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THINK
Pieces
1/2016

Monetary distribution effects of Horizon 2020 – A first analysis

Following-up on a similar analysis for FP7 (THINK Piece 1/2015), this paper presents a first look at Horizon 2020 in terms of monetary redistribution between Member States. The paper is structured in four parts: Part one provides a description of the data used, whereas part two consists of a mainly descriptive overview on the key findings, for reasons of comparability presented in the same format as the previous analysis of FP7. New reflections are presented in part three with a closer look at the situation of the six largest Member States, and part four is trying to identify some noteworthy features from a direct comparison between the FP7 and Horizon 2020 analysis.

0. Intro

This paper is deliberately not touching on the key objectives for Horizon 2020, such as strengthening the knowledge base, developing human capital, increasing the international competitiveness, supporting the development of new goods and services, and providing evidence for designing better public policy. Instead, the intention of this paper is to look at the (basically unintended) monetary distribution effects of the Framework Programme, notably the direct distribution effects between Member States. Horizon 2020 was never meant to be a policy tool for monetary re-distribution, but nevertheless it is of some importance to get an idea on the size and directions of these effects.

Within the EU budget, the Framework Programme for Research and innovation is in a rather singular situation, as two totally different approaches are used to define the relative shares of the Member States:

- For the spending on the Framework Programme ("money out"), funds are coming from the overall EU budget, for which the national contributions are essentially based on economic strength and political bargaining (the most significant example for this is the "British rebate"). The distribution of the financial burden is thus essentially the result of a political negotiation process.

- For the income from the Framework Programme ("money in"), funds are mainly coming through co-financed research projects. The selection is based on a scientific peer-review system, aiming at identifying the proposals of highest scientific quality. The distribution of funds is therefore based on the judgement of independent experts – and entirely outside any political influence.

Against this background it is not surprising at all that the two distributional approaches lead on balance to diverging results – and such differences are therefore not per se "bad" or "unfair".

1. Data

For the subsequent analysis, three datasets were used (The complete data and calculations are presented in the Table at the end of this paper, together with links to the public sources used):

- For the spending on Horizon 2020 ("money out"), the assumption is made that the financing of the FP budget by Member States follows the same pattern as the financing of the overall EU budget. Since the real expenditure on Horizon 2020 is linked to the "life time" of the supported projects and will thus cover a period from 2014 up to 2020 or even later, it appears justifiable to use the EU budget for the latest year available (2015) as reference point – assuming that differences for the previous years and the yet unknown changes in the subsequent years are likely to roughly level out. The figures used refer to the "total own resources" per Member State, which are the "final" figures after all calculations for rebates and adjustments have been made.

- For the income from FP7 ("money in"), the European Commission published on 26 January 2016 in the "European Union Open Data Portal" several files providing funding information for some 22.500 project participants. This information is constantly updated as new contracts are signed. Data presented here have thus to be regarded as a "snapshot" at a given (random) moment in time.

  For the sake of the analysis here this data has been adjusted by excluding two projects from the calculations:

  - "Eurofusion" is the flagship project in fusion research, both for its huge budget (427 Million €) and its unusual structure (roughly 75% of the funds going to one single country (DE)). Since Fusion Projects were not included in public FP7 data, an inclusion would also hampered a direct comparison between these two Framework Programmes.
  - "COST H2020" is a block grant of 48 Million € devoted to finance COST activities across Europe, but formally (and misleadingly in the sense of the analysis undertaken here) attributed to one single country (BE).

- Given the huge differences in the size of Member States, population figures from Eurostat for 2015 are used to complement absolute figures with calculations "per capita".

For the sake of simplicity, the subsequent analysis is exclusively focused on spending and income related to the 28 Member States – making it a "zero sum game". The funding of project partners from associated states or third countries is therefore not included here, nor are the contributions from associated countries taken into account. These restrictions are however of limited impact, as almost 95% of the Horizon 2020 funding goes to project partners in Member States.

