



Brussels Studies

La revue scientifique électronique pour les recherches sur Bruxelles / Het elektronisch wetenschappelijk tijdschrift voor onderzoek over Brussel / The e-journal for academic research on Brussels
Collection générale | 2014

Regional financing for research and development expenditure

Brussels and the “Europe 2020” objective

Financement régional des dépenses en recherche et développement. Bruxelles face à l'objectif « Europe 2020 »

Gewestelijke financiering van de uitgaven voor onderzoek en ontwikkeling. Brussel en de doelstelling “Europa 2020”

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Electronic version

URL: <http://journals.openedition.org/brussels/1250>
DOI: 10.4000/brussels.1250
ISSN: 2031-0293

Publisher

Université Saint-Louis Bruxelles

Electronic reference

Hervé Devillé, « Regional financing for research and development expenditure », *Brussels Studies* [Online], General collection, no 82, Online since 22 December 2014, connection on 19 April 2019. URL : <http://journals.openedition.org/brussels/1250> ; DOI : 10.4000/brussels.1250



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Number 82, December 22nd 2014. ISSN 2031-0293

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Regional financing for research and development expenditure. Brussels and the 'Europe 2020' objective

Translation: Jane Corrigan

Following the loss of competitiveness of most European countries with respect to the other major economic powers since the 1970s, as part of its 'Europe 2020' programme, the European Union has set the objective to allocate 3% of the GDP to research and development (R&D). As part of its national reform programme, Belgium decided to follow this objective. This analysis attempts to highlight this effort at the level of the Belgian federated entities according to forecast hypotheses for GDP, R&D expenditure and its distribution between the private and public sector for 2020. With respect to the hypotheses considered, the Brussels Region would only achieve 1.9% of the GDP by this time, mainly due to a lack of private R&D expenditure in the regional territory. The Flemish Region would basically reach the objective in 2020 and the Walloon Region would exceed it thanks to a significant increase in private expenditure. At national level, Belgium would reach the objective in 2020 overall, thanks to compensations, in particular in terms of private expenditure, between the Walloon and Brussels regions

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Introduction

1. Following the loss of competitiveness of most European countries with respect to the other major economic powers (USA and Japan) since the 1970s, the European Union has set the objective to noticeably improve the performance of the member states as regards innovation and research and development (R&D) by 2020. The 'Europe 2020' programme is a strategy which is likely to combat the structural weaknesses of the European economies via 'intelligent, sustainable and inclusive growth'.¹ The 'union for innovation' initiative of this programme set the objective to improve the conditions for access to research financing aimed at realising innovations in terms of products and services likely to bring growth and employment.

2. At the Barcelona summit in 2002, the European Union had decided to realise these efforts via an objective in terms of rate of R&D (reach 3% of the GDP, 2/3 of which would be supported by the private sector in 2010). As this objective was not reached by this deadline, the new European programme has renewed it for all of the member countries for 2020 without a particular distribution between the public and private sectors. Consequently, the Belgian authorities are committed to reaching 3% of the GDP for their R&D expenditure by 2020 as part of their national reform programme (PNR 2011-2014).²

3. The following sections of this article will take up this frame of reference, applied to each region by distinguishing the R&D expenditure for the public and private sectors in order to determine the position of the Brussels Region with respect to the other regions in terms of efforts to agree to in view of meeting the objective of 3% of the GDP for Belgium in 2020 [Biatour and Kegels, 2008; Biatour et al., 2005 and Fiers, 2005]. To this end, the R&D expenditure for the public authorities

whose territorial base exceeds that of the regions will be distributed among them (the wider regions) and simulations will be carried out with different growth scenarios for this expenditure and the GDP for the public and private sectors. These simulations will allow an evaluation of the contribution of the regions to the efforts which Belgium must agree to as well as the necessary financial support from the various authorities and subsidising agents [Lannoy, *et al.*, 2006; Lannoy *et al.*, 2008; Clerbois and Ernaelsteen, 2013].

1. Innovation and research & development expenditure

4. Research and development is aimed essentially at the increase and use of knowledge in view of using it for new applications [OECD, 2003].

5. Innovation is a wider concept of which R&D activities are just one component. It is aimed at the implementation of a product (good or service) or of a new or noticeably improved process, new marketing method or new organisational method in company practices, workplace organisation or external relations [OECD, 2005]. Innovation involves scientific, technological, organisational, financial and commercial activities. A firm's capacity to innovate is not only measured according to its past R&D activities but also according to whether it can gather the other components necessary for innovation (concepts, technologies, skills) within the framework of external partnerships and integrate them in its innovation strategy.

6. There is, however, complementarity between R&D financed by the public authorities which is generally oriented towards the diffusion of new knowledge, and R&D financed by private organisms which are

¹ European Commission, 2011, Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Horizon 2020' Framework Programme for Research and Innovation.

² National reform programme – Belgium, federal government, regional and community governments; editorial committee, Prime Minister's Office, SPF Finances, Federal Planning Bureau, SPF Economie, SPF Sécurité sociale, SPF Emploi, the Regions and the Communities. <http://www.be2020.eu/index.php?lang=fr&IS=91>

more oriented towards the marketing of new products or processes. New collaborative methods of organisation resulting from this complementarity have emerged. They allow the development of synergies between firms, research units and training centres within the framework of innovative projects (competitiveness clusters) financed by private, public, national and foreign stakeholders (states, regions, EU) in the framework of dedicated programmes.

2. The types of R&D expenditure

7. The data considered represent the gross domestic expenditure³ on R&D (DERD) used by the European Commission to set the quantified objective for research (3% of the GDP). R&D expenditure is distributed between the private sector and the public sector and is apportioned according to source of financing and performing sector;⁴ only the latter is distributed according to region. The private performing sector composed of the sector of firms and non-profit institutions (NPIs) financed 69.6% of R&D expenditure in 2011. The public performing sector composed of the state and higher education financed 30.4% of R&D expenditure during the same year.⁵

8. In terms of subsidising authorities, the communities are essentially competent for expenditure related to education and culture, the regions for expenditure related to the economy and the environment, and the federal authority for expenditure related to residual jurisdiction operating at national or international level. Although firms are asked about gross expenditure on R&D independently of sources of financing in the Science Policy Office survey (question 16 of the BELSPO 2011 questionnaire), the actual R&D expenditure seems to be indicated.

9. The non-consideration by firms of tax breaks in the form of reductions in taxes or social security contributions granted to them by the federal authorities for their R&D staff expenditure leads to an underestimation of their private expenditure. This tax exemption, which constitutes a shortfall for the public sector, leads to an underestimation of the public effort in favour of research. In the 2014 national reform programme, the budgetary cost of these federal tax measures in favour of R&D staff is estimated at 0.18% of the GDP in 2020 and, according to the perspective maintained by the Federal Planning Bureau (FPB), must be taken into account in the calculation of the global objective of 3% of the GDP to be reached by Belgium.

