and this links immediately to economic growth. ICTs are generating 60% of productivity growth in leading economies around the world. However, ICT adoption is lagging behind in Europe compared to leading trading partners around the world. ICTs generate on average only 40% of productivity growth in Europe<sup>12</sup> (only a handful of EU countries adopt enough ICTs in order to generate also 60% of productivity growth: in particular Ireland and some Nordic countries).

Boosting innovation procurement of ICT based solutions is thus essential to drive economic growth in Europe as ICTs catalyse the move towards more open, standardised, cheaper systems and open up the internal market in the public sector, as highlighted in the Digital Single Market (DSM).

Study SMART 2011/0036 found that 40% of R&D procurement in Europe focuses on ICT-based innovations. The updated figures for 2018 confirm this. Study SMART 2016/0040 finds that this is also the case for PPI procurement in Europe (38% of PPI procurement is adopting ICT-based innovative solutions). It also finds that in a few leading countries (Finland, Sweden, Ireland) this percentage goes over 60%. The same countries that also show the highest contribution of ICTs to productivity growth / economic growth...

## 2. Methodology

As clarified in EC guidance<sup>13</sup>, 'Innovation procurement' refers to any procurement that has one or both of the following aspects: (1) buying the process of innovation – research and development services – with (partial) outcomes; (2) buying the outcomes of innovation created by others. In the first instance, the public buyer buys the research and development services of products, services or processes, which do not exist yet. The public buyer describes its need, prompting businesses and researchers to develop innovative products, services or processes to meet the need. In the second instance, the public buyer, instead of buying off-the-shelf, acts as an early adopter and buys a product, service or process that is new to the market and contains substantially novel characteristics<sup>14</sup>. Innovation procurement is thus composed of both R&D procurement and public procurement of innovative solutions (also called PPI procurement).

The amount of PPI procurement in 2018 in Europe was determined by study SMART 2016/0040<sup>6</sup> and study benchmarked the performance of countries around Europe against each other.

For the identification of R&D procurements, this benchmarking used the same CPV based methodology as was first used in the DG CNECT funded study 2011/0036<sup>15</sup>. R&D procurements are identified as public procurements that are published using one of the CPV codes from the category

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<sup>12</sup> How ICT can restore lagging European productivity growth, [Report for EU Parliament](#), Oct 2018  
OECD, [Journal economic studies: 'Measuring the contribution of ICT to economic growth'](#)

"ICTs are a powerful driver of growth and employment. A quarter of EU GDP growth and 40% of productivity growth are due to ICT.", JRC, ['The role of ICT in economic productivity and growth'](#), based on EU KLEMS (<http://www.euklems.net/>)

<sup>13</sup> European Commission [notice C\(2018\)3051](#), 'guidance on innovation procurement', 2018

<sup>14</sup> EC guidance clarifies: Early adopters refers to the first 20% customers on the market that are buying a new or significantly improved product, service or process. This includes procurements of products, services or processes that have already been demonstrated on a small scale, and may be nearly or already in small quantity on the market, but that have not been widely adopted by the market yet. This also includes existing solutions that are to be utilised in a new and innovative way.

<sup>15</sup> SMART 2011/0036 benchmarked for the first time the investments in public procurement of R&D around Europe  
<https://ec.europa.eu/digital-single-market/en/news/quantifying-amount-public-procurement-ict-and-rd-across-europe>

73000000 for research and development. This is done across the 30 countries analysed (27 EU Member States, the UK, NO and CH).

Both public procurements that are published European wide in the TED database and public procurements that are published only at national level are taken into account. For the latter type procurements, the benchmarking used the same data sources for national published procurements as in the CNECT funded study SMART 2016/0040. The same methodology as in this study was used to identify R&D procurements in the classical and utilities sectors. For estimating the values of R&D procurements in the defence sector (which are usually not published in EU or national databases) the benchmarking used data published by the European Defence Agency about the amount of R&D investments and the amount of procurement / outsourcing in EDA countries. For the 3 countries that are not covered by EDA data (NO, CH, DK) the benchmarking used other sources for the estimation.

