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FUNDING SOCIAL SCIENCE IN INTERNATIONAL COMPARISON

1. INTRODUCTION

Measuring scientific output and comparing it to the inputs and to the outputs of other scientific fields has long been of high interest for those engaged in doing and financing scientific research – potentially all taxpayers. Participants of the debate were quick to point out differences between two fields of sciences, applying an oft-used dichotomy: natural sciences on the one hand and social sciences and humanities on the other. These debates, rather than remaining within the boundaries of academic discussions, have become common in political discussions around financing,[2] which can go

[1] The author would like to thank Attila Varga for his prompt help with more complex statistics and the help of Zsolt Boda, András Jakab, Judit Mosoni-Fried and Balázs Váradi with their comments on earlier versions of the chapter. I am responsible for all remaining errors.

[2] Scott Jaschik summarizes some of the most prominent criticisms of social sciences and humanities (liberal arts) in the US, starting with US president Barack Obama: “I promise you, folks can make a lot more, potentially, with skilled manufacturing or the trades than they might with an art history degree.”; Mitt Romney, former governor and Republican nominee for president: “I wonder whether you get information coming into college that says you know, this course of study will lead to this kind of jobs and there’s a lot of opening here as opposed to – as you said, English – and as an English major I can say this.... as an English major your options are uh, you better go to graduate school, all right? And find a job from there.”; Governor Rick Scott, Republican of Florida: “If I’m going to take money from a citizen to put into education then I’m going to take that money to create jobs. So I want that money to go to degrees where people can get jobs in this state. Is it a vital interest of the state to have more anthropologists? I don’t think so.”; Governor Patrick McCrory, Republican of North Carolina: “If you want to

as far as the idea of state-mandated closure of certain programs, even those supported from tuitions that were deemed to be too far from economic performance like ‘real’ sciences or desired vocational trainings.[3]

Note that many of the arguments cut across the natural vs. social sciences (/humanities) divide, and differentiate instead on the very direct, perceived economic impact and usefulness of certain studies and research, most importantly in engineering and business. Criticisms, rather than following a simple logic of economic impact, often argue more broadly, e.g., hinting at a general disregard for real-world problems or majority culture on the part of people from social sciences and humanities.[4]

As can be expected, these types of criticism attract responses, primarily[5] from the academic community.[6] Rather than replaying that debate, this chapter will focus on one aspect of the exchanges, the numbers showing *international trends in funding research in social sciences and humanities*.

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take gender studies that’s fine, go to a private school and take it. But I don’t want to subsidize that if that’s not going to get someone a job.” Scott Jaschik, “Obama vs. Art History,” *Inside Higher Ed,* January 31, 2014, https://www.insidehighered.com/news/2014/01/31/obama-becomes-latest-politician-criticize-liberal-arts-discipline.

[3] See the recent plans of the Government of Hungary, cutting back on the number of higher education programs that mostly concern social sciences. “Vége a kommunikáció szaknak? Több képzést is megszüntethet a kormány” [“The end of communications studies? Several programs can be cut by the government”], *Eduline,* March 11, 2015, http://eduline.hu/felsooktatas/2015/3/11/szakok_megszunese_felsooktatas_kommunikacio_MIQ1K6.

[4] For one such critique, see Laurie Fendrich, “The Humanities Have No Purpose” *The Chronicle of Higher Education,* March 20, 2009, http://chronicle.com/blogs/brainstorm/the-humanities-have-no-purpose/6738. For a critical overview of various responses to the question of ‘what’s the use of humanities?’ see Stanley Fish, “Will the Humanities Save Us?” *The New York Times,* January 6, 2008, http://opinionator.blogs.nytimes.com/2008/01/06/will-the-humanities-save-us/. For a possible response, see Fendrich’s argument: “The only way to justify studying the humanities is to abandon modern utilitarian arguments in favor of much older arguments about the end, or purpose of man.” For a nice, if not too recent, overview of the US debate, see Stéfan Sinclair, “Confronting the Criticisms: A Survey of Attacks on the Humanities” *4Humanities – Advocating for the Humanities,* October 9, 2012, http://4humanities.org/2012/10/confronting-the-criticisms/.

[5] …but not exclusively, see the report commissioned by Ernst & Young, presenting data on the economic output of creative and cultural industries: *Creating growth. Measuring cultural and creative markets in the EU,* December 2014, http://www.creatingeurope.eu/en/wp-content/uploads/2014/11/study-full-en.pdf.

[6] Responses to some of the critiques quoted in note 1 above: Matthew T. Hora, Ross J. Benbow and Amanda K. Oleson, “Obama and Walker: Both Wrong” *Inside Higher Ed,* March 16, 2015, https://www.insidehighered.com/views/2015/03/16/essay-criticizes-focus-vocational-training-higher-education-policies-president. A more elaborated response: Anthony T. Kronman, *Education’s End. Why Our Colleges and Universities Have Given Up on the Meaning of Life* (New Haven, CT: Yale University Press 2007). From the Hungarian debate, see a reply, based on labor market statistics: János Köllő, “Nincs is túltermelés bölcsészekből” [“There is actually no overproduction of humanities majors”] *Index,* February 16, 2015, http://index.hu/gazdasag/defacto/2015/02/16/nincs_is_tultermeles_bolcseszekbol/.

Far from resolving disputes, it should get us, those interested in making informed choices, closer to having a meaningful debate and help us be more precise in what we are debating.

To see what proportion of funding goes to social sciences, we will first need to see what fields constitute social sciences in the first place (Part 1). After that, the chapter will present comparative data on research spending, from different aspects, primarily to see what can impact the relative and absolute numbers, as compared to other fields and to the situation, over time, in various countries (Part 2). The chapter concludes by highlighting some important considerations about the 'other side of the equation': how we should assess the role (benefit, value, impact, output etc.) of social science research (Part 3).

2. WHAT SCIENCES?

The first question that arises concerns the boundaries of 'social sciences', as often contrasted to 'natural sciences' or 'sciences'. The short conclusion is that this is an endless endeavor. Without trying to give an ultimate definition of the field, it seems useful to look at available, lower-level classifications that fit the research question of how the funding of social science research compares to overall funding. First, mechanisms for funding institutions directly can apply categories of academic fields that might or might not be used as a basis of distributing funds. Second, the assessment of the impact or output of research, above all, bibliometric data is often sliced up according to a classification that takes, among others, (natural) sciences and social sciences separately. While many rightly challenge the straightforward dichotomy, and urge the adoption of more flexible categories based on the human impact on what is studied (e.g., 'natural systems', 'human-influenced systems' and 'human-dominated systems'[7]), the need to rely on statistics both on the funding and the assessment side requires us to consider how the various fields of sciences are categorized.