10. As the objectives to be reached, the territorial bases and the behaviour of officials are different for the public and private sectors, we feel that it is important to distinguish between them. To this end, we shall use the distribution proposed by the Barcelona objective: 1/3 spent by the public sector as an incentive for education, training and research, and 2/3 spent by the private sector to support the development of new products and services.

3. The evolution of expenditure in R&D

11. Between 1993 and 2011,⁶ domestic expenditure on R&D (DERD) in Brussels-Capital Region increased from 463.452 to 956.903 million euros (106.5%) with an average annual growth rate of 4.1%. In 2011, the rate of R&D expenditure for the Brussels-Capital Region was 1.37% (2.21% for Belgium). According to performing sector, R&D expenditure for Brussels in 2011 represented 11.7% of R&D expenditure for Belgium, that of the Flemish Region, 61.7%, and that of the Walloon Re-

³ The gross domestic expenditure on R&D is from the biennial surveys of the Science Policy Office (BELSPO) and only concerns the expenditure from within the statistical unit (intra-muros) excluding expenditure from outside it (extra-muros). See the questionnaire of the 2010-2011 biennial survey related to the R&D expenditure of firms.

⁴ The representation according to performing sector is relevant as it determines the amount of R&D expenditure in the geographic entity considered independently of the sources of financing. This amount must be compared to the GDP of the entity concerned as the latter also includes the added value produced by foreign officials established in its territory.

⁵ Calculation by the author, based on the Science Policy Office 2011, statistics, R&D indicators.

⁶ The data related to higher education were backward extrapolated on request of the Science Policy Office for the years 1993 to 2001. The data related to other performing sectors have existed since 1993.

gion, 26.6%. The distribution of R&D expenditure for the Brussels-Capital Region was 53.4% in the private sector (50.4% for firms and 3% for NPIs) and 46.6% in the public sector (9.7% for the state and 36.9% for higher education).

12. In 2011, the expenditure on R&D (DERD) for firms in the Brussels Region was 69% in the service sectors, including 31.3% on services for high technology firms and 17.7% on financial intermediation, and 29.8% in the production sectors, including 26.1% on high technology production (21% in the chemical industries, including 8.5% in the pharmaceutical industries). The R&D expenditure for firms in Brussels was also mainly concentrated in the big firms (59.7% for firms with more than 250 employees, including 34.8% for firms with more than 1000 employees).

4. Public sector R&D expenditure in the regions

13. In order to better highlight the regional distribution of R&D expenditure, we have used the concept of the wider region which allows a territorial distribution of R&D expenditure for public authorities whose territorial base exceeds that of the regions (communities and federal authorities). The French Community mainly finances expenditure related to education, culture and matters relating to the person for the Brussels and Walloon regions. The Flemish Community finances the same expenditure for the Brussels and Flemish regions. Jointly, for the three regions the federal authorities finance R&D expenditure related to residual jurisdiction, in particular as regards the management of federal scientific establishments, space research, the organisation of data exchange networks and scientific responsibilities, as well as programmes requiring homogeneity at national and international level. The Regions

are responsible for research expenditure related to the economy, energy, public works, the environment and transport.

14. The territorialised expenditure of the communities and the federal authorities in addition to the expenditure of the regions constitutes the public expenditure of the wider regions, which serves as a basis for the calculation of regional contributions to the financing of the national objective as regards public expenditure for 2020 (Lannoy, Mignolet, Mulquin, 2006-2008).

15. The gross domestic expenditure on research and development for the public sector apportioned according to performing sector and federated regional entities⁷ is made up of the domestic expenditure on research and development for the state and higher education.

4.1. Composition and evolution of public expenditure on R&D for the Brussels wider region

16. In 2011, the total amount of public expenditure on R&D for the Brussels wider region was composed of 8.6% of expenditure specific to the region and 91.4% of expenditure charged to the other federated entities, 51.4% of which was from the French Community, 26.1% from the Flemish Community and 13.9% from the federal authorities (figure 1).

17. The R&D expenditure for the Brussels wider region increased by 116.3% between 1993 and 2011, rising from 206.284 (0.56% of its GDP) to 446.202 million euros (0.64% of its GDP), i.e. an annual average increase of 12.6 million euros in current prices or an average annual growth rate of 4.4%. Their share in the total public expenditure on R&D for Belgium decreased noticeably however (from 24.3% to 18%, i.e. by 6.3 percentage points) between 1993 and 2011.

⁷ The territorial breakdown (wider regions) of gross domestic expenditure on Research and Development for the public sector according to subsidising authority was obtained via specific extractions carried out on request by the Science Policy Office (BELSPO) officials, based on the results of their biennial surveys. State expenditure including direct expenditure and the general operational allocations as well as higher education expenditure for the French and Flemish Communities and the federal authorities were apportioned according to the three regions. The total expenditure for the public sector from all of the regional, community and federal authorities was thus distributed according to authority solely among the regional entities. The regional total therefore corresponds to that of the representation according to performing sector which takes into account all of the R&D expenditure of the regional entity concerned in terms of objective to be reached independently of sources of financing. These figures are then transmitted officially to Eurostat by the Science Policy Office together with the figures for Belgium.