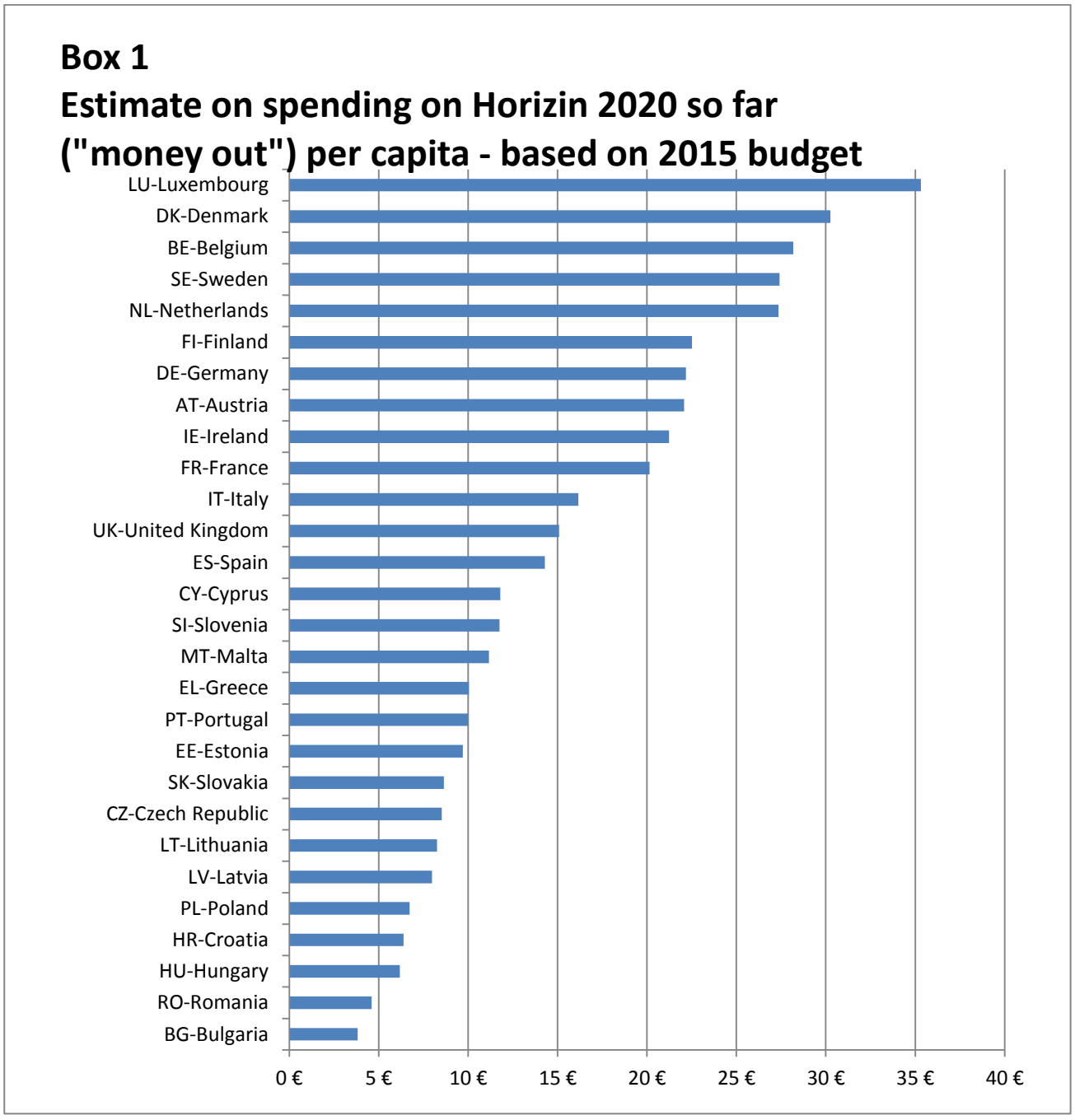
2. Analysing Horizon 2020

2.1. Spending on FP7 ("Money out")

The table at the end of this paper presents in column 6 the "total own resources" per Member State for the EU budget 2015. Column 7 shows the percentage share per country, with Germany and France in the lead, contributing 21.7 % and 16.1% respectively to the EU budget.

In column 8 these percentage shares are used to calculate the "virtual" financial contribution per Member State to the total Horizon 2020 funding (on project partners in Member States) so far.

Box 1 presents the amount of spending so far on Horizon 2020 per capita as shown in column 9. Whereas Luxembourg, Denmark, Belgium, Sweden and the Netherlands spent each more than 25€ per capita, the corresponding amounts for Bulgaria and Romania are below 5€.