There are exemplary fields of sciences on both sides, and few would doubt that physics is a field of (natural) science while sociology belongs to social sciences. Yet, there are less clear fields, like areas of architecture, geography, health studies or psychology, where the decision could require slicing up what has been traditionally seen as one field of study. In addition, classifications differ in how they treat higher level categories like humanities, arts and design, medical sciences, engineering or agricultural

[7] Simon Bastow, Patrick Dunleavy and Jane Tinkler, *The Impact of Social Sciences, How academics and their research make a difference* (London: Sage 2014), http://www.uk.sagepub.com/upm-data/59598_Bastow__Impact_of_the_social_sciences.pdf. 20–21.

sciences. Interdisciplinarity is yet another phenomenon that challenges the view of clear-cut categories. Bastow, Dunleavy and Tinkler conclude that it is "surprisingly difficult" to go beyond the top-level categories (in their case four discipline groups) "because of an absence of any well-developed official or government categorizations".[8] Finally, certain subfields of seemingly "clear cases" might slip into the other higher level category, like some more theoretical areas of physics, falling closer to philosophy (and humanities), or certain clinical and experimental fields in social psychology.

There are, however, widely used international classifications, most importantly the ISCED ("International Standard Classification of Education") prepared by the UNESCO and FOS ("Revised Field of Science and Technology" Classification) by OECD, also known as the "Frascati Manual". The fact that these are themselves constantly being reworked shows both the flexibility and the constant change in how we view the relationship between the two major academic fields. Both can be read on three levels, with the top level categories used as follows. (Table 1) These top-level categories are then broken down into narrower fields and a detailed list of fields like optics or religious studies.

TABLE 1. • *Classification of scientific fields.*

ISCED (UNESCO)

01 Education
02 Arts and humanities
03 Social sciences, journalism and information
04 Business, administration and law
05 Natural sciences, mathematics and statistics
06 Information and communication technologies
07 Engineering, manufacturing and construction
08 Agriculture, forestry, fisheries and veterinary
09 Health and welfare

Source: UNESCO Institute for Statistics, ISCED Fields of Education and Training 2013 (ISCED-F 2013), Manual to accompany the International Standard Classification of Education 2011, http://www.uis.unesco.org/Education/Documents/isced-fields-of-education-training-2013.pdf, leaving out categories '00 Generic programmes and qualifications' and '10 Services'.

FOS – 'Frascato Manual' (OECD)

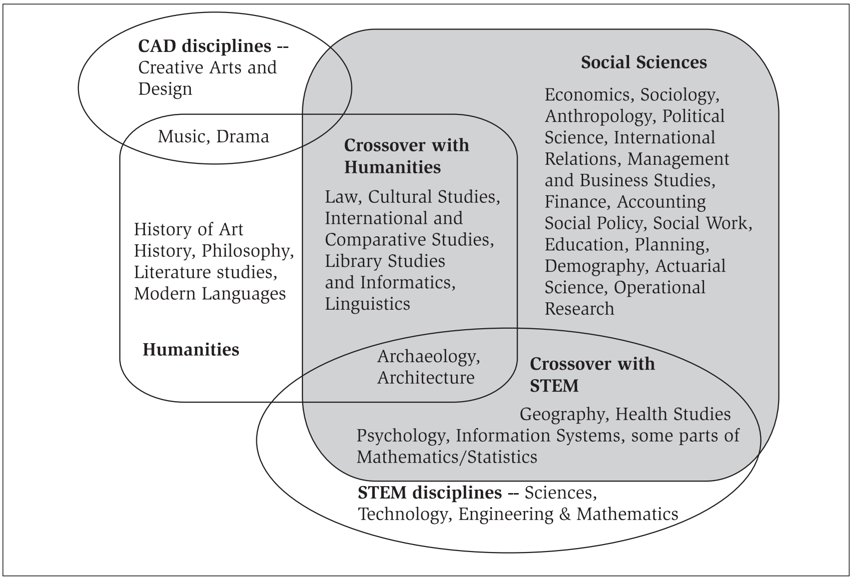
1 Natural sciences
2 Engineering and technology
3 Medical and health sciences
4 Agricultural sciences
5 Social sciences
6 Humanities

Source: Working Party of National Experts on Science and Technology Indicators Revised Field of Science and Technology (FOS) Classification in the Frascati Manual, February 26, 2007, http://www.oecd.org/science/inno/38235147.pdf.

[8] Bastow, Dunleavy and Tinkler (n 7) 5.

While these categorizations might seem quite straightforward, the figure does not indicate the contentious areas that might fall in one category under one classification and in another under the second one. The UNESCO material states that the two classifications "have different purposes and it is not feasible to ensure a direct correspondence between" them.[9] In many cases it is not easy to tell where a field should go (e.g., computer science at the edge of hardware engineering and software and network development), not to mention individual research projects that inherently rely on various areas.

The connections and overlaps among scientific fields are hard to be captured by clear-cut sets of fields and sub-fields. One can grasp the complexity of defining the boundaries by a look at the figure prepared by the LSE Public Policy Group. (Figure 1) Note that this is only indicative of the complexity, as it places its focus on social sciences and humanities instead of sciences in general, and does not consider interdisciplinary and cross-disciplinary research.



Source: Simon Bastow, Patrick Dunleavy, Jane Tinkler, The Impact of Social Sciences, How academics and their research make a difference, Visualising the Data, http://studysites.uk.sagepub.com/visualisation/, p. 3, Figure 1.1 The social sciences and how they relate to other disciplines.

FIGURE 1. • *Relations and overlaps between scientific fields, with focus on social sciences.*

[9] UNESCO Institute for Statistics, ISCED Fields of Education and Training 2013 (ISCED-F 2013), Manual to accompany the International Standard Classification of Education 2011, http://www.uis.unesco.org/Education/Documents/isced-fields-of-education-training-2013.pdf. 17, para. 54.