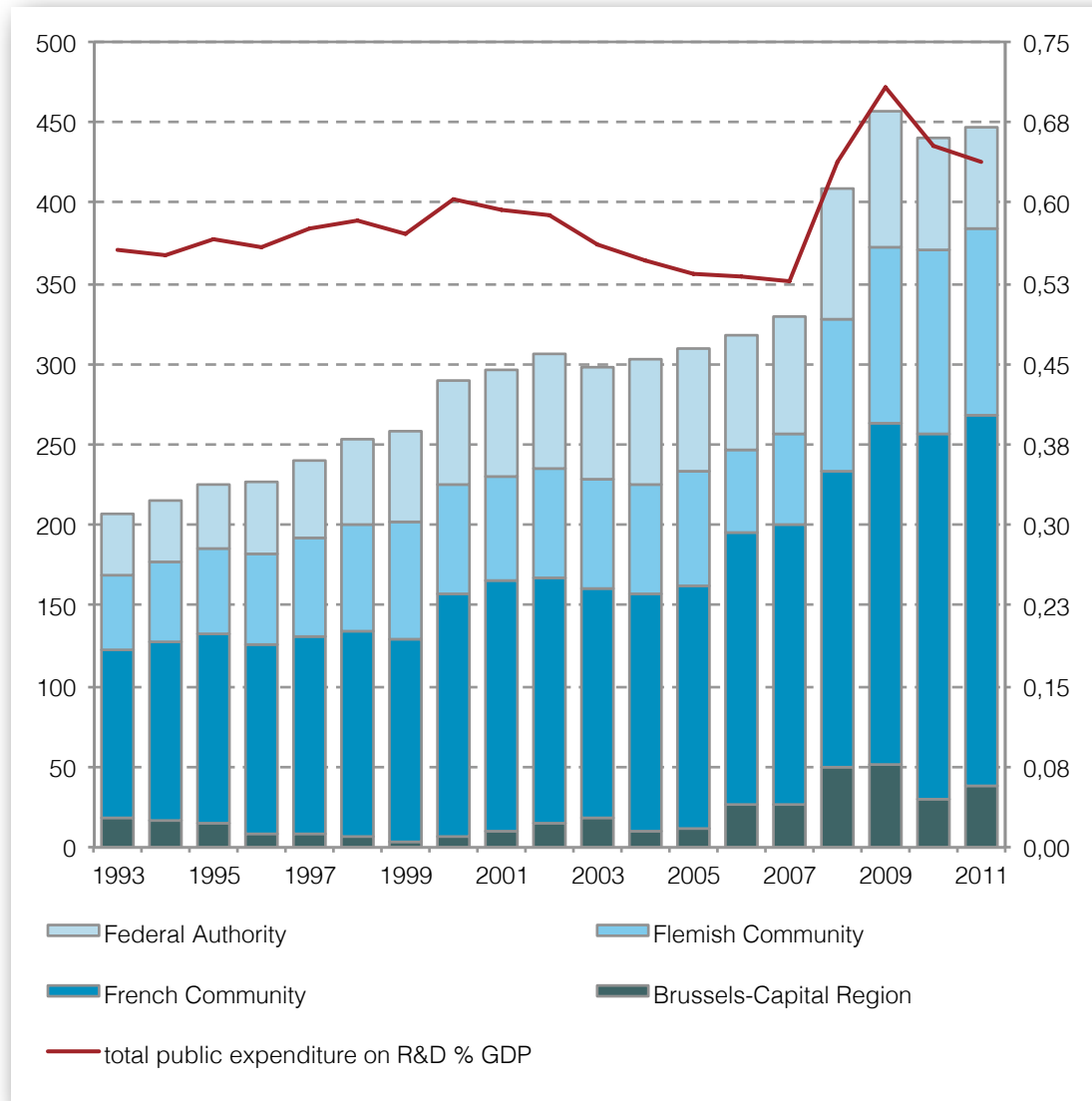


Figure 1. Evolution of the distribution and rate of public expenditure on R&D for the BCR extended to include the French and Flemish Communities and the federal authorities (million current euros and % GDP). Source: Belspo and calculations by the author

18. The Brussels Region's own expenditure on R&D increased by 108.1% during the same period with an average annual growth rate of 4.2%, which was slightly lower than the average annual growth rate of the total R&D expenditure for this region. Consequently, the relative share decreased slightly (from 8.9% to 8.6%, i.e. by 0.3 percentage points) from 1993 to 2011.

19. The expenditure for the French Community increased by 119.2% during the period with an average annual growth rate of 4.5%, which was slightly higher than the average annual growth rate of the total R&D expenditure for the Brussels Region. Consequently, the relative share increased slightly (from 50.7% to 51.4%, i.e. by 0.7 percentage points) during the period.

20. The expenditure for the Flemish Community increased by 151.4% during the period with an average annual growth rate of 5.3%, which was 0.9 percentage points higher than the average annual growth rate of the total R&D expenditure for the Brussels Region. Consequently, the relative share increased noticeably (from 22.5% to 26.1%, i.e. by 3.6 percentage points) from 1993 to 2011.

21. The expenditure for the federal authorities increased by 68.1% with an average annual growth rate of 2.9%, which was 1.5 percentage points lower than the average annual growth rate of the total R&D expenditure for the Brussels Region. Consequently, the relative share decreased noticeably (from 17.9% to 13.9%, i.e. by 4 percentage points) during the period.

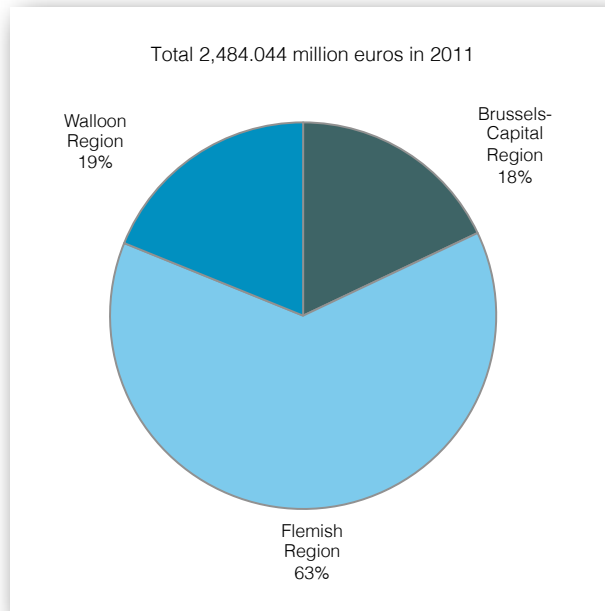


Figure 2. Distribution of public expenditure on R&D for the regions extended to include the communities and the federal authorities in 2011 (million euros and %). Source: Belspo and calculations by the author.

GDP by this deadline must therefore be established in order to examine the conditions for growth in R&D expenditure for the wider regions, which would allow this rate to be reached in 2020.

24. The GDP used takes into account the national medium term forecast (June 2014) established by the Federal Planning Bureau for 2014-2019. The distribution between the regions is based on the regional economic forecasts from the Hermreg model (July 2014⁹) aligned with

22. Figure 2 shows the distribution of R&D expenditure for the wider regions as defined above. In 2011, public expenditure on R&D for Belgium reached 2,484.044 million euros (0.67% of its GDP⁸) including 18% for the Brussels-Capital Region (446.202 million euros, 0.64% of its GDP), 63% for the Flemish Region (1,569.039 million euros, 0.74% of its GDP) and 19% for the Walloon Region (468.802 million euros, 0.54% of its GDP).

4.2. Public budgetary efforts in R&D for 2020

23. According to the distribution between public and private expenditure on R&D defined in the Barcelona objective, a rate of 1% of the GDP is required for 2020 for public expenditure on R&D. Forecasts for this expenditure and the

the national forecast for the same years. The forecast for 2020 is established for each region based on the last growth rate (2019) of the medium term regional forecasts. These forecasts (1.4% of the annual average real GDP growth corresponding to 3% of the nominal GDP growth between 2012 and 2020) lead to public expenditure on R&D for all of the wider regions amounting to 4,766.556 million current euros, i.e. 1% of the nominal GDP forecast for Belgium in 2020 (line 6 of table 1).