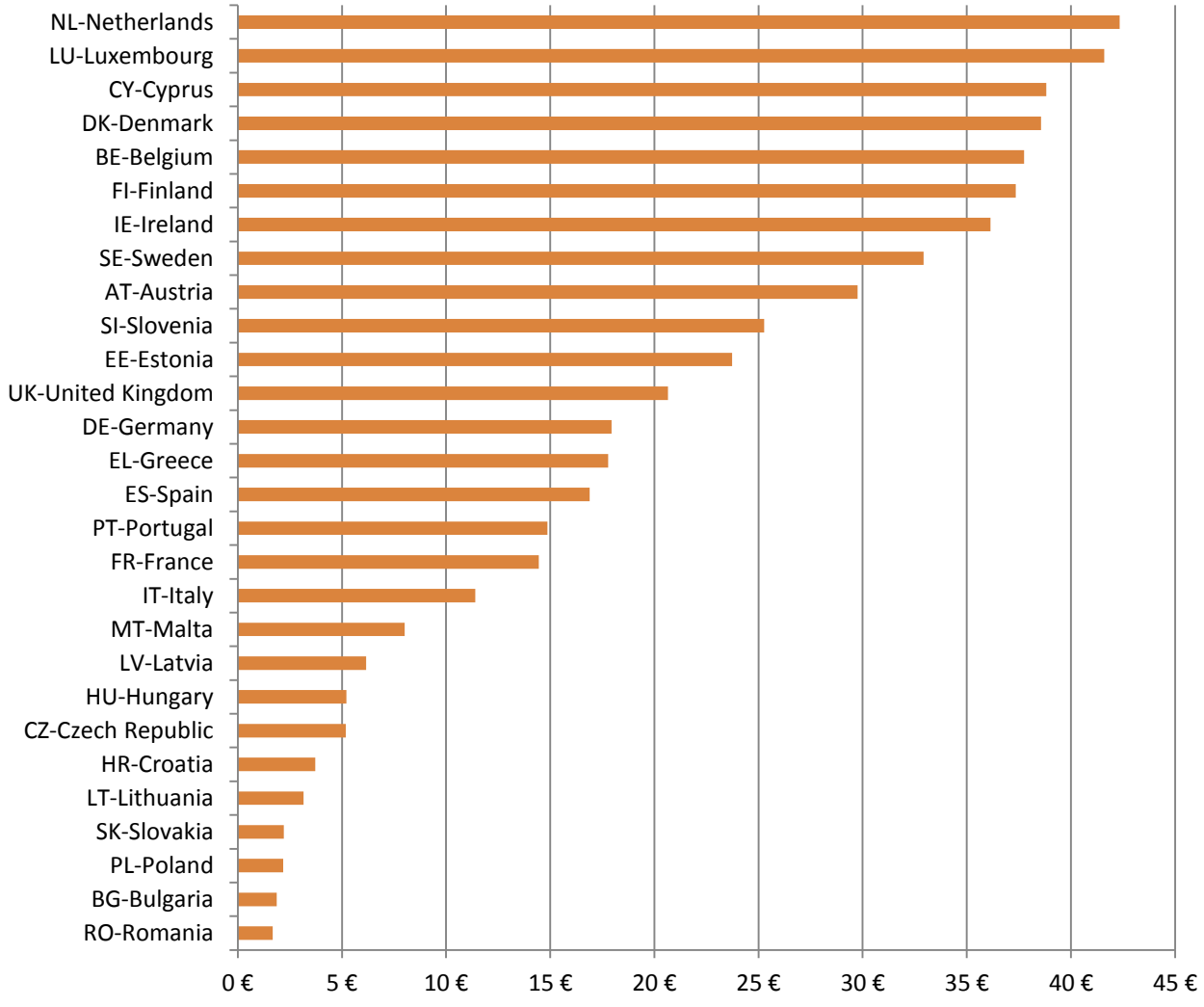


2.2. Income from Horizon 2020 ("money in")

The table presents in column 3 the amount of Horizon 2020 funding going to research organisations or firms from the different Member States. The total financial support across the 28 Member States amounts so far to around 8.3 billion €. Column 4 shows the percentage share per country, with Germany and the United Kingdom in the lead with shares of 17.5% and 16.1% respectively.

May-be more revealing is a breakdown of the income from FP7 per capita, as presented in column 5 and illustrated in Box 2. While the Netherlands, Denmark, Sweden, Finland and Belgium assured so far a total income from Horizon 2020 per capita of above 30€, these returns per capita were less than 3€ for Romania, Poland, Bulgaria and Slovakia. Somewhat surprisingly, the income from Horizon 2020 so far per capita is substantially higher for Ireland than for the United Kingdom, Austria is well ahead of Germany, and Slovenia generates more than double the funding per capita than Italy...

Box 2:
Income from Horizon 2020 so far ("money in") per capita



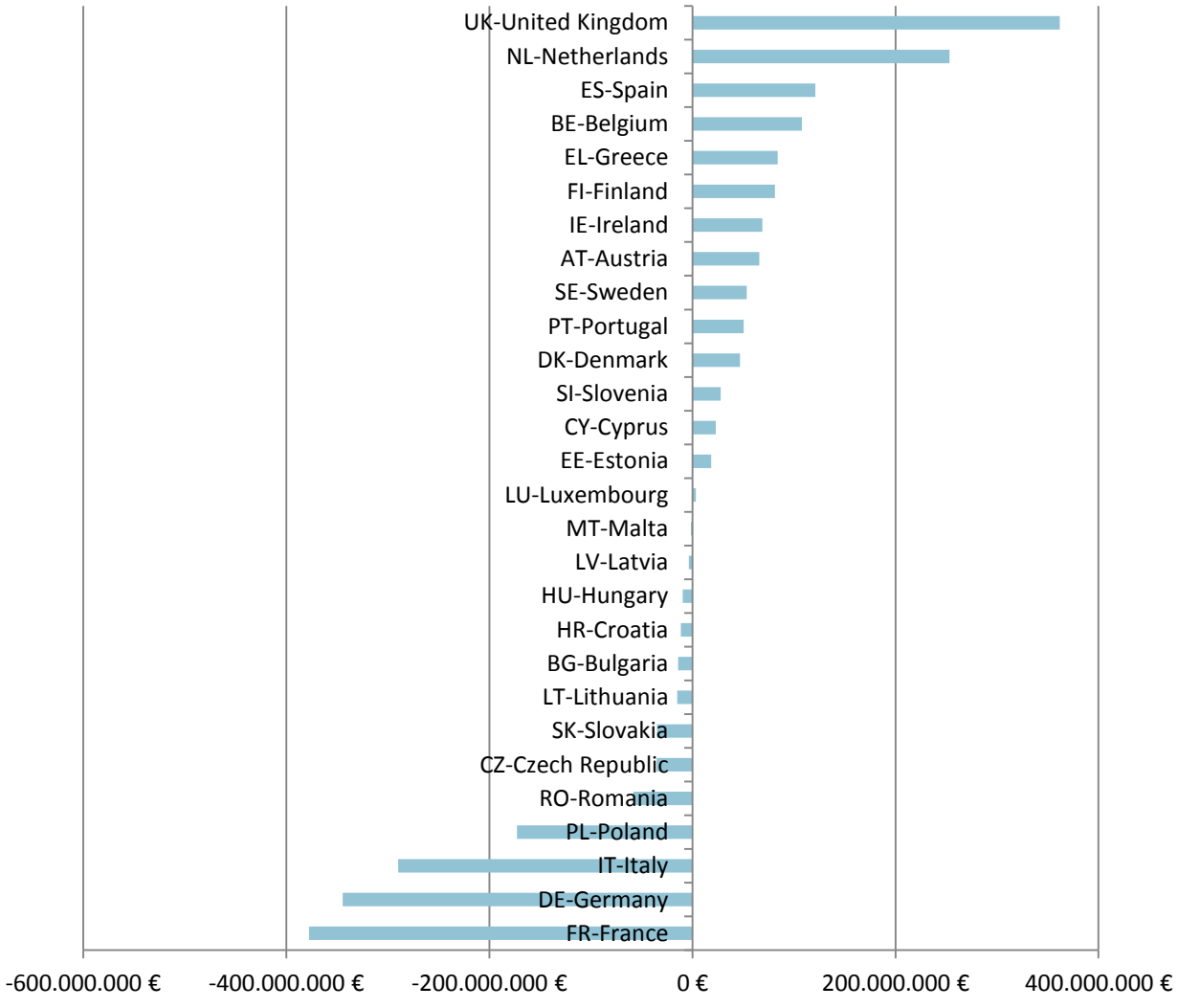
2.3. Net monetary distribution effects

The most interesting part of this analysis is now the direct comparison between the spending on Horizon 2020 and the income from Horizon 2020.