A more sophisticated approach is to take account of the overlaps and divide the relevant fields and then give a weight to how much a field belongs to this or that 'top level' field. The LSE Public Policy Group assessing the impact of social sciences adopted this solution. It starts with a set of criteria that unites social sciences[10] and then applies a method of weighing. The numbers in their report on law, journalism and linguistics are equally divided between social science and humanities; statistics on architecture is accounted for in Social Sciences, STEM (Science, Technology, Engineering and Mathematics) and CAD (Creative Arts and Design); archaeology, environmental sciences and social psychology are ¾ STEM and ¼ social science; while statistics itself is half social science and half STEM.[11] This means that 75% of funding going towards social psychology should be counted as (natural) sciences funding, while the rest as social sciences resource.

These classifications are thus useful to assess the ratio of where funds go in terms of scientific areas. Yet, when it comes to measuring impact, often more practical considerations step in. As the study of the European Commission notes: "For its bibliometric assessment – in particular when it comes to specific fields, one is more or less bound to the fields as defined by the Social Science Citation Index and its producer, Thomson Reuters."[12] The Social Science Citation Index includes fields like 'area studies', 'environmental studies', 'ergonomics', 'planning and development', 'biological psychology', and 'transportation'. Both the Social Science Citation Index and the Arts & Humanities Citation Index includes 'linguistics', although indicating different sub-areas.[13] (Both indexes are put together by Thomson Reuters. For a full list and comparison of the classifications, see Annex.)

[10] Bastow, Dunleavy and Tinkler (n 7) Visualising the Data, http://studysites.uk.sagepub.com/visualisation/. 4.

[11] Bastow, Dunleavy and Tinkler (n 7) Visualising the Data, http://studysites.uk.sagepub.com/visualisation/. 6.

[12] Viola Peter, Lorena Rivera Leon, Yann Cadiou, Mathieu Doussineau: *Evaluation of the Impact of Framework Programme supported Social Sciences and Humanities Research. A bibliometric approach* (Luxembourg: Publications Office of the European Union 2010) https://ec.europa.eu/research/social-sciences/pdf/other_pubs/ssh-evaluation-bibliometric_en.pdf 5.

[13] 'Social science' type linguistics includes "resources relating to all theoretical and applied aspects of linguistics, including phonetics, phonology, morphology, syntax, and semantics. The category also includes resources dealing with language as a social phenomenon such as sociolinguistics, language acquisition and education, psycholinguistics, computational linguistics, corpus linguistics, semiotics and the relationship between memory and language" while the 'humanities' linguistics ('language & linguistics') refers to "resources relating to theoretical, literary and historical linguistics as well as stylistics and philology". See Thomson Reuters, Social Science Citation Index 2012, Scope Notes, http://ip-science.thomsonreuters.com/mjl/scope/scope_ssci/, and Thomson Reuters, Arts & Humanities Citation Index 2012, Scope Notes, http://ip-science.thomsonreuters.com/mjl/scope/scope_ahci/, respectively.

It should be apparent that there is no one best and ultimate classification. What we are left with is the imperative to indicate throughout this overview what disciplinary classification is applied in the sources relied upon. The results will be extremely sensitive to how we group the various fields, e.g., whether we treat natural sciences and engineering, or arts and humanities and social sciences together. In all cases, the basis of classification or the major choices of classification will be indicated.

3. RESEARCH FUNDING RATIOS[14]

3.1.Ratio of spending that goes to social sciences

The first number that allows us to compare the ratio of social science research expenditures quickly is the share of such expenditures in overall research and development spending in the respective country. Table 2 summarizes the ratio of social science research funding from total R&D expenditures, with an approximate geographic grouping of countries where comparative data from 2011 is available in the OECD/Eurostat database, while countries with data from other years are listed in the third table, on the right. Note that these numbers include spending from all sources, including business, government etc. As for the classification, the OECD data relies on the Frascati Manual classification (the list used by the OECD, see earlier, right column of Table 1), combining social sciences and humanities.

The data from 2011 is somewhat sporadic, especially from outside Europe, and the fact that many countries do not have data from 2011 or not even a year close to 2011 makes the comparison even harder. (Note further that I cannot deal here with how the data is collected, what it shows exactly, and what other limitations apply, other than those that are apparent from the data set. That would require a separate study.) Even this inconclusive data set allows from some preliminary generalizations. Central and Eastern Europe, with the exception of Slovakia, seems to make up one block with 7–9% going for social sciences and humanities (Visegrád countries, 2011, Romania, 2012, and Slovenia, 2011). Numbers from elsewhere Europe are very diverse, from around 5% in Ireland and Germany (1999) through 12.9% in the UK (2012) to 15–18.5% in Norway, the Netherlands, Portugal and Greece. Where data is available, numbers

[14] For supporting tables with the datasets used in this chapter, see the Annex of the electronic version of this chapter: Zsolt Körtvélyesi: "Funding social science in international comparison" *MTA Law Working Papers* 2015/36. http://jog.tk.mta.hu/uploads/files/mtalwp/2015_36_Kortvelyesi.pdf.

TABLE 2. • *Data on the share of social sciences and humanities in overall research and development spending, 2011 where not indicated (first two tables), and other years in the last table (as indicated). Own calculation based on OECD-Eurostat data. Countries grouped by year and geographic location.*

Country (2011)	Ratio
Ireland	5.68%
Denmark	8.04%
Netherlands	14.95%
Norway	14.46%
Portugal	17.68%
Greece	18.55%
Turkey	16.39%
Czech Rep.	7.28%
Hungary	9.27%
Poland	9.04%
Slovak Rep.	16.07%
Slovenia	8.30%

Country (2011)	Ratio
Russia	4.19%
Canada	8.45%
Argentina	18.44%
Chile	19.12%
South Africa	14.79%
Chinese Taipei	3.92%
Korea	3.94%

Country (year)	Ratio
Australia (2008)	7.53%
Austria (1998)	9.38%
Germany (1999)	5.05%
Japan (2001)	5.34%
Mexico (2003)	18.05%
Spain (2002)	7.66%
United Kingdom (2012)	12.90%
People's Rep. of China (2007)	1.37%
Romania (2012)	9.63%

Source: OECD, Joint OECD-Eurostat international data collection on resources devoted to RD, dataset on gross domestic expenditure on R-D by sector of performance and field of science, last updated April 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#.

from South America (Argentina and Chile), together with South Africa, are above the European average, at 18–19% and 14.79%, whereas the ratio in Asia seems to be considerably lower than anywhere else, with 5.34% in Japan (2001), just below 4% in Korea and Chinese Taipei, and 1.37% in China.