25. According to the perspective of the planning bureau, by considering the budgetary cost of federal tax measures in favour of R&D staff (0.18% of the national GDP in 2020), with a 50% distribution between the public and private sectors,¹⁰ a tax exemption of 428.990 million euros (0.09% of the national GDP) must be taken into account for the public sector. This would bring the net amount to be reached for Belgium to 4,337.566 million euros in 2020 (0.91% of its GDP). The regional amounts corresponding to these rates appear in line 10 of table 1.

26. The Brussels wider region with an amount of 446.202 million euros in 2011 should have an average annual growth rate of 7.86% (43.55 million euros/year) of the public expenditure on R&D to reach the amount of 881.673 million euros (1% of its GDP) in 2020 (table 1, lines 6 to 8). By considering a tax exemption of 79.35 million euros distributed among all of the regions (0.09% of the Brussels GDP), this amount is reduced to 802.322 million euros (0.91% of the GDP) for the Brussels public sector and requires an average annual growth rate of 6.74% (table 1, lines 9 to 12). The average annual growth rate of public expenditure on R&D for the Brussels Region (6.25%) observed in the recent period (2005-2011)¹¹ leads to an amount of 770.293 million euros

⁸ The GDP of the 'extra-territorial' entity was distributed between the three regions proportionately to their respective GDP in order to ensure coherence between the national GDP and the sum of regional GDP.

⁹ The HERMREG model is a regional version of the HERMES model elaborated by the Federal Planning Bureau (FPB) and the regions in view of establishing medium term regional forecasts consistent with the national forecast.

¹⁰ This 50% distribution between public and private sector corresponds to the report by ETP researchers working in these sectors in 2011.

¹¹ After 2005, the R&D expenditure for the regions increased noticeably in view of meeting the Barcelona objective set initially in 2010; as this objective could not be met by most member countries by this deadline, it was carried over in the new programme 'Europe 2020'. The Brussels Region experienced the highest growth of this R&D expenditure in 2008 (+24%) and in 2009 (+11%); unfortunately the effort was not maintained during the recent period (-3.5% in 2010 and +1.3% in 2011) due to budgetary restrictions.

Scenarios / Regions	BX Region	WL Region	FL Region	Belgium
2011 amounts	446,20	468,80	1569,04	2484,04
2011 rate	0,64	0,54	0,74	0,67
2020 amounts	770,29	738,61	2879,35	4388,25
2020 rate	0,87	0,66	1,04	0,92
Average growth rate 2005-2011	6,25	5,18	6,98	6,53
EU 2020 amounts - 1% GDP	881,67	1116,71	2768,18	4766,56
2020 rate	1,00	1,00	1,00	1,00
Average growth rate 2011-2020	7,86	10,12	6,51	7,51
Tax exemption - 0.09% GDP	79,35	100,50	249,14	428,99
2020 amounts – 0.91% GDP	802,32	1016,21	2519,04	4337,57
2020 rate	0,91	0,91	0,91	0,91
Average growth rate 2011-2020	6,74	8,98	5,40	6,39

Table 1. R&D expenditure to be provided by the public sector of widened federated entities in 2020. With and without tax breaks distributed among the regions (million euros and % of GDP). Source: Belspo and calculations by the author.

(0.87% of its GDP) in 2020 (table 1, lines 3 to 5) and leaves a deficit of 111.38 million euros (0.13% of its GDP) at this deadline. This deficit is reduced to 32.029 million euros (0.04% of the GDP) when the tax exemption is taken into account.

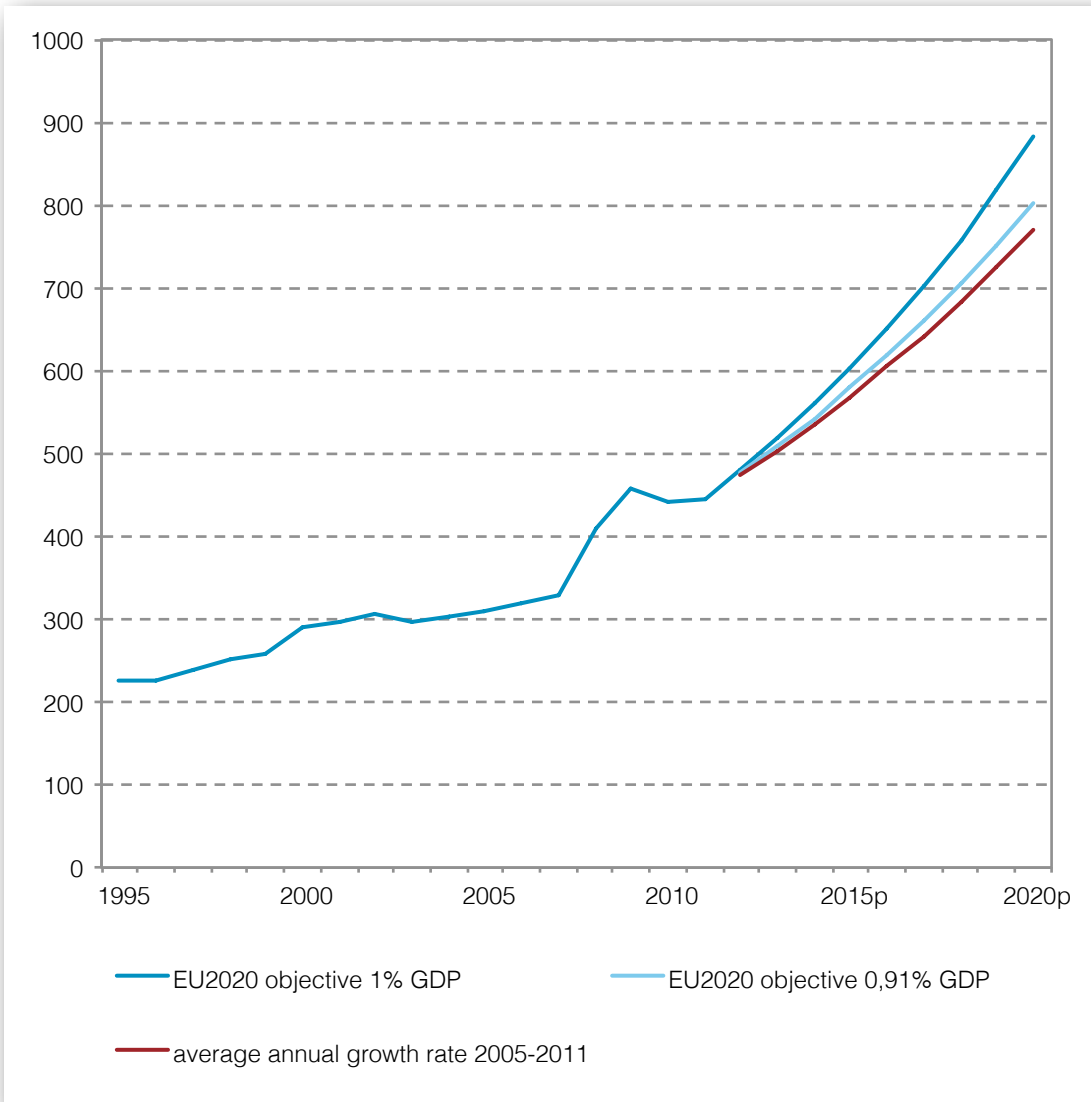
27. The Walloon wider region with an amount of 468.802 million euros in 2011 should have a growth rate of 10.12% (64.79 million euros/year) to reach the amount of 1,116.708 million euros (1% of its GDP) in 2020. With the tax exemption (0.09% of its GDP), this amount is reduced to 1,016.205 million euros (0.91% of the GDP) and requires an average annual growth rate of 8.98%. The growth rate of 5.18% of the recent period leads to an amount of 738.606 million euros in 2020 (0.66% of its GDP) and leaves a deficit of 378.102 million euros (0.34%