In the table, column 10 presents the difference in absolute amounts per Member State, whereas column 11 shows the difference as percentage figures. Colum 12 indicates for all Member States what amount is received so far by Horizon 2020 projects for one € financial contribution. Finally, column 13 shows the net results on a per capita basis.

Box 3 (based on column 10) illustrates the position of each Member States in terms of absolute amounts. The most significant distribution effects can be observed for the United Kingdom with a "surplus" of over 360 Million €, followed by the Netherlands with over 250 Million €. At the other end of the table, France shows a "deficit" of over 375 Million €, followed by Germany with almost 345 Million €, Italy with almost 290 Million €.

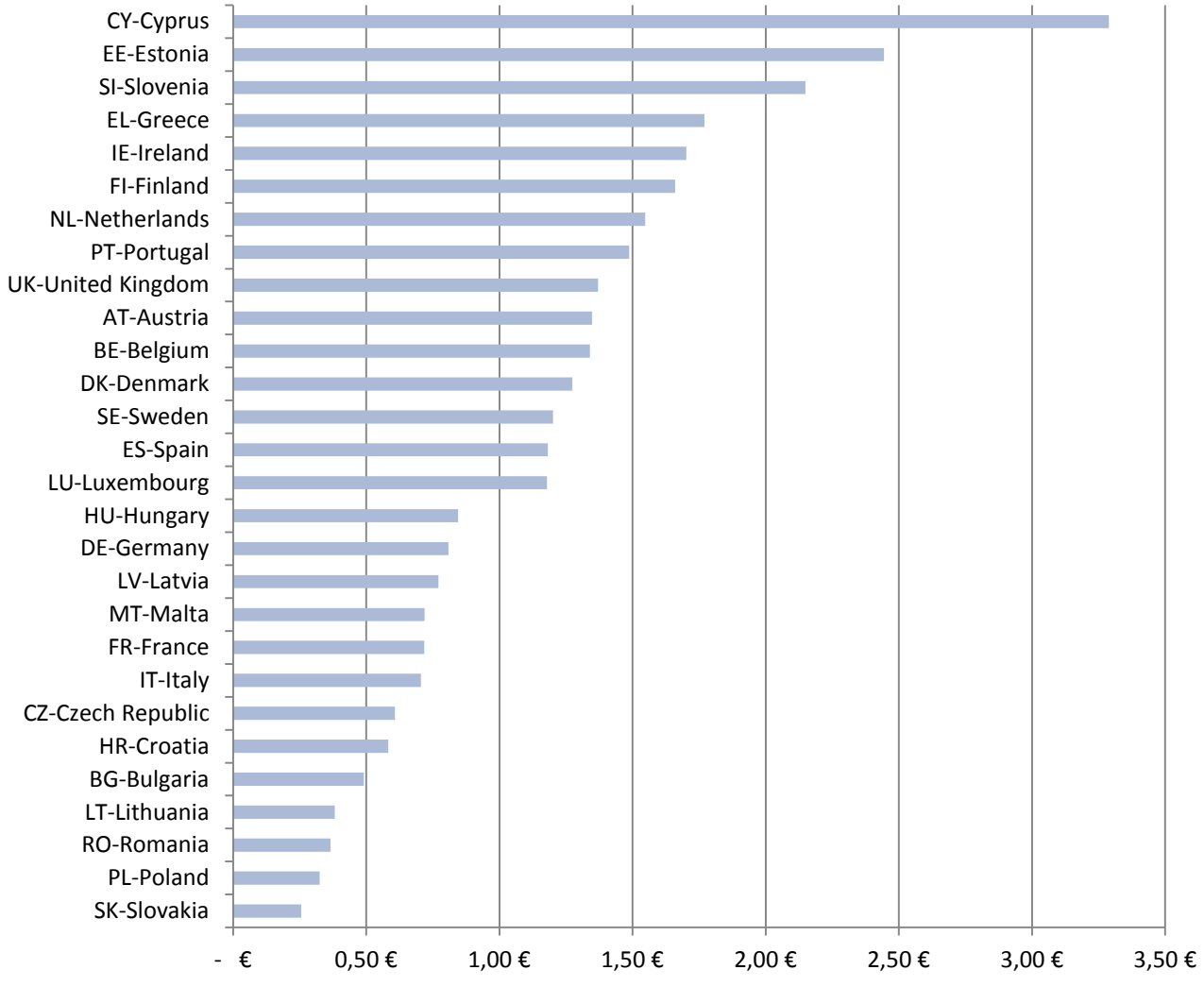
Box 3:
Estimate of net distributional effect of Horizon 2020 so far ("money in - money out")



Besides these countries at the extreme ends of the scale, it seems worth being noted that Greece performs remarkably well with a net surplus of over 80 million €. Spain as a net beneficiary does remarkably better than for example Italy or France. Poland is finally by far the highest net contributor from the "New Member States", with a net position of over - 170 million €.