For the non-defence sectors (classical and utilities sector), the values of R&D procurements that were not published (missing values) were estimated using the same methodology as used in study SMART 2016/0040. After identifying the amount of explicit R&D procurement for the 30 countries, this benchmarking used the same methodology as (adding also the implicit and the unpublished R&D procurement) to identify the total amount of R&D procurement in each country. Consequently, the benchmarking identified those public procurements indicated with a CPV code from the range 73000000 that were already counted as public procurements of innovative solutions by the study SMART 2016/0040 (R&D procurements that include the purchase of the resulting innovative solutions) and removed those amounts from the R&D procurement data. This is in line with the OECD methodology of identifying R&D procurement<sup>16</sup>. The approach removes double counting between the PPI and the R&D procurement benchmarking. As a result, one can simply add up the amount of R&D procurement investment for 2018 in a country found in this benchmarking with the amount of public procurement of innovative solutions (PPI procurement) found in the latter study in order to find the total amount of innovation procurement investments of 2018 in that country.

To calculate the percentages of R&D procurement out of total public procurement, this benchmarking also reuses the same values of total public procurement for each country as used in this study. As a result, one can also simply add up the share of public procurement of R&D out of total procurement for 2018 found in a country in this benchmarking with the share of PPI procurement found in the latter study, in order to find the share of innovation procurement out of total procurement in 2018 in that country.

Section 3 shows the data that was obtained per country for what regards the R&D and innovation procurement investment levels.

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<sup>16</sup> OECD paper, measuring the link between public procurement and R&D and innovation, 2016, [https://www.oecd-ilibrary.org/science-and-technology/measuring-the-link-between-public-procurement-and-innovation\\_5jlv7sl1w7h-en](https://www.oecd-ilibrary.org/science-and-technology/measuring-the-link-between-public-procurement-and-innovation_5jlv7sl1w7h-en)

### 3. Investment levels

#### 3.1 Public procurement of R&D

Table 1 lists the total amount of R&D procurement found in the 30 countries in alphabetical order. Table 2 lists the share of R&D procurement in each country out of the amount of total procurement (according to ESTAT data) and out of GDP.

Table 1: Total amount of R&D procurement (in the classical, utilities and defence sectors)	
Country	Year 2018 (in euros)
Austria	63.347.047
Belgium	164.555.863
Bulgaria	9.887.112
Croatia	26.718.450
Cyprus	14.407.129
Czech Republic	161.704.311
Denmark	214.948.978
Estonia	53.493.216
Finland	197.815.572
France	3.752.007.705
Germany	4.284.876.518
Greece	106.914.684
Hungary	44.788.782
Ireland	78.444.410
Italy	671.369.584
Latvia	39.629.697
Lithuania	23.531.620
Luxembourg	66.880.191
Malta	25.880.907
Netherlands	835.007.933
Norway	662.541.820
Poland	590.646.361
Portugal	59.963.849
Romania	23.000.106
Slovakia	89.696.099
Slovenia	26.323.713
Spain	348.554.735
Sweden	220.145.969
Switzerland	56.139.944
United Kingdom	3.656.354.700
<b>Total (of all 30)</b>	<b>16.569.577.003</b>
<b>Total (EU-27)</b>	<b>12.194.540.539</b>