of its GDP) which is reduced to 277.599 million euros (0.25% of its GDP) with the tax exemption.

28. The Flemish wider region with an amount of 1,569.039 million euros in 2011 should have a growth rate of 6.51% (119.91 million euros/year) to reach the amount of 2,768.174 million euros (1% of its GDP) in 2020. The growth rate of 6.98% of the recent period leads to an amount of 2,879.353 million euros in 2020 (1.04% of its GDP) which exceeds the objective of 111.178 million euros (0.04% of its GDP). This profit amounts to 360.314 million euros (0.13% of its GDP) with the tax exemption.

29. For all of the wider regions (Belgium), with an amount of 2,484.044 million euros in 2011, the average annual growth rate which would allow the amount of 4,766.566 million euros (1% of the national GDP) to be reached in 2020 is 7.51% (228.25 million euros/year). The growth rate of 6.53% of the recent period leads to an amount of 4,388.252 million euros in 2020 (0.92% of its GDP) and leaves a deficit of 378.304 million euros (0.08% of its GDP). However, a profit of 50.686 million euros (0.01% of its GDP) is achieved when the tax exemption is considered.

30. Figure 3 below presents the evolution of the amounts of public expenditure on R&D for the Brussels-Capital Region (wider) which need to be reached in 2020, 1% of the GDP, 0.91% of the GDP after tax breaks and 0.87% of the GDP corresponding to the average annual growth rate (6.25%) of this R&D expenditure in the recent period (2005-2011).



5. R&D expenditure for the private sector

31. The private sector R&D expenditure is made up of¹² the gross domestic expenditure on research and development (DERD) of firms and private non-profit institutions (NPIs). They are apportioned by federated regional entities.

5.1. Composition and evolution of private R&D expenditure

32. Private gross domestic expenditure for the Brussels Region practically doubled between 1993 and 2011 (figure 4), from 257.168 (0.69% of its GDP) to 510.701 million euros (0.73% of its GDP), with an average annual growth rate of 3.88%, which is nevertheless 0.5 percentage points lower than that of public expenditure (4.38%).

33. This expenditure constitutes slightly more than half (53.4%) of the total R&D expenditure for the Brussels Region, with the largest share (50.4%) from private firms, and the remainder (3%) from private non-profit institutions (NPIs). This expenditure underwent a steady rate of growth of about 4%/year between 1993 and 2001, a decrease between 2002 and 2005 (0.07%/year), strong growth in 2006 (51.6%) which continued until 2008 (6.4%) and a drop at the end of the period (-3.4%/year), during which the rate of growth could not be maintained following the budgetary restrictions imposed at the end of the financial crisis.

34. Figure 5 indicates the distribution of private R&D expenditure for the regions in 2011, with private R&D expenditure for Belgium amounting to 5,686.965 million euros (1.54% of its GDP), including 9% for the Brussels-Capital Region (510.701 million euros, 0.73% of its GDP), 61% for the Flemish Region (3,468.976 million euros, 1.63% of its GDP) and 30% for the Walloon Region (1,707.288 million euros, 1.97% of its GDP).

Figure 3. Evolution of public expenditure on R&D for the Brussels wider region corresponding to the 2020 objective, with tax breaks distributed among the regions and the forecast of the growth rate from the recent period. Source: Belspo and calculations by the author

¹² The private sector R&D expenditure is also presented according to performing sector as this representation takes into account all of the R&D expenditure of the regional entity concerned in terms of objective to be reached independently of sources of financing.