A separate dataset is available from the US National Science Foundation, that it also partly based on OECD data, and only looks at *academic spending* – a huge difference, to the benefit of social sciences and humanities, as we will see (Table 3). There is an approximate overlap with how the category 'social sciences and humanities' is used in this case, as for the NSF, "Social sciences is concerned with an understanding of the behaviour of social institutions and groups and of individuals as members of a group. Detailed fields: anthropology, economics, political science, sociology, and other social sciences."[15] In addition to the percentage of research and development spending, the last row of the table shows the ratio of spending go-

[15] National Science Foundation, National Center for Science and Engineering Statistics, Federal Funds for Research and Development, "Appendix A. Technical Notes, Definitions" in Fiscal Years 2013–15, http://www.nsf.gov/statistics/2015/nsf15324/pdf/nsf15324.pdf, 314–15.

ing to natural sciences and engineering vs. social sciences and humanities. E.g., 4.0 means that there is exactly a four-fold difference, with four times more funding going to natural sciences and engineering.

TABLE 3. • *Share of academic research and development expenditures, by country and field, percent distribution.*

Country / Field	*U.S. (2007)*	*Japan (2006)*	*Germany (2002)*	*Russia (2007)*	*Canada (2005)*	*Taiwan (2006)*	*Spain (2006)*	*Australia (2006)*	*Sweden (2005)*
Natural sciences and engineering	91.2%	67.4%	78.8%	81.4%	80.3%	86.3%	63.1%	74.0%	78.9%
Social sciences and humanities	6.7%	32.6%	20.7%	18.6%	19.7%	13.7%	36.9%	26.0%	19.5%
Not classified	2.1%	NA	0.4%	NA	NA	NA	NA	NA	1.6%
NSE:SCH ratio	13.6	2.0	3.8	4.4	4.1	6.3	1.7	2.8	4.0

Source: National Science Board, "Chapter 4: Research and Development: National Trends and International Linkages," in Science and Engineering Indicators 2010, http://nsf.gov/statistics/seind10/pdf/c04.pdf. See full table in the Annex of the electronic version of this chapter (see the first note of this part) or Table 4-16 on p. 4-44 of the original report.

With an exclusive focus on the academic sector, there remains great variation. Yet, there seems to be a 'strong centre field', as four out of the nine country indicators fall between 4.4 and 3.8. This means that in half of the countries there is a four-fold between funds going to natural sciences and engineering and those spent on social sciences and humanities. Natural sciences and engineering can outspend social sciences and humanities from 1:1.7–2.0 (Spain and Japan, both data from 2006) to 1:13.6 (US, 2007). We should inquire further as to what can explain this great variance.

The share of social science spending in overall spending only gives a precursory insight into how social sciences do in terms of funding. The numbers comparing the various fields against each other might give the false impression that funds allocation is a zero-sum game, with an increase in one field meaning a decrease in another. This view would be mistaken also because the role of private sources cannot be adequately captured by a mere distributional logic. A more accurate comparison is, accordingly, to take the percentage relative to GDP, rather than to overall research and development spending.

3.2. Spending intensity: funding as measured against GDP

Spending intensity will show more clearly the national priorities in R&D spending. In addition, the absolute numbers should give us an idea about the comparative capabilities of the various areas. Table 4 shows, based on data from the OECD.Stat database, the absolute numbers (first data column, last year where data is available, in "PPP dollar, current prices" for comparison[16]) as well as this spending in percentage of the country's GDP ("spending intensity", second data column, by dividing the absolute number with the relevant GDP data). By way of comparison, data on the share of social science funding in all research and development spending, from 2011, as well as research and development spending as a percentage of GDP, from 2013, are also provided. (The dataset includes "total intramural" spending. Intramural means "all expenditures for R&D performed within [...] a sector of the economy", here including business, government, higher education and private non-profit funds.[17])

This table does justice to countries that, for whatever reason, largely outspend non-social science research and end up with a relatively lower social science vs. non-social science research spending ratio (Table 2), but still spend a relatively higher amount of money (in absolute numbers or in percentage of their GDP).

It is apparent that the share of social science spending in all R&D spending (the aspect that we earlier looked at, here you see these numbers in the third data column) does not need to be high to allow a high social science research spending in percentage of the GDP (second data column, in bold). As the example of Canada, Denmark, Korea or Slovenia shows, a relatively lower share of social sciences from overall research spending can go hand-in-hand with a high percentage of social science research spending against

[16] As the report of the National Science Foundation (US) notes on comparing R&D expenditures: "Comparisons of international R&D statistics are hampered by the lack of R&D-specific exchange rates. Two approaches are commonly used: (1) express national R&D expenditures as a percentage of gross domestic product (GDP), or (2) convert all expenditures to a single currency. The first method is straightforward but permits only gross comparisons of R&D intensity. The second method permits absolute level-of-effort comparisons and finer-grain analyses but entails selecting an appropriate method of currency conversion. The choice is between market exchange rates (MERs) and purchasing power parities (PPPs), both of which are available for a large number of countries over an extended period." National Science Board, "Chapter 4: Research and Development: National Trends and International Comparisons," in Science and Engineering Indicators 2014, http://nsf.gov/statistics/seind14/content/chapter-4/chapter-4.pdf, p. 4-17. I will use the purchasing power parities (PPP) approach as it gives a more accurate picture if we compare countries with largely varying price levels.

[17] For the full definition, see the Frascati Manual. Proposed Standard Practice for Surveys on Research and Experimental Development, OECD, 2002, 108, 6.2.1, para. 358.

TABLE 4. • *Social sciences research funding in absolute numbers and GDP ratios along with the share of social science research funding in all R&D expenditures (see also Table 1) and gross domestic R&D expenditures per GDP.*

