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Second Task Force on the Capitalisation of Research and Development in National Accounts

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EUROPEAN COMMISSION
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Final report
Second Task Force on the Capitalisation of Research and
Development in National Accounts

Luxembourg, September 2012

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I Overview

1. The share of goods in GDP has been steadily declining in favour of services in the European Union Member States and other developed countries. Both inputs into production process and outputs of production have become more "intangible". In many cases most of the value of these intangible products is to intellectual endeavour they embody – a feature that calls for their treatment as investment. However, research and development (R&D) services have not been so far included in gross fixed capital formation in ESA95. Instead, they are treated as intermediate consumption. Given the fact that R&D has many characteristics of investment, its capitalisation has become one of the major topics of the revision of the System of National Accounts and the upcoming revision of the ESA95. As a result of the work of the Canberra II Group on the Measurement of Non-financial Assets in particular, it was proposed to include R&D expenditure as gross fixed capital formation in the core national accounts. Hence, the latest System of National Accounts (SNA2008) explicitly recognises that expenditure on research and development should be recorded as capital formation.

2. Before achieving the aim of capitalisation of R&D, the quality of the data must first be tested in the satellite accounts. A high level of reliability of data and its international comparability have to be ensured. A statistical basis for the development of harmonised European R&D satellite accounts exists, since, under Commission Regulation (EC) No 753/2004 of 22 April 2004, all European Union countries must gather statistical information in the field of research and development. The Regulation lays down that Member States must obtain the necessary data using a combination of different sources, such as sample surveys, administrative data sources or other data sources. The emphasis is placed on comparability at the international level, since the Regulation clearly specifies that the statistical areas it covers are based on harmonised concepts and definitions set out in the latest versions of the Frascati and Canberra manuals.

3. However, data currently collected are insufficient for the comprehensive preparation of R&D satellite accounts. The fair application of European legislation therefore means that the required estimates must be harmonised, clearly identified and discussed between the Member States. In this context the main objective of the first Eurostat Task Force on R&D was to prepare templates for supplementary tables of R&D with the long-term aim of enabling the capitalisation of R&D.

4. The second Task Force made use of the outcome of the first Task Force, completed two rounds of the templates for supplementary tables of R&D and by doing so the Task Force tested the reliability of the R&D data. The reliability tests and the identification of the main difficulties encountered in completing the supplementary tables was the main objective of this Task Force. The second objective of the Task Force was the promotion of exchange of experience with regard to the capitalisation of R&D between the participants.

5. The Task Force met 3 times in 2011 and 2012. In the preparation to the meetings, the EU Member States and the EFTA countries were requested to complete the R&D questionnaire containing the R&D capitalisation templates. Furthermore, the countries were encouraged to provide comments on their preliminary experience with regard to the capitalisation of R&D services. In the course of the work carried out by the Task Force difficult issues, such as the treatment of the freely available R&D services and the issue of service life of R&D assets, were thoroughly discussed.

6. At its final meeting in March 2012 the recommendations listed below for the capitalisation of R&D expenditure were agreed by the Task Force. The Task Force saw no major obstacles against implementing the capitalisation of R&D in National Accounts.

II Recommendations of the second Task Force on the capitalisation of R&D in National Accounts

7. The following recommendations were agreed by the Task Force on R&D:

- a) *full consistency between the data in the agreed compulsory R&D tables and the national accounts should be ensured in the course of the capitalisation of R&D services;*

The Task Force agreed a compulsory set of tables that should be used as bridge between data sources and National Accounts (see Annex to this report). In particular Table 1 and Table 2 concern the calculation of output of R&D. Table 1 may be filled in for sectors for which sufficient information from sources other than Frascati surveys is available (that could most probably be the case for S13, but maybe also for other sectors). In the other cases Table 2, which is based on Frascati surveys data, should be used. The Task Force made a recommendation that full consistency between the data in the agreed compulsory R&D tables and the national accounts should be ensured in the course of the capitalisation of R&D services.

- b) *until the R&D stocks are available, the consumption of the R&D assets used in the production of R&D services does not have to be taken into account in the estimates of the R&D output (as a part of the consumption of fixed capital);*

The calculation of the consumption of fixed capital in the production of R&D services (R&D output) by means of the PIM method requires estimation of the use of all fixed assets, including existing R&D assets used to produce new R&D. As the stocks of R&D assets are not yet available in most of the countries, the Task Force recommended that for the moment the consumption of the R&D assets used in the production of the R&D services may not be taken into account.

- c) *the input method is recommended in the calculation of R&D in volume terms;*

In view of difficulties in identifying the output unit in R&D and as no unit value indices exist, the Task Force recommended to use the input method for the volume measures of R&D.