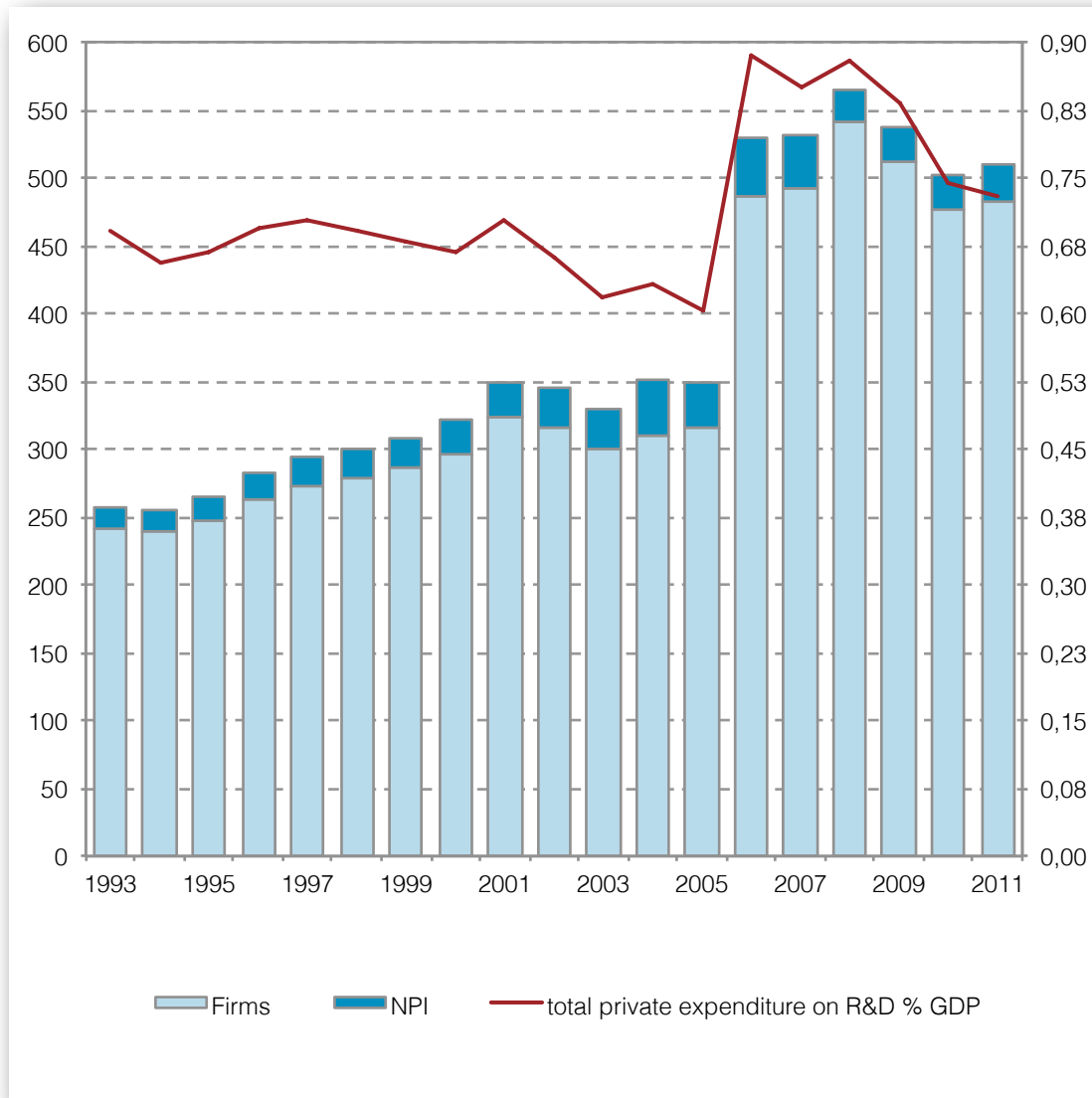


Figure 4. Evolution of the distribution and rate of private R&D expenditure for BCR (million current euros and % GDP). Source: Belspo and calculations by the author

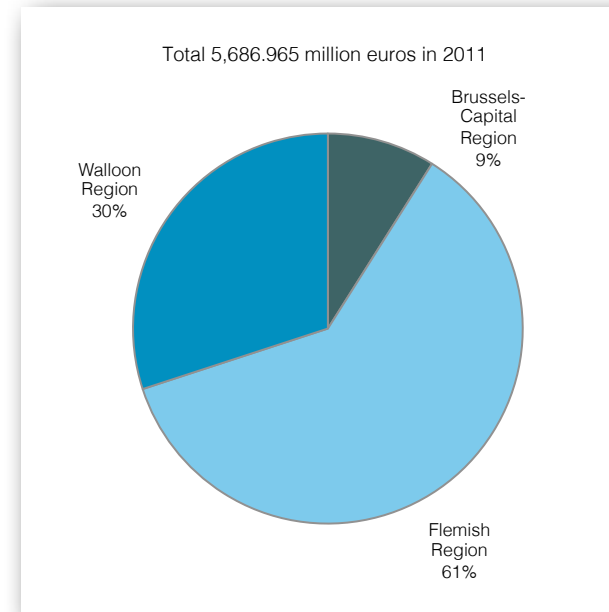


Figure 5. Distribution of private R&D expenditure for the regions in 2011 (million euros and %). Source: Belspo and calculations by the author

5.2. Private budgetary efforts in R&D for 2020

35. According to the distribution between public and private expenditure on R&D defined in the Barcelona objective, a rate of 2% of the GDP is required for 2020 for private R&D expenditure. The medium term forecasts of the Federal Planning Bureau (1.4% annual average growth of real GDP corresponding to 3% growth of nominal GDP between 2012 and 2020) result in private R&D expenditure for all of the regions amounting to 9,533.111 million current euros (2% of the national GDP) in 2020 (line 6 of table 2). When the tax exemption for the private sector (428.990 million euros, 0.09% of the GDP) is considered, the net amount to be reached for Belgium is 9,104.121 million euros (1.91% of the national GDP) in 2020. The regional amounts corresponding to this rate appear in line 10 of table 2.

36. The Brussels Region with an amount of 510.701 million euros in 2011 should have an average annual growth rate of 14.76% (125.26 million euros/year) of this private R&D expenditure in order to reach the

Scenarios / Regions	BX Region	WL Region	FL Region	Belgium
2011 amounts	510,70	1707,29	3468,98	5686,97
2011 rate	0,73	1,97	1,63	1,54
2020 amounts	901,09	4031,71	5550,00	10482,80
2020 rate	1,02	3,61	2,005	2,20
Average growth rate 2005-2011	6,51	10,02	5,36	7,03
EU 2020 amounts - 2% GDP	1763,34	2233,42	5536,35	9533,11
2020 rate	2,00	2,00	2,00	2,00
Average growth rate 2011-2020	14,76	3,03	5,33	5,91
Tax exemption - 0.09% GDP	79,35	100,50	249,14	428,99
2020 amounts - 1.91% GDP	1684,00	2132,91	5287,21	9104,12
2020 rate	1,91	1,91	1,91	1,91
Average growth rate 2011-2020	14,18	2,50	4,79	5,37
Tax exemption - 0.09% GDP Bx	428,99	0,00	0,00	428,99
2020 amounts - 1.91% GDP	1334,35	2233,42	5536,35	9104,12
2020 rate	1,51	2,00	2,00	1,91
Average growth rate 2011-2020	11,26	3,03	5,33	5,37

Table 2. R&D expenditure of the private sector of the federated entities in 2020, with tax breaks distributed among all of the regions or only in the Brussels Region (million euros and % of the GDP). Source: Belspo and calculations by the author

amount of 1,763.345 million euros (2% of its GDP) in 2020 (table 2, lines 6 to 8). When a tax exemption of 79.35 million euros (0.09% of the Brussels GDP) distributed among all of the regions is considered, this amount is reduced to 1,683.995 million euros (1.91% of its GDP) for the Brussels private sector and requires an average annual growth rate of 14.18% (table 2, lines 9 to 12). With a tax exemption of 428.990 million euros (0.09% of the national GDP) carried over entirely to the private sector of the Brussels Region which is greatly in deficit,¹³ this amount is reduced to 1,334.355 million euros (1.51% of the Brussels GDP) and requires an average annual growth rate of 11.26% (table 2, lines 13 to 16). The average annual growth rate of private R&D expenditure for the Brussels Region (6.51%) observed in the recent period (2005-2011) leads to an amount of 901.092 million euros (1.02% of its GDP) in 2020 (table 2, lines 3 to 5) and leaves a deficit of 862.253 million euros (0.98% of its GDP) at this date. This deficit is reduced to 782.903 million euros (0.89% of its GDP) with a tax exemption distributed among the regions and to 433.263 million euros (0.49% of its GDP) with a tax exemption carried over entirely to the private sector of the Brussels Region.