Country (with the year of latest available data, for the first two data columns)	*Soc. Sci. research funding, $M (PPP dollars, current prices)*	*Soc. Sci. research funding intensity (Soc. Sci. spending / GDP that year, current prices, current PPPs)*	*Soc. Sci. share from all R&D spending, 2011*	*Gross Domestic Expenditures on R&D as a percentage of GDP, 2013*
Australia (2008)	1 440,362	0.17%	NA	NA
Austria (1998)	347,347	0.16%	NA	2.99%
Canada (2013)	2 217,817	0.15%	8.45%	1.62%
Chile (2012)	256,049	0.07%	19.12%	0.39%
Czech Republic (2012)	360,656	0.12%	7.28%	1.92%
Denmark (2011)	575,550	0.24%	8.04%	3.06%
Germany (1999)	2 493,895	0.12%	NA	2.85%
Greece (2011)	368,490	0.12%	18.55%	0.80%
Hungary (2012)	194,230	0.09%	9.27%	1.41%
Iceland (2009)	78,170	0.62%	NA	1.99%
Ireland (2011)	178,946	0.09%	5.68%	NA
Japan (2001)	5 543,944	0.16%	NA	3.47%
Korea (2013)	2 631,239	0.16%	3.94%	4.15%
Mexico (2003)	794,470	0.07%	NA	0.50%
Netherlands (2011)	2 186,750	0.28%	14.95%	1.98%
Norway (2012)	731,527	0.22%	14.46%	1.65%
Poland (2012)	816,015	0.09%	9.04%	0.87%
Portugal (2012)	655,685	0.23%	17.68%	1.37%
Slovak Republic (2013)	227,996	0.16%	16.07%	0.83%
Slovenia (2012)	123,345	0.21%	8.30%	2.59%
Spain (2002)	751,297	0.07%	NA	1.24%
Turkey (2013)	2 153,288	0.15%	16.39%	0.94%
United Kingdom (2012)	5 010,771	0.21%	NA	1.63%
Argentina (2012)	982,714	NA	18.44%	0.58%
People's Rep. of China (2007)	1 680,305	0.02%	NA	2.08%
Romania (2012)	167,475	NA	NA	0.39%
Russia (2013)	1 677,120	0.05%	4.19%	1.12%
South Africa (2011)	688,050	0.11%	14.79%	NA
Chinese Taipei (2013)	1 091,783	NA	3.92%	2.99%

Source: OECD.Stat, Dataset: Gross domestic expenditure on R-D by sector of performance and field of science, total intramural, 2011, PPP dollar, current prices (first two data columns); on Gross domestic product (GDP), PPP dollar, current prices (third data column); on Main Science and Technology Indicators (last data column). Data extracted on July 22, 2015, http://stats.oecd.org/Index.aspx?DataSetCode = GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

the GDP. This of course implies a higher overall research and development budget (last column). No clear geographic trend can be identified (note, again, the limited amount of countries covered), although it is easy to see that all of the countries with social science research spending intensity over 0.2% (of their GDP) are European countries. In other cases, like in China (0.02%), Russia (0.05%), Chile, Mexico, Spain (0.07%), the ratio remains below 0.1%. Some European countries, including Ireland, Poland and Hungary also fall in this category with 0.09%.

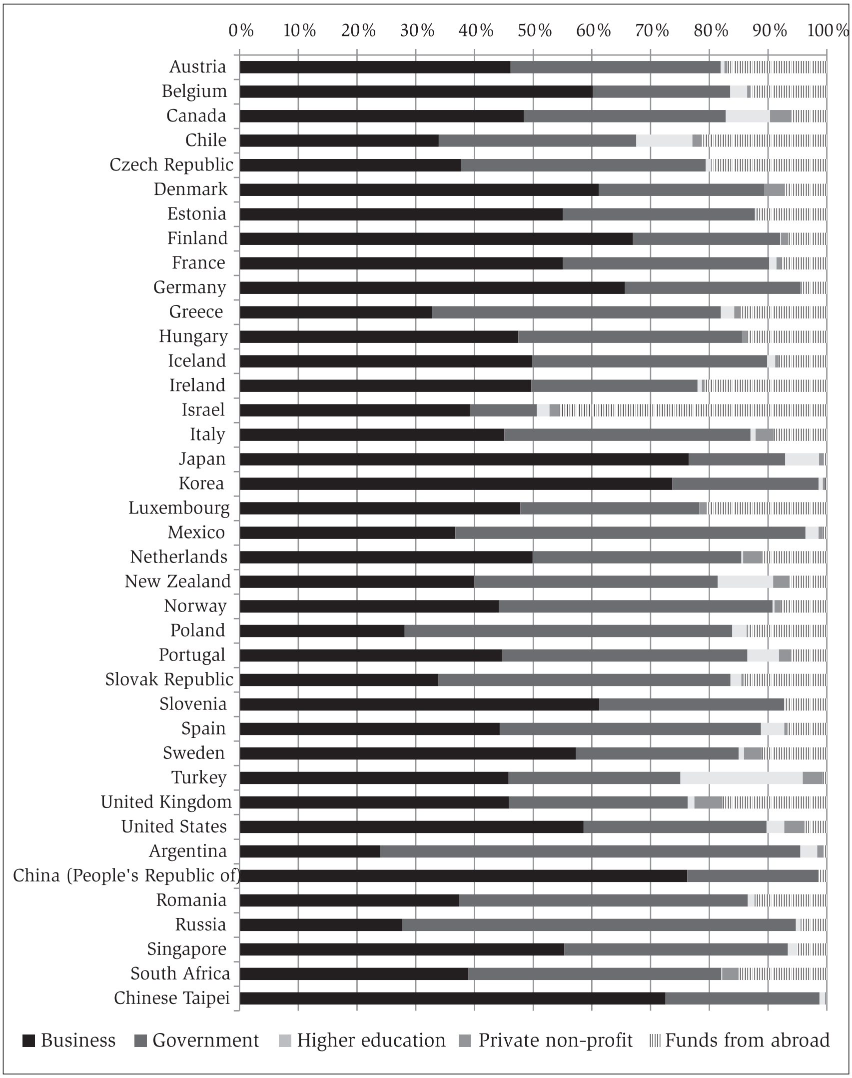
These numbers reflect more accurately the scale of social science funding in the respective countries, but it is still hard to see what can explain the huge differences. I can only indicate here that at least some of the differences between spending across scientific fields might be a result of the difference in wages in the various regions. The ratio of wage-related spending, which can greatly vary across countries, is high in social sciences and humanities. On the other hand, the price of equipment is more constant – often truly global, in the case of the most precious machinery, e.g., in cutting-edge research in physics or medicine. All this will result in varying ratios of funding, without accurately reflecting priorities and research opportunities. Further research should take account of this difference.

One explanation at hand that this chapter can look into is the different weight and priorities of the business sector in R&D spending. We can assess the role of various types of funders, from business to governmental and non-governmental sources.

3.3. Funding by sector

Let's first look at the ratio among the different sectors in various countries. Figure 2 takes OECD.Stat data by funding sectors: government, business, higher education and non-profit. These categories are available for funding from abroad in some countries, but considering the lower share of funding from abroad taken together, these numbers are merged into one "Funds from abroad" category. In EU member states, this usually translates into EU funds, e.g., in the UK, Austria, Belgium, Greece, Poland and Slovakia. In the case of non-EU countries with high level of funds from abroad, like Chile or Israel, detailed data is not available.