- d) *geometric depreciation function is recommended as a reference method in the calculation of CFC of R&D; however, countries that have developed alternative methods may continue to use them;*

The Task Force recommended that countries should use the geometric depreciation function as a reference in the calculation of consumption of fixed capital of R&D assets. However, countries that developed alternative methods may continue to use them.

- e) *the R&D services subcontracted by one R&D institutional unit to another R&D institutional unit should be recorded as intermediate consumption. However, the possibility of recording the output of R&D institutional unit net of subcontracted R&D or on a gross basis would be left open to countries that encounter problems in*

obtaining data needed to adjust the Frascati intramural expenditures on R&D to gross recording;

Already the previous R&D Task Force encouraged the Member States to record the R&D services subcontracted by one R&D company to another R&D company as intermediate consumption. However, the possibility of recording the output of R&D companies net of subcontracted R&D was left open to countries that encounter problems in obtaining data needed to adjust the Frascati intramural expenditures on R&D to gross recording.

- f) ***all expenditures by government on Intellectual Property Products (IPPs), including freely available R&D, should be recorded as GFCF, if they satisfy the requirement that IPPs is intended for use in the production of more than one year;***

While filling in the questionnaires some countries excluded a part of the freely available R&D from investment. The justification of such a treatment was intensively discussed. Finally the Task Force was reminded of the pragmatic decision of the ESA 95 review group to capitalise all freely available R&D which is intended for use in the production of more than one year.

- g) ***the net operating surplus of market producers of R&D (as reference to return to capital) is derived as mark-up including unsuccessful R&D. The method to obtain the mark-up may be calculated as industry specific or as a single mark-up for all industries: To ensure stability of the mark-up time series, an average or a weighted moving average of several years should be used;***

Ideally, the averaging technique should be consistent with the parameters used in the calculation of CFC. In practice, however, there could be problems regarding the availability of long time series and thus a simple average of a limited time-span should also be allowed.

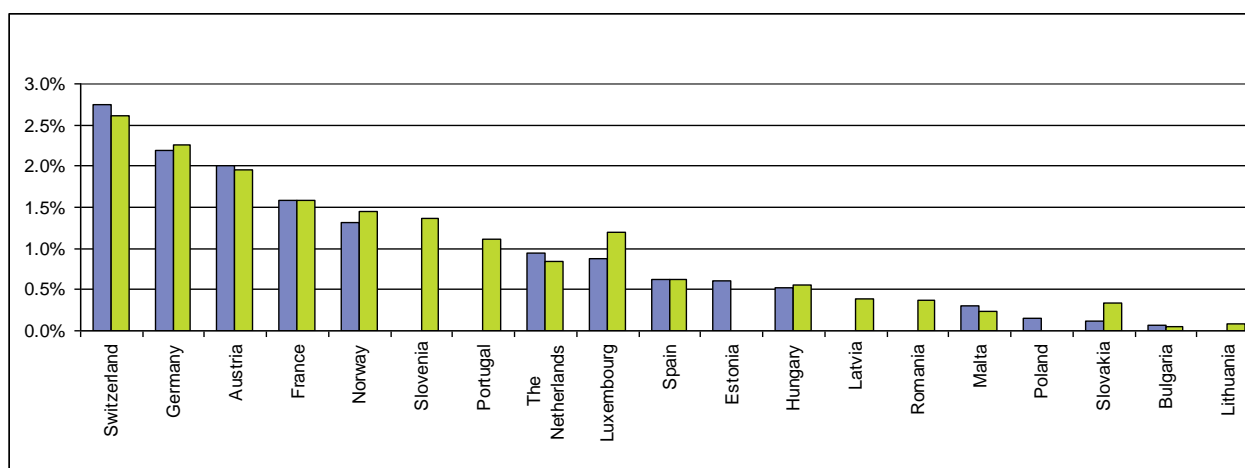
- h) ***Service Life estimates used in the calculations of R&D should be based on dedicated surveys or other relevant research information, including information of other countries with comparable market/industry characteristics. In case, where such information is not available, a single average Service Life of 10 years should be retained. It is also recommended that the above mentioned Service Life estimates should be investigated regularly, e.g. every 10 years.***

A majority of countries have neither detailed nor reliable information on service life for each component of R&D. The proposed single average of service life of 10 year is a practical solution for those countries that have no information on service life of R&D assets. There is no intention to prevent countries from using more specific information resulting from their research efforts.

III. Impact of the R&D capitalisation - Reliability of the results

8. The main objective of the Task Force was to test the reliability of the R&D data. The results showing the impact of capitalisation of R&D on GDP using the statistical information provided in the questionnaires in 2011 and in 2012 are best illustrated by **Chart 1** below.