37. The Walloon Region, with an amount of 1,707.288 million euros in 2011, should have a growth rate of 3.03% (52.61 million euros/year) to reach the amount of 2,233.417 million euros (2% of its GDP) in 2020. With the tax exemption (0.09% of its GDP), this amount is reduced to 2,132.913 million euros (1.91% of its GDP) and requires an average annual growth rate of 2.5%. The growth rate of 10.02% in the recent period leads to an amount of 4,031.706 million euros in 2020 (3.61% of its GDP) and a surplus of 1,798.289 million euros (161% of its GDP), which amounts to 1,898.793 million euros (1.7% of its GDP) with the tax exemption.

38. The Flemish Region, with an amount of 3,468.976 million euros in 2011, should have a growth rate of 5.33% (206.74 million euros/year) to reach the amount of 5,536.349 million euros (2% of its GDP) in 2020. With the tax exemption (0.0905% of its GDP), this amount is re-

¹³ Many national firms have their head office established in the Brussels Region and their production units in the two other regions. This could explain the insufficient private R&D expenditure for the Brussels Region and justify the transfer of the tax exemption to the private sector of this region.

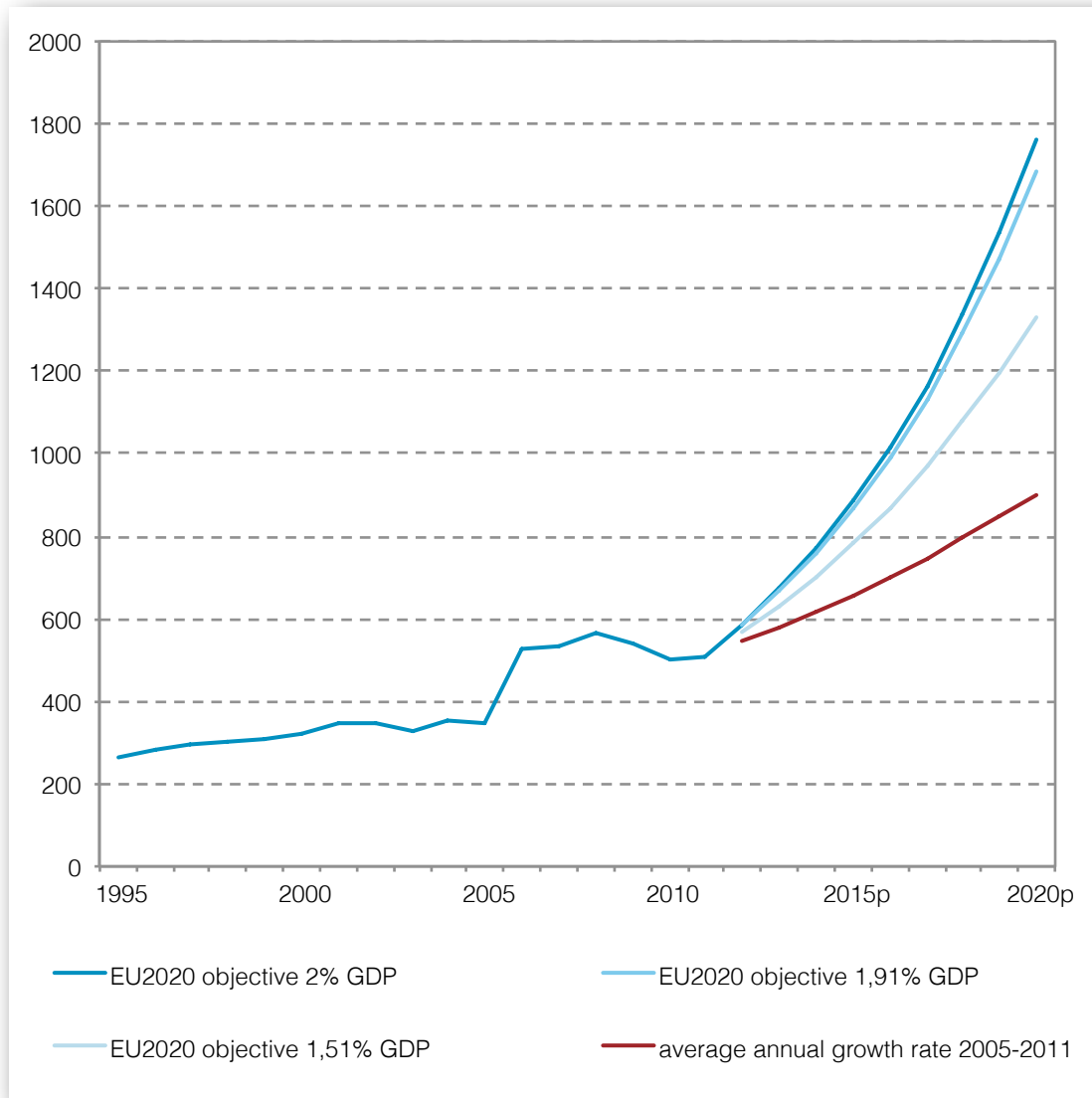


Figure 6. Evolution of private R&D expenditure for the Brussels Region corresponding to the 2020 objective, with tax breaks distributed among the regions and Brussels, and with the forecast of the growth rate of the recent period. Source: Belspo and calculations by the author

duced to 5,287.213 million euros (1.91% of its GDP) and requires an average annual growth rate of 4.79%. The growth rate of 5.36% in the recent period leads to an amount of 5,550.004 million euros in 2020 (2.005% of its GDP) and a slight surplus of 13.655 million euros (0.005% of its GDP), which increases to 262.791 million euros (0.09% of its GDP) with the tax exemption.

39. For all of the regions (Belgium), with an amount of 5,686.965 million euros in 2011, the average annual growth rate allowing the amount of 9,533.111 million euros (2% of the national GDP) to be reached in 2020 is 5.91% (348.61 million euros/year). With the tax exemption (0.09% of the GDP), this amount is reduced to 9104.121 million euros (1.91% of the national GDP) and requires an average annual growth rate of 5.37%. The growth rate of 7.03% of the recent period leads to an amount of 10,482.802 million euros in 2020 (2.2% of the national GDP) and a surplus of 949.691 million euros (0.2% of the GDP), which increases to 1,378.681 million euros (0.29% of the GDP) with the tax exemption.