Box 4 (based on column 12) illustrates the relative "success" of Member States in Horizon 2020 so far by indicating what amount of Horizon 2020 funding they receive for every € spent on the Horizon 2020 budget.

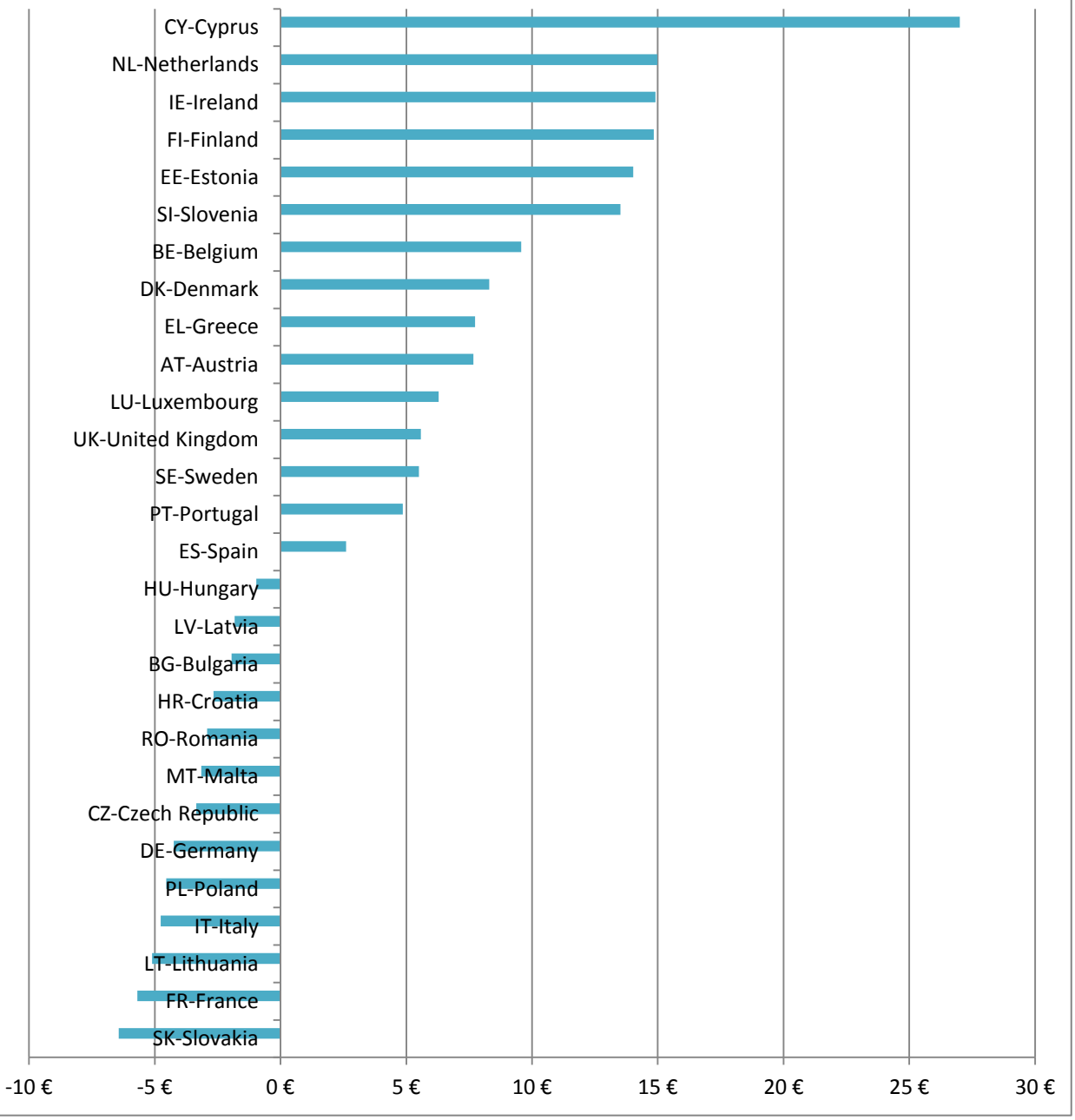
Box 4:
Estimate on income received from Horizon 2020 funding for every € spent on Horizon 2020 Budget



Surprisingly Cyprus, Estonia and Slovenia come out with the highest return ratio, receiving more than 2€ for every € spent on the Horizon 2020 budget so far. Greece, Ireland, Finland and the Netherlands also generated a return of over 1.50 € per € invested. At the other end of the scale, Slovakia, Poland, Romania and Lithuania received less than 40 cents out of Horizon 2020 for every € spent.

Finally, Box 5 (based on column 13) looks again at the situation per capita, estimating the net distributional effects of FP7 for each inhabitant of the Member States.

Box 5:
Estimate on net distributional effects of Horizon 2020 so far per capita ("money in - money out")



Horizon 2020 generated per head of population net gains in the order of 25 € for Cyprus. For the Netherlands, Ireland, Finland, Estonia and Slovenia, this surplus is still close to 15 €.

At the opposite end, the net loss per capita is in the order of 5 € for Slovakia, France, Lithuania, Italy, Poland and Germany.

3. A closer look at the Horizon 2020 performance of the six largest Member States

Since Horizon 2020 is still a relatively "young" programme, the calculations presented here might still be subject to important changes notably for the smaller Member states, for which the number of project participations is still limited. For the six largest Member States, however, the figures appear sufficiently solid to enter into a somewhat more detailed analysis. In order to allow appropriate comparisons despite the different size of these countries, the per capita data for "money in" and "money out" as well as the "net effect" (columns 5, 9, 13 in the table at the end of this paper) were recalculated as percentages of the EU average funding per capita (see table below and Box 6).