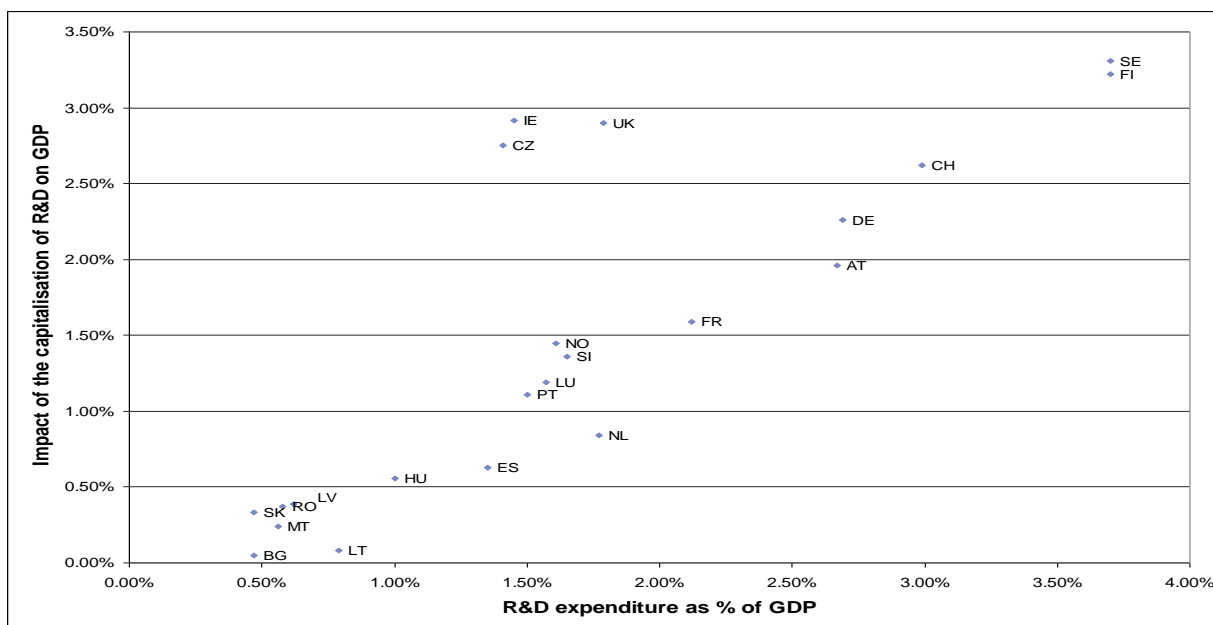
Chart 1: Impact of R&D capitalisation on GDP – in per cent of GDP – Preliminary results



Source: Results of the questionnaire on capitalisation of R&D in 2011 (blue) and in 2012 (green)

9. The Task Force also analysed the correlation between GERD expenditure and impact of R&D capitalisation on GDP. The results are plotted in **Chart 2** below.

Chart 2: Correlation between GERD expenditure and impact of R&D capitalisation on GDP – Preliminary results



Source: Results of the questionnaire on capitalisation of R&D of 2012, and GERD database.

10. Chart 1 visualizes the progress of the Member States while calculating R&D figures. Several countries were able to fill in the questionnaire twice and the number of reporting countries increased significantly with the second exercise. Furthermore, the chart shows that the estimates on the impact of R&D capitalisation for those countries delivering two data sets are considerably stable.

11. Chart 2 shows a strong positive correlation for all countries between GERD expenditure and impact of R&D capitalisation on GDP. Some countries stated that their R&D data are still subject to further improvements (e.g. methodological, expanding coverage of survey currently in operation) and that their data are expected to be more comparable with the other countries' results.

12. The joint analysis of Chart 1 and Chart 2 shows that the widespread results presented in Chart 1 are in line with the information provided by Chart 2. Low GERD expenditure leads to a low impact of the capitalisation of R&D expenditure on GDP and vice versa.

13. A self-assessment of the countries with respect to the plausibility of results and to the coherence across the different approaches was provided by the R&D questionnaires. The self-assessment is in line with the positive results given in Chart 1 and Chart 2. The vast majority of countries classified the results of their calculations as plausible and coherent.

IV. Final Conclusions

14. The Task Force on R&D completed its work according to its mandate: 1) to analyse the results of the supplementary tables on the capitalisation of R&D sent by the Member States, in particular the reliability of the data and the main difficulties encountered in completing them; 2) to promote the exchange of experience with regard to the capitalisation of R&D between the countries.

15. The Task Force had identified the main practical problems in compiling R&D estimates and put forward solutions, as presented in part 2, that will help to further improve the reliability and comparability of the R&D estimates.

16. Developing National Accounts R&D estimates is a difficult area and continued work is needed to keep on improving the quality the R&D estimates. In order to foster this, Eurostat will produce a dedicated compilation guide and will organise training on R&D for R&D compilers.