The list contains OECD countries first and non-OECD countries, where data is available, second (following alphabetical order in both cases).



Source: OECD.Stat, Dataset: Gross domestic expenditure on R-D by sector of performance and source of funds, PPP dollars – current prices, total intramural, 2011, Data extracted on August 1, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 2. • *Research and development spending by type of source.*

The almost generally decisive share of business and government spending is not surprising. There is great variation, however, in the share of these two sectors. Trying to answer our original question, concerning a possible relationship between the share of funding sectors and social science spending, we need to delve further into the data.

Table 5 takes data on the share of social sciences from all R&D spending, presented earlier in Table 2, and data that we just saw on the share of funding from the business sector, from countries where both figures are available, from 2011.

TABLE 5. • *Share of social sciences from all R&D spending and share of funding from the business sector, compared, 2011.*

Country	*Share of Social Sciences from all R&D spending*	*Business / Total intramural R&D funding source ratio*
Canada	8.45%	48.42%
Chile	19.12%	33.89%
Czech Republic	7.28%	37.68%
Denmark	8.04%	61.16%
Greece	18.55%	32.74%
Hungary	9.27%	47.46%
Ireland	5.68%	49.67%
Korea	3.94%	73.71%
Netherlands	14.95%	49.92%
New Zealand	14.46%	39.96%
Norway	9.04%	44.20%
Poland	17.68%	28.12%
Portugal	16.07%	44.72%
Slovak Republic	8.30%	33.85%
Sweden	16.39%	57.31%
Argentina	18.44%	23.93%
Russia	4.19%	27.68%
South Africa	14.79%	39.01%
Chinese Taipei	3.92%	72.53%

Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds and Gross domestic expenditure on R-D by sector of performance and field of science, both in PPP dollars – current prices, total intramural, 2011, Data extracted on July 22 and August 1, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

The greater share of business funding seems to account for some of the variation. Most of the top 'business funding' countries are mostly the ones with a lower share of social sciences spending. The two Asian countries on the list (Chinese Taipei and Korea) as well as Ireland are all with close or well above 50% in the share of business funding and a 4–5% share of social sciences spending. While countries like Poland, Greece, Argentina and

Chile are the countries with the lowest business funding, proportionately (around or below 30%) and they are also the countries with the highest share of social sciences spending (close or above 18%).

This either means that business funding drives away money from social sciences (the 'zero sum scenario') or, more plausibly, that business funding results in social sciences being outspent, without being decreased in absolute numbers or in proportion of the GDP. It seems that blaming the business sector for a lower share of money going for social sciences research would be a mistake. To see why, we should again take the GDP-percentage data and combine that with the share of business funding.

TABLE 6. • *Social sciences spending in the percentage of GDP (year indicated) and share of funding from the business sector, compared (2011).*

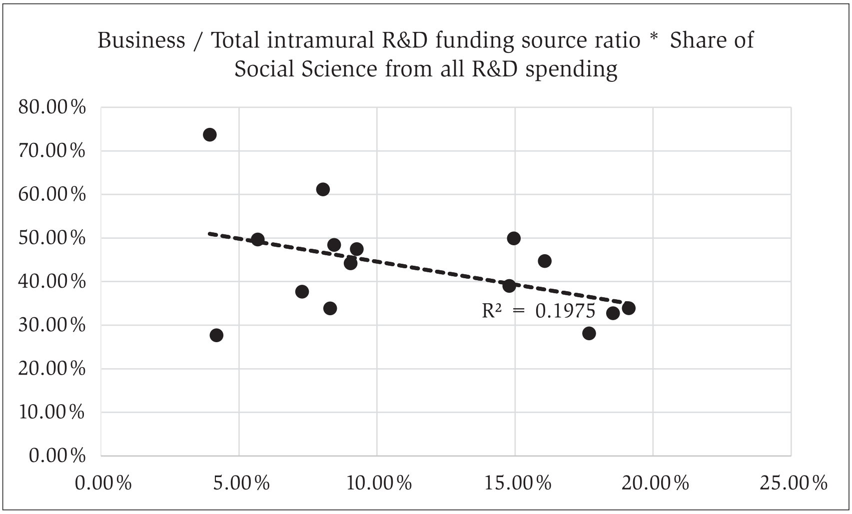
Country	*Social Sciences spending / GDP ratio ('intensity')*	*Business / Total intramural R&D funding source ratio (2011)*
Canada	(2013) 0.15%	48.42%
Chile	(2012) 0.07%	33.89%
Czech Rep.	(2012) 0.12%	37.68%
Denmark	(2011) 0.24%	61.16%
Greece	(2011) 0.12%	32.74%
Hungary	(2012) 0.09%	47.46%
Ireland	(2011) 0.09%	49.67%
Korea	(2013) 0.16%	73.71%
Netherlands	(2011) 0.28%	49.92%
Norway	(2012) 0.22%	44.20%
Poland	(2012) 0.09%	28.12%
Portugal	(2012) 0.23%	44.72%
Slovak Rep.	(2013) 0.16%	33.85%
Russia	(2013) 0.05%	27.68%
South Africa	(2011) 0.11%	39.01%

Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, Gross domestic expenditure on R-D by sector of performance and field of science, and Gross domestic product (GDP), all in PPP dollars – current prices, total intramural, 2011 (where not indicated), Data extracted on July 22 and August 1, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

Table 6 shows that higher share of business does not mean a lower share of social sciences research funding in the percentage of GDP. If anything, the larger share of funding coming from business might give a boost to research funding in general, and even if this falls disproportionately on fields other than social sciences (i.e. natural sciences, engineering, health sciences), this does not mean that social sciences are altogether disadvantaged.