Member State	Funding in % of EU average amount per capita	Contribution in % of EU average amount per capita	Difference in % of EU average
UK-United Kingdom	126%	92%	34%
PL-Poland	13%	41%	-28%
IT-Italy	70%	99%	-29%
FR-France	88%	123%	-35%
ES-Spain	103%	87%	16%
DE-Germany	110%	136%	-26%

A short analysis for each of the countries shows that rather different factors lead to the actual results:

Germany pays by far the highest contribution to the EU budget, not only in absolute terms, but also on a per capita basis. Despite a well above average performance in terms of Horizon 2020 funding received per capita, the net balance is substantially negative. In short one could summarise the findings by stating that the German research system scores very well compared to the EU average, but by far not as strong as the German economy does …

Spain pays the lowest contribution from the five "old" Member States considered her. Thanks to the fact that (contrary to FP7) Spanish participants achieved an above average Horizon 2020 funding, Spain arrives at a somewhat surprising second place when ranking the largest EU Member States by their net benefit from Horizon 2020.

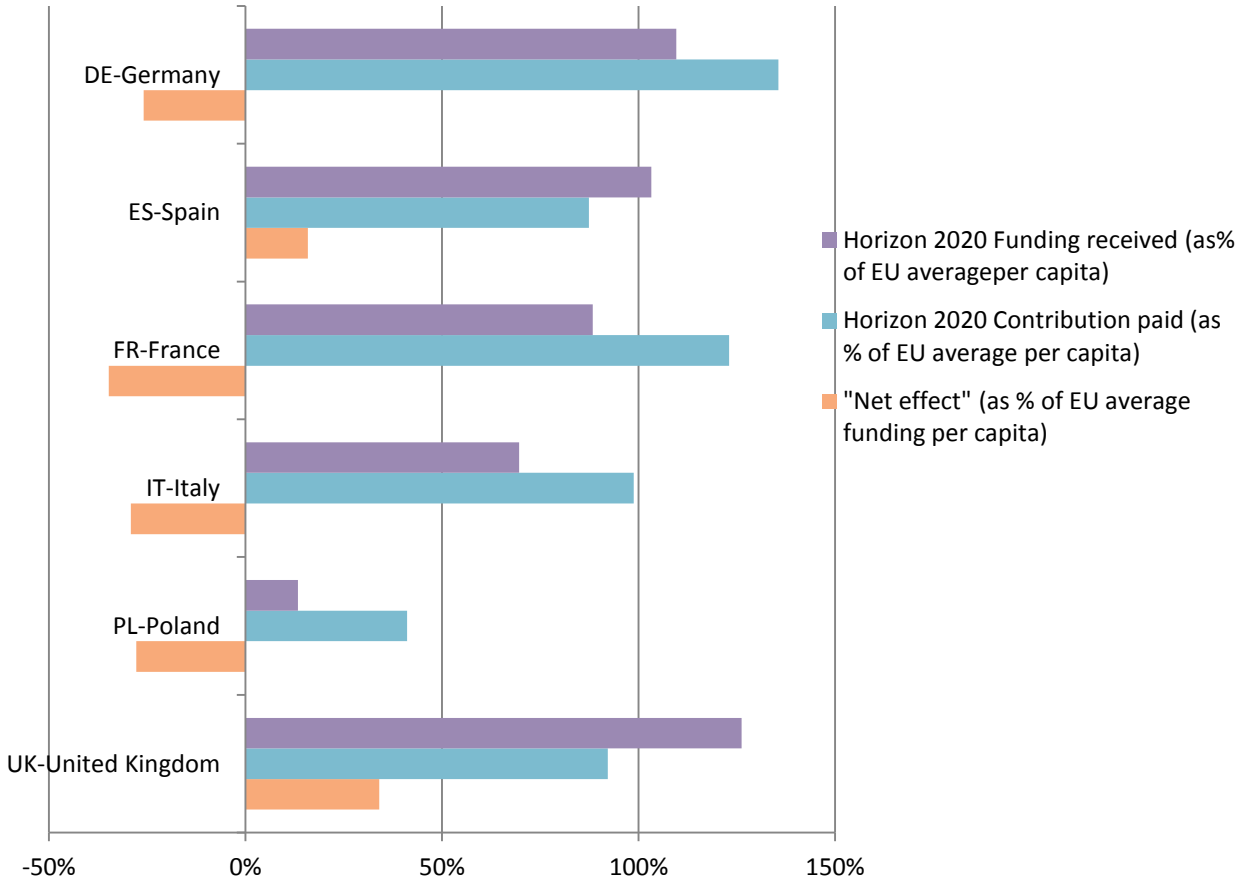
France, to the contrary, shows the highest net losses from its Horizon 2020 participation. This is mainly due to the comparatively high budget contribution, which is not matched by a comparable performance of the French research system in Horizon 2020. So far the return from projects per capita is well below the EU average.

Italy pays a Horizon 2020 budget contribution which is almost identical to the EU average per capita. Since the funding generated from Horizon 2020 is on a per capita basis the lowest from the five "old" Member States, there is a considerable net loss for Italy from its Horizon 2020 participation so far.

Poland is the only "new" Member State in this selection and shows both for the budget contribution and the return from Horizon 2020 funding figures which are well below the EU average. But despite a budget contribution which is at less than half of the EU average, the very low income generated from Horizon 2020 projects leads to a very substantial financial deficit in Horizon 2020 so far.