40. Figure 6 presents the evolution of the amounts of private R&D expenditure for the Brussels-Capital Region which must be reached in 2020, 2% of the GDP, 1.51% of the GDP after tax breaks carried over entirely to the private sector of the Brussels Region, and 1.02% of the GDP corresponding to the average annual growth rate (6.51%) of this R&D expenditure in the recent period (2005-2011).

Conclusion

41. The conclusions related to the rates of regional R&D expenditure in view of the 'Europe 2020' objective (table 3) are qualified.

42. According to the distribution proposed by the Barcelona objective for R&D expenditure between the public sector (1/3) and the private sector (2/3), and the equal distribution of tax breaks between these sectors (report by researchers working for ETPs), the public sector should reach a rate of 0.92% of the Belgian GDP in 2020.

43. With the growth rate of 6.25% of the recent period (2005-2011),

Federated entities	Rates of R&D expenditure in 2020		
	Pub. Dom. Exp.	Prv. Dom. Exp.	Tot. Dom. Exp.
Brussels Region	0,87	1,02	1,90
Flemish Region	1,04	2,00	3,05
Walloon Region	0,66	3,61	4,27
Belgium	0,92	2,20	3,12

Table 3. Rates of R&D expenditure for the Regions and for Belgium in 2020 corresponding to the forecast for the 2005 - 2011 period (in %). Source: *Bel-spo* and calculations by the author

the Brussels-Capital wider region reaches a rate of 0.87% of its GDP in 2020. The result is that if the growth in public expenditure on R&D of the recent period does not increase by about 1.6 percentage points in BCR, the gap of 0.13% of the GDP with respect to the objective of 1% of the GDP will not be filled in 2020. When taking the tax exemption into account, the efforts will only have to increase by 0.5 percentage points in order to reach the objective of 0.91% of the GDP by this deadline. The Flemish Region exceeds the objective with 1.04% of its GDP in 2020 and the Walloon Region, with 0.66% of its GDP, maintains a gap of 0.34% of the GDP (0.25% of the GDP with the tax exemption), which is greater than that of the Brussels Region with respect to the objective of 1% of its GDP (0.91% of its GDP with the tax exemption). For all of the wider regions, with a rate of 0.92% of the national GDP, Belgium maintains a gap of 0.8% of its GDP in 2020 (which is reduced entirely with the tax exemption) thanks to the good performance of the Flemish Region.

44. The private sector should reach a rate of 2.2% of the Belgian GDP in 2020. With the growth rate of 6.51% of the recent period (2005-2011), the Brussels-Capital Region reaches a rate of 1.02% of its GDP in 2020 for its private R&D expenditure. The result is that if the growth in this expenditure does not increase by 8.25 percentage points in BCR, the gap of 0.98% of the GDP with respect to the objective of 2% of the GDP will not be filled in 2020. When taking the tax exemption distributed among the regions into account, the efforts will only have to

increase by 7.67 percentage points to reach the objective of 1.91% of the GDP by this deadline. With a tax exemption carried over to the private sector of the Brussels Region, the efforts will have to increase by only 4.75 percentage points to reach the objective of 1.51% of its GDP in 2020. The Flemish Region greatly exceeds the objective with 2.005% of its GDP in 2020 and the Walloon Region, with 3.61% of its GDP. For all of the wider regions, with the rate of 2.2% of its GDP, Belgium significantly exceeds the objective of 2% of the GDP (1.91% of the GDP with tax breaks) in 2020 thanks to the good performance of the Walloon Region, which compensates to a large extent for the private R&D expenditure deficit of the Brussels Region.

45. As regards the global position, when its total expenditure (public and private) on R&D for 2020 is considered with respect to the objective of 3% of the GDP in the 'Europe 2020' strategy, and when considering the budgetary cost of federal tax measures in favour of R&D staff (0.18% of the national GDP in 2020), each region should reach a rate of R&D expenditure of 2.82% by this deadline.

46. With the growth rate of the recent period, the Brussels-Capital wider region reaches a rate of 1.9% of its GDP in 2020 for all of its R&D expenditure, which maintains a deficit of 1.1% of its GDP (0.92% of the GDP with a tax exemption distributed among the regions and 0.52% of the GDP with a tax exemption carried over to the Brussels private sector) for 2020. This deficit is the result of a slight insufficiency in the growth of public expenditure on R&D due to budgetary restrictions and a significant lack of private R&D expenditure, whereby the agreed efforts after 2005 were not maintained at the end of the period due to less favourable economic conditions.

47. With the growth rate of the recent period, the Flemish wider region reaches a rate of 3.05% of its GDP in 2020 for all of its R&D expenditure. This rate exceeds the European objective of 3% of the GDP (reduced to 2.82% of the GDP with tax breaks distributed among the regions) in 2020 with the desired ratio between its public (1.04%) and private (2.005%) expenditure.

48. Despite the insufficiency in its public expenditure (0.66% of the GDP), the Walloon wider region obtains a rate of 4.27% of its GDP in

2020 for all of its R&D expenditure. This rate exceeds the European objective of 3% of the GDP (2.82% of the GDP with tax breaks) in 2020 thanks to the significant growth in its private R&D expenditure (3.61% of its GDP) supported by the additional means available through the Marshall 1 and 2 plans.

49. With the growth rate of the recent period, Belgium reaches a rate of 3.12% of its GDP in 2020 for all of its R&D expenditure. This rate exceeds the European objective of 3% of the GDP (reduced to 2.82% of the GDP with tax breaks) for 2020. This objective was able to be met thanks to the good overall performance of the Flemish Region and the Walloon Region. The performance of the latter in terms of private R&D expenditure compensated for the insufficient financing of this type of expenditure for the Brussels Region.

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Thanks

The author would like to thank E. Ziarko, J. Ravet, K. Boosten, G. Van Mellaert and J. Malek-Mansour from the Science Policy Office (BEL-SPO) for the detailed data related to R&D expenditure cross-tabulated according to authority, region and source of financing. He would especially like to thank Ch. Kegels from the Federal Planning Bureau (FPB), R. Kalenga-Mpala from the Institut Bruxellois de Statistique et d'Analyse (IBSA), B. Wayens (ULB & USL-B) for valuable methodological advice and J. Ravet from the Science Policy Office (BELSPO) for a careful revision of the text.

Financial support

Brussels Studies gets published with the support of:



Innoviris, the Brussels Institute for Research and Innovation



University Foundation

To cite this text

DEVILLÉ, Hervé, 2014. Regional financing for research and development expenditure. Brussels and the 'Europe 2020' objective, In: *Brussels Studies*, Number 82, December 22nd 2014, www.brusselsstudies.be

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