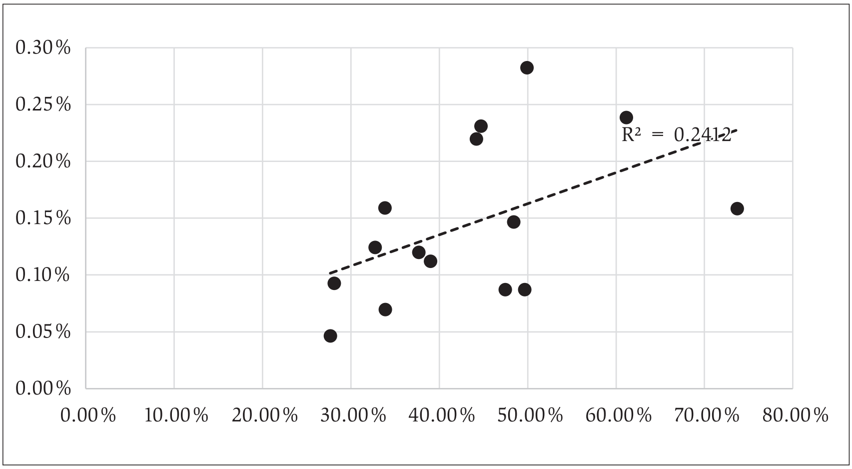
E.g., the two countries with the highest figures for social science spending intensity, Denmark and the Netherlands also have high share of business spending, whereas the two countries with the lowest social science spending intensity, Chile and Russia, this goes together with a low share of business spending.

Analyzing this (limited amount of) data (with 15 countries where all data is available) shows a negative linear correlation between the share of research funding from the business sector and the share of social sciences from among research and development funds (Figure 3). However, if we take the 'business' share and the overall share of social sciences research funding in percentage of the GDP, we find a positive correlation (Figure 4). (Note, in all cases, the weak statistical power due to the small sample size.)



Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, Gross domestic expenditure on R-D by sector of performance and field of science, and Gross domestic product (GDP), all in PPP dollars – current prices, total intramural, 2011, Data extracted on July 22 and August 1, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 3. • *R&D spending correlation: share of business sector (source, in percentage of total R&D spending) and share of social sciences (discipline, in percentage of total R&D spending).*



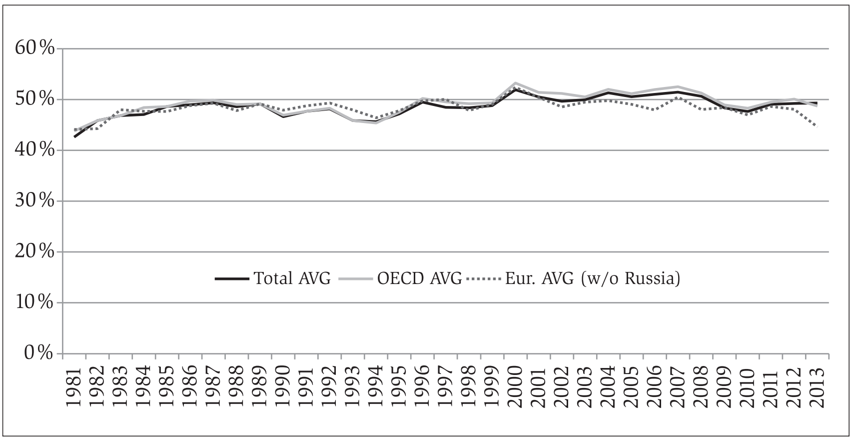
Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, Gross domestic expenditure on R-D by sector of performance and field of science, and Gross domestic product (GDP), all in PPP dollars – current prices, total intramural, 2011, Data extracted on July 22 and August 1, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 4. • *R&D spending correlation: share of social sciences (discipline, in percentage of GDP) and share of business sector (source, in percentage of total R&D spending).*

Figure 3 shows that there is indeed a negative correlation between the share of business funds and the share of social sciences from overall funds if we take the percentage share against all R&D spending. The higher the share of business funding, the more likely it is that we see a lower percentage of all spending going for research and development financing social sciences. This should not come as a surprise, considering the preference of business funding for fields like natural sciences and engineering. This is also not too informative if we accept the increase of social sciences spending *as percentage of the GDP* as an overall goal. If we shift our focus accordingly and look at the percentage of social sciences spending against total GDP (Figure 4), we find a positive connection. This shows that it is a false first impression that social sciences are disadvantaged by the business sector.

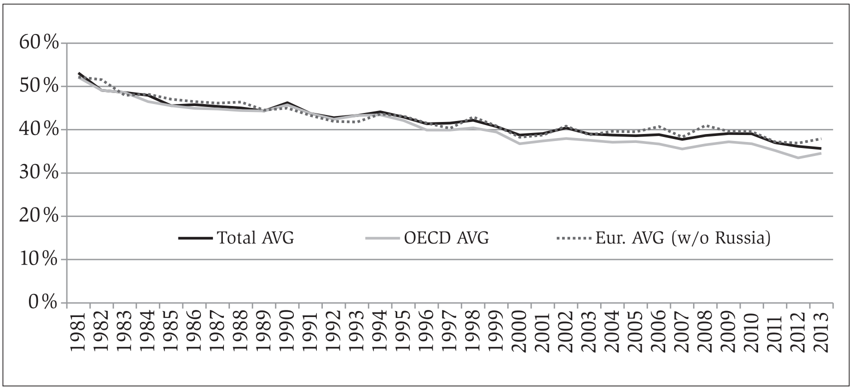
The important conclusion is that while more business spending decreases the share of social sciences from all R&D spending (i.e. relatively), it also tends to go hand-in-hand with more funds for social sciences in absolute terms or, rather, in the percentage of GDP. Using percentage of the GDP as a baseline should make the comparison more informative. Using absolute numbers would raise both the problem of the huge differences between countries that are richer and those that are poorer, and the problem of the lack of exchange rates specific to R&D spending, see earlier. (For detailed data and a confirmation that the share of social sciences spending per all R&D spending decreases with more overall R&D spending in percentage of the GDP, see supporting tables in note 14.) More funding from the for-profit sector is more likely to go hand-in-hand with higher levels of social sciences spending (in percentage of the GDP) as well, together with more spending for other fields like natural sciences, engineering and health sciences. These increases remain of course stronger, and there is an evident connection between more business spending and a bigger overall R&D budget per GDP.

Examining the role of business funding is often seen as of primary importance because of its growing role. E.g., it is common to point out the responsibility of governments to counterbalance the impact of business funding on the growing importance of applied research as opposed to basic research and a growing preference for areas like health sciences, natural sciences or engineering. Concerning the thesis of the growing role, Figure 5 shows that there has not been a considerable growth of the share of the input of the business sector, for the last 25 years, neither globally (based on data from 41, not all country data covering the entire time period), nor regionally, if we limit our focus to European (without Russia or Turkey) or OECD countries.



Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, in PPP dollars – current prices, total intramural, Data extracted on August 3, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

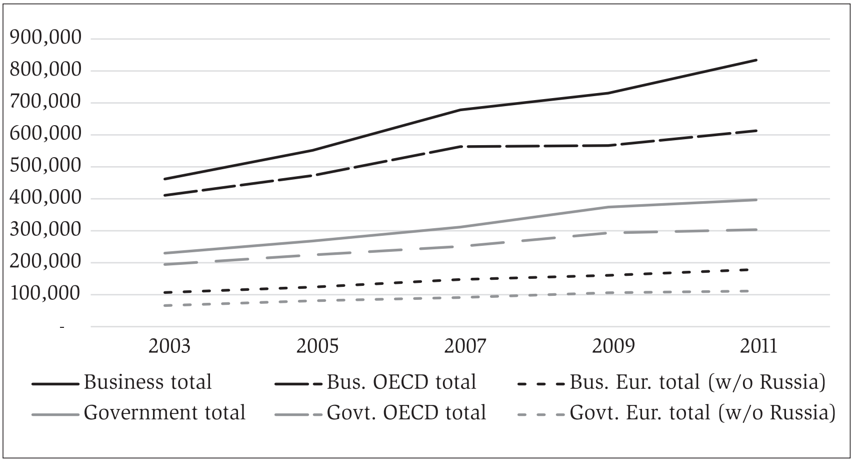
FIGURE 5. • *Share of the business sector from all R&D spending, 1981–2013.*



Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, in PPP dollars – current prices, total intramural, Data extracted on August 3, 2015, http://stats.oecd.org/Index.aspx?DataSetCode = GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 6. • *Share of the government sector from all R&D spending, 1981–2013.*

Figure 6 also shows that there is a constant decline in the share of government funding. Before we continue our inquiry into the causes let's take a brief look at the impact of the crisis.



Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, in PPP dollars – current prices, total intramural, Data extracted on August 3, 2015, http://stats.oecd.org/Index.aspx?DataSetCode = GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 7. • *Government and business sectors R-D spending in PPP dollars, current prices, selected years, three groupings of countries (country list excluding Australia and Switzerland for lack of data).*

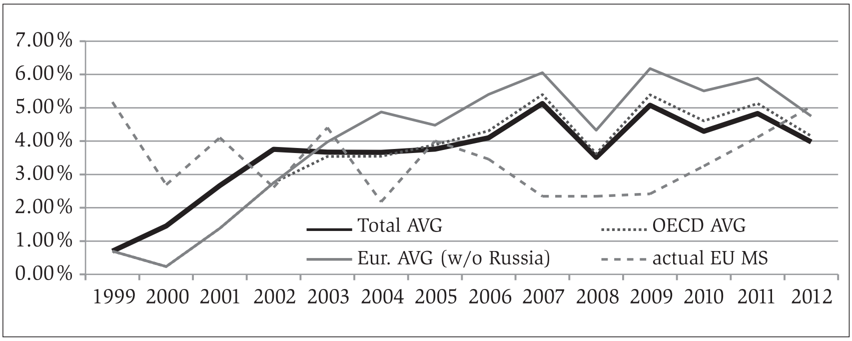
The absolute numbers (Figure 7) show that business spending stagnated in the years of the crisis (here the number for 2009), again rising by 2011 – and most of the growth comes from outside the OECD, most importantly from China. (Their increase of 38% from 2009 to 2011 is an important boost to the total in absolute numbers.) There seems to be some delay with government spending where there is still rise for 2009, but total spending is almost constant after 2009.

We have been witnessing a constant decline in the share of government funding. What can explain this phenomenon, if not business? Could it be other than the change in the general political atmosphere around funding scientific research? From among other sources, we find the most important increase in the share of funding from abroad, from 2.61–2.81% to 10.40–12.66%, with the higher shares in Europe. In most part, this translates into an increase in another type of 'government' spending, support from the European Commission, above 5% on average in member states (in 2012), with a slightly lower share of foreign business sources, from what the somewhat sporadic data can tell. Figure 8 shows the average share of foreign business spending in three groups of countries: all countries where data is available, European countries, without Russia, and OECD countries. As a fourth line, the share of R&D spending from the European Commission is added, only including data from countries that were EU members in the relevant year. The quite sporadic data might account for the sudden decrease in 2008, but even this limited data shows the growing share of foreign business spending as a clear trend, with some backlash after the crisis. The share of European Commission funding largely follows this in the sense that the decreasing share of business funding comes with the growing importance of European funds.

The European integration might mean that the importance of funding from abroad, both from business and the European Commission, will be growing. The trends for domestic sources are clearer from the available data: the share of government funding slowly decreases, with a change of trend after the crisis. The role of the business sector remains important, but there is neither a considerable trend towards growing importance, nor a clear decrease of its share.

A 2011 OECD study focusing on public research institutions reveals that the share of the business sector in funding such institutions is higher than what general statistics based on the Frascati Manual (see earlier, right column of Table 1) suggest. For public research institutions, then, there seems to be a move towards industry that goes together with a growing preference for applied research.[18] This in turn confirms the second concern raised

[18] OECD: *Public Research Institutions. Mapping Sector Trends* (Paris: OECD Publishing 2011), especially Chapter 2: A Statistical View of Public Research Institutions, p. 25–54.



Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and source of funds, in PPP dollars – current prices, total intramural, Data extracted on August 3, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

FIGURE 8. • *Share of foreign business spending (3 groups of countries) and share of European Commission funding in EU member states at the time, 1999–2012, in both cases based on percentage of all R&D spending.*

in the beginning of this subchapter, on the disparate impact of business spending on basic research.

As the ability of policy-makers to influence business decisions is limited, especially if it relates to changing priorities towards social sciences or basic research, government action in this area can seek to make up for the missing funds and spend taxpayers' money where private funds are less likely to flow, possibly also going hand-in-hand with an undesired impact on research priorities or wider social issues like the gender gap. These are all reasons to stress the responsibility of governments in this respect.

Here we will not look into the role played by governments to foster basic research (more than applied research), but will conclude this section comparing the share of business and government sectors by an overview of the share of the two in funding across fields of sciences. As indicated earlier, many countries do not provide data based on fields of sciences. As a result, trends or ratios indicating the share of natural sciences and engineering and social sciences and humanities, combined with the share of government and business funding, might not be entirely reliable and serve more as an indication, especially if we divide the two fields even further. With this caveat, from the most recent year where data is available for most countries, 2011, the share of government and business funding by fields of sciences looks as follows (Table 7).

TABLE 7. • *Share of all R&D funding, by field of sciences and the two main sectors, 2011.*

Field of Sciences / Sector	*Government*	*Business*
All