The **United Kingdom** pays a contribution to the Horizon 2020 budget which is – on a per capita basis – below the EU average and significantly lower than the contributions from Germany, France or even Italy. Since the British research system managed to generate the highest rate of financial return from Horizon 2020 projects for the six countries under consideration, the UK is clearly the single most important net beneficiary of Horizon 2020 so far.

Box 6:
Estimate on the (financial) performance of the six largest Member States in Horizon 2020 so far



4. Some early comparisons between FP7 and Horizon 2020

At this relatively early stage of Horizon 2020, comparisons with full FP7 should be handled with great care. This notably applies to the observations for smaller countries, as a small number of participations might alter the results considerably.

Taking this proviso into due account, there are however a couple of observations which are worth being carefully considered:

- According to this snapshot, Spain does remarkably (and may-be also surprisingly) much better in Horizon 2020 than in FP7. So far Spain even managed to become a net beneficiary of Horizon 2020, whereas it was incurring financial losses from FP7.

- The growing success of Spain is also the main reason why the seemingly stable ranking of the Top countries receiving Framework Programme funding has changed:

FP7	Horizon 2020 so far
1. Germany	1. Germany
2. United Kingdom	2. United Kingdom
3. France	3. France
4. Italy	4. Spain
5. The Netherlands	5. The Netherlands
6. Spain	6. Italy

- The analysis provided in this paper highlighted the remarkable success of some "new" Member States in Horizon 2020 so far, notably Cyprus, Estonia and Slovenia. The encouraging figures showing a net improvement against FP7 for these relatively small countries should not distract the attention from the fact that for the large EU-13 countries such as Poland and Romania the situation is unchanged, if not even deteriorating. Overall there are thus no strong indications for an effective "catching up" process or a "widening participation" in Horizon 2020 as yet.

- Previous analysis portrayed the United Kingdom as the Member State with the highest net gain from FP7. In view of the ongoing public debate on a possible "Brexit" it is important to note that this description is still valid for Horizon 2020 so far, with an estimated net financial gain for the United Kingdom in the order of 350 Million €.

- At the same time, four of the six largest Member States incurred massive financial deficits from Horizon 2020 so far: France and Germany show an estimated loss of roughly 350 Million €, followed by Italy with – 300 Million €. The figures for Poland are in a sense even more alarming, as the estimated loss of 170 Million € in Horizon 2020 corresponds to a return rate of only 32 cents per € spent.

- Comparing the results from FP7 and Horizon 2020 so far as regards the return for every € spent, current data indicates that the relative return rate is diminishing for the larger Member States, including the UK, but with the notable exception of Spain. This could be a (for the time being still rather weak) indication that "smaller" countries do even better in Horizon 2020 than in FP7.

- Analysing research policy on the basis of monetary flows only is by no means adequate. On the other hand, the calculations presented in this paper indicate issues which go well beyond the pure monetary analysis. For instance, the figures presented in Box 2 on the income per capita from Horizon 2020 so far illustrate that the independent selection process by peer review of proposals leads to an extremely uneven distribution among the Member States. There is in fact a difference by a factor bigger than 25 for the income per capita for Romania on the one hand and the Netherlands on the other – basically unchanged from FP7 to Horizon 2020 so far.
  Such differences can be partially explained by wage levels, but they do also hint at rather substantial differences in the depth of the research potential and the scientific quality. This is an alarming indication that the preconditions for a true European Research Area might actually not yet been met. As these inequalities persist in Horizon 2020 despite the greater focus on applicability and innovation, there is also every reason to include careful reflections on this issue for any new innovation initiatives planned at European level.