17. Taking into account its discussions and recommendations, the Task Force on R&D saw no major obstacles against implementing the capitalisation of R&D in National Accounts. One member expressed the view that it is too early to make this decision.

V. List of participants of the Task Force

Belgium	Bernadette BOUDRY, Cedric LUPPENS
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Annex - Templates of tables presenting the impact of reclassification of R&D on the value added by industries and on Gross Domestic Product

Table 1

OUTPUT OF R&D

Year:

		S11	S12	S13	S14	S15	TOTAL
1	Intermediate consumption						
2	Compensation of employees						
3	Other taxes on production						
4	Other subsidies on production						
5	Gross operating surplus						
6	Adjustment for exhaustiveness						
7	Other adjustments						
8	TOTAL = OUTPUT						

Table 2

OUTPUT OF R&D

Year :

		S11		S12		S13		S14		S15		TOTAL	
		+	-	+	-	+	-	+	-	+	-	+	-
1	Frascati Manual Intramural expenditures on R&D												
2	Subtract payments for licences to use intellectual products (principally R&D assets, such as patents) that should be recorded as GFCF												
3	Subtract expenditure on own-account production of software												
4	Add payments to postgraduate students not included in FM data												
5	Subtract capital expenditures												
6	Add other taxes on production not included in FM data												
7	Subtract other subsidies on production												
8	Add extramural purchases of R&D that should be recorded as intermediate consumption. Applies only to R&D industry												
9	Sub-Total (1 to 8): current expenditures												
10	Add estimate of consumption of fixed capital plus a return to capital (for non market producers only consumption of fixed capital):												
11	- Option 1: As percentage of current expenditures (line 9) or compensation of employees												
12	- Option 2: As cost of capital services measured with a PIM												
13	Adjustment for exhaustiveness												
14	Other adjustments												
15	Balance : Output of R&D												

Table 3

GFCF OF R&D

Year:

		S11		S12		S13		S14		S15		TOTAL	
		-	+	-	+	-	+	-	+	-	+	-	+
1	R&D output												
2	Add Imports of R&D												
3	Add trade margins												
4	Add taxes on products												
5	Subtract subsidies on products												
6	Subtract extramural purchases of R&D that should be recorded as intermediate consumption. Applies only to R&D industry												
7	Subtract Acquisitions of R&D not expected to provide a benefit												
8	Subtract changes in inventories of finished R&D												
9	Subtract Exports of R&D												
10	Add Net purchases of R&D between domestic sectors												
11	Sub-Total												
12	Balance: Total GFCF of R&D												
13	Add/subtract capital transfers of R&D assets between sectors in capital account												

Table 4

R&D ASSETS AND CONSUMPTION OF FIXED CAPITAL

Year:

		R&D assets	CFC
1	S11		
2	S12		
3	S13		
4	S14		
5	S15		
6	TOTAL		

Table 5

IMPACT OF RECLASSIFICATION OF R&D ON THE VALUE ADDED BY INDUSTRIES

Year:

		Market producers of R&D (by NACE)	Non-market producers of R&D (by NACE)	TOTAL
1	Output before R&D capitalisation			
2	Changes in output because of own account production of R&D			
3	Changes in output because of government consumption of fixed capital of R&D			
4	Output after R&D capitalisation			
5	Intermediate consumption before R&D capitalisation			
6	Changes in intermediate consumption because of capitalisation of R&D purchases previously included in IC			
7	Intermediate consumption after R&D capitalisation			
8	Value added before R&D capitalisation			
9	Changes in value added			
10	Value added after R&D capitalisation			

Table 6

IMPACT OF RECLASSIFICATION OF R&D ON THE GROSS DOMESTIC PRODUCT

Year:

	Before R&D capitalisation	After R&D capitalisation
FROM THE OUTPUT		
Output (basic prices)		
Intermediate consumption (excl. deductible VAT) (-)		
Value added (gross, basic prices)		
Taxes less subsidies on products		
Taxes on products		
Subsidies on products (-)		
Difference imputed and paid VAT		
Domestic product (gross, market prices)		
FROM THE GENERATION OF INCOME		
Compensation of employees		
Wages and salaries		
Employers' social contributions		
Taxes on production and imports less subsidies		
Taxes on production and imports		
Subsidies (-)		
Operating surplus/mixed income (gross)		
Consumption of fixed capital		
Operating surplus/mixed income (net)		
Domestic product (gross, market prices)		
FROM THE FINAL EXPENDITURE		
Final consumption expenditure		
Fixed capital formation (gross)		
Changes in inventories		
Acquisitions less disposals of valuables		
Exports of goods and services		
Imports of goods and services (-)		
Domestic product (gross, market prices)		