Table 2: Share of total R&D procurement (in the classical, utilities and defence sectors) (in out of total public procurement and out of GDP)		
Country	Year 2018 (% out of total procurement)	Year 2018 (% out of GDP)
Austria	0,09%	0,02%
Belgium	0,22%	0,04%
Bulgaria	0,12%	0,02%
Croatia	0,24%	0,05%
Cyprus	0,54%	0,07%
Czech Republic	0,41%	0,08%
Denmark	0,48%	0,07%
Estonia	1,20%	0,21%
Finland	0,41%	0,08%
France	0,90%	0,16%
Germany	0,68%	0,13%
Greece	0,48%	0,06%
Hungary	0,19%	0,03%
Ireland	0,28%	0,02%
Italy	0,26%	0,04%
Latvia	0,81%	0,13%
Lithuania	0,44%	0,04%
Luxembourg	0,81%	0,11%
Malta	1,35%	0,11%
Netherlands	0,51%	0,11%
Norway	0,92%	0,18%
Poland	0,75%	0,12%
Portugal	0,19%	0,03%
Romania	0,08%	0,01%
Slovakia	0,43%	0,10%
Slovenia	0,38%	0,05%
Spain	0,22%	0,03%
Sweden	0,25%	0,05%
Switzerland	0,08%	0,01%
United Kingdom	0,82%	0,15%
<b>Total (of all 30)</b>	<b>0,58%</b>	<b>0,10%</b>
<b>Total (EU-27)</b>	<b>0,54%</b>	<b>0,09%</b>

### 3.2 Innovation Procurement

Table 3 lists the total amount of innovation procurement found in the 30 countries in alphabetical order (i.e. the sum of the total amount of R&D procurement in table 1 and the total amount of PPI procurement from study SMART 2016/0040). Table 4 lists the share of innovation procurement in each country out of the amount of total procurement (according to ESTAT data) and out of GDP.

Table 3: Total amount of innovation procurement (in the classical, utilities and defence sectors)	
Country	Year 2018 (in euros)
Austria	7.304.297.775
Belgium	7.795.387.407
Bulgaria	345.974.600
Croatia	603.068.862
Cyprus	155.833.509
Czech Republic	1.683.240.629
Denmark	5.085.787.651
Estonia	443.586.697
Finland	6.248.762.307
France	53.588.373.185
Germany	58.895.294.552
Greece	1.646.617.682
Hungary	1.691.611.831
Ireland	2.924.426.328
Italy	21.761.837.820
Latvia	313.538.565
Lithuania	409.170.702
Luxembourg	630.129.295
Malta	201.186.469
Netherlands	19.711.675.310
Norway	10.074.395.695
Poland	5.171.949.703
Portugal	1.274.178.066
Romania	621.413.177
Slovakia	858.939.018
Slovenia	412.109.789
Spain	15.225.340.998
Sweden	11.154.115.541
Switzerland	9.002.376.199
United Kingdom	59.370.222.369
<b>Total (of all 30)</b>	<b>304.604.841.731</b>
<b>Total (EU-27)</b>	<b>226.157.847.468</b>

Table 4: Share of total innovation procurement (in the classical, utilities and defence sectors) out of total public procurement and out of GDP		
Country	Year 2018 (% out of total procurement)	Year 2018 (% out of GDP)
Austria	10,09%	1,89%
Belgium	10,36%	1,73%
Bulgaria	4,05%	0,63%
Croatia	5,50%	1,17%
Cyprus	5,79%	0,75%
Czech Republic	4,26%	0,81%
Denmark	11,26%	1,71%
Estonia	9,96%	1,73%
Finland	12,98%	2,68%
France	12,87%	2,28%
Germany	9,37%	1,74%
Greece	7,39%	0,89%
Hungary	7,35%	1,28%
Ireland	10,27%	0,92%
Italy	8,57%	1,24%
Latvia	6,43%	1,06%
Lithuania	7,60%	0,76%
Luxembourg	7,66%	1,07%
Malta	10,52%	0,86%
Netherlands	12,03%	2,55%
Norway	14,04%	2,73%
Poland	6,56%	1,04%
Portugal	4,07%	0,63%
Romania	2,22%	0,31%
Slovakia	4,10%	0,95%
Slovenia	5,99%	0,75%
Spain	9,53%	1,26%
Sweden	12,92%	2,39%
Switzerland	12,30%	1,51%
United Kingdom	13,33%	2,48%
<b>Total (of all 30)</b>	<b>10,62%</b>	<b>1,81%</b>
<b>Total (EU-27)</b>	<b>9,93%</b>	<b>1,67%</b>