Version 1.0 – 12.03.2016 - Feedback: mail@peter-fisch.eu

Column 1	2	3	4	5	6	7	8	9	10	11	12	13
Member State	Population 2015	H2020 Funding Received 2014/15	%	H2020 Funding received 2014/15 per capita	EU Budget Contribution 2015	%	H2020 Contribution 2014/15 based on Budget 2015	H2020 contribution based on Budget 2015 per capita	Difference between H2020 Funding received and contribution to H2020 budget	Difference between H2020 Funding received and contribution to H2020 budget, in %	H2020 Funding received per 1 € contribution to H2020 budget	Difference between H2020 Funding received and contribution to H2020 budget per capita
AT-Austria	8.576.261	255.133.321 €	3,07	29,75 €	3.179.309.152 €	2,28	189.347.948 €	22,08 €	65.785.373 €	0,79	1,35 €	7,67 €
BE-Belgium	11.258.434	424.971.047 €	5,11	37,75 €	5.326.692.800 €	3,81	317.238.213 €	28,18 €	107.732.834 €	1,30	1,34 €	9,57 €
BG-Bulgaria	7.202.198	13.494.533 €	0,16	1,87 €	461.700.649 €	0,33	27.497.191 €	3,82 €	-14.002.658 €	-0,17	0,49 €	-1,94 €
CY-Cyprus	847.008	32.870.870 €	0,40	38,81 €	167.803.854 €	0,12	9.993.780 €	11,80 €	22.877.090 €	0,28	3,29 €	27,01 €
CZ-Czech Republic	10.538.275	54.586.162 €	0,66	5,18 €	1.509.719.745 €	1,08	89.913.350 €	8,53 €	-35.327.188 €	-0,42	0,61 €	-3,35 €
DE-Germany	81.197.537	1.456.805.965 €	17,52	17,94 €	30.243.199.608 €	21,66	1.801.173.628 €	22,18 €	-344.367.663 €	-4,14	0,81 €	-4,24 €
DK-Denmark	5.659.715	218.231.336 €	2,62	38,56 €	2.875.983.152 €	2,06	171.282.969 €	30,26 €	46.948.367 €	0,56	1,27 €	8,30 €
EE-Estonia	1.313.271	31.160.144 €	0,37	23,73 €	214.068.080 €	0,15	12.749.107 €	9,71 €	18.411.037 €	0,22	2,44 €	14,02 €
EL-Greece	10.858.018	193.090.611 €	2,32	17,78 €	1.831.669.791 €	1,31	109.087.509 €	10,05 €	84.003.102 €	1,01	1,77 €	7,74 €
ES-Spain	46.449.565	784.919.003 €	9,44	16,90 €	11.148.112.107 €	7,98	663.940.515 €	14,29 €	120.978.488 €	1,45	1,18 €	2,60 €
FI-Finland	5.471.753	204.403.260 €	2,46	37,36 €	2.068.567.838 €	1,48	123.196.285 €	22,51 €	81.206.975 €	0,98	1,66 €	14,84 €
FR-France	66.415.161	959.901.567 €	11,54	14,45 €	22.459.706.357 €	16,08	1.337.617.425 €	20,14 €	-377.715.858 €	-4,54	0,72 €	-5,69 €
HR-Croatia	4.225.316	15.705.750 €	0,19	3,72 €	452.951.907 €	0,32	26.976.148 €	6,38 €	-11.270.398 €	-0,14	0,58 €	-2,67 €
HU-Hungary	9.855.571	51.398.647 €	0,62	5,22 €	1.022.074.173 €	0,73	60.870.975 €	6,18 €	-9.472.328 €	-0,11	0,84 €	-0,96 €
IE-Ireland	4.628.949	167.271.596 €	2,01	36,14 €	1.650.142.754 €	1,18	98.276.427 €	21,23 €	68.995.169 €	0,83	1,70 €	14,91 €
IT-Italy	60.795.612	692.762.865 €	8,33	11,39 €	16.499.419.001	11,82	982.644.653 €	16,16 €	-289.881.788 €	-3,49	0,70 €	-4,77 €
LT-Lithuania	2.921.262	9.226.302 €	0,11	3,16 €	405.503.303 €	0,29	24.150.284 €	8,27 €	-14.923.982 €	-0,18	0,38 €	-5,11 €
LU-Luxembourg	562.958	23.415.429 €	0,28	41,59 €	333.774.893 €	0,24	19.878.404 €	35,31 €	3.537.025 €	0,04	1,18 €	6,28 €
LV-Latvia	1.986.096	12.226.722 €	0,15	6,16 €	266.119.863 €	0,19	15.849.119 €	7,98 €	-3.622.397 €	-0,04	0,77 €	-1,82 €
MT-Malta	429.344	3.441.927 €	0,04	8,02 €	80.474.017 €	0,06	4.792.736 €	11,16 €	-1.350.809 €	-0,02	0,72 €	-3,15 €
NL-Netherlands	16.900.726	715.670.365 €	8,61	42,35 €	7.764.475.612 €	5,56	462.423.583 €	27,36 €	253.246.782 €	3,05	1,55 €	14,98 €
PL-Poland	38.005.614	83.019.423 €	1,00	2,18 €	4.294.231.160 €	3,08	255.748.599 €	6,73 €	-172.729.176 €	-2,08	0,32 €	-4,54 €
PT-Portugal	10.374.822	154.224.070 €	1,85	14,87 €	1.741.812.959 €	1,25	103.735.967 €	10,00 €	50.488.103 €	0,61	1,49 €	4,87 €
RO-Romania	19.870.647	33.354.049 €	0,40	1,68 €	1.533.805.587 €	1,10	91.347.814 €	4,60 €	-57.993.765 €	-0,70	0,37 €	-2,92 €
SE-Sweden	9.747.355	320.910.311 €	3,86	32,92 €	4.487.760.796 €	3,21	267.274.511 €	27,42 €	53.635.800 €	0,64	1,20 €	5,50 €
SI-Slovenia	2.062.874	52.120.655 €	0,63	25,27 €	407.165.684 €	0,29	24.249.289 €	11,76 €	27.871.366 €	0,34	2,15 €	13,51 €
SK-Slovakia	5.421.349	11.975.158 €	0,14	2,21 €	786.175.931 €	0,56	46.821.744 €	8,64 €	-34.846.586 €	-0,42	0,26 €	-6,43 €
UK-United Kingdom	64.875.165	1.340.066.454 €	16,11	20,66 €	16.426.122.233 €	11,76	978.279.367 €	15,08 €	361.787.087 €	4,35	1,37 €	5,58 €
All Member States	508.450.856	8.316.357.542 €	100,00	16,36 €	139.638.543.006 €	100,00	8.316.357.542 €	16,36 €	0 €	0,00	1,00 €	

Data Sources:

Column 2

Population Figures Eurostat table tps000001

http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&tableSelection=1&labeling=labels&footnotes=yes&language=de&pcode=tps00001&plugin=0

Column 3

Horizon 2020 Funding received CORDIS – EU research projects under Horizon 2020 (2014-2020), Version updated 2016-01-26

https://open-data.europa.eu/en/data/dataset/cordis-h2020projects-under-horizon-2020-2014-2020

Column 6

EU Budget 2015 Definitive Adoption (EU, Euratom) 215/339 of the European Union's general budget for the financial year 2015,OJ L 69/2015 of 13.3.2015, Table 6, page 20

http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=OJ:L:2015:069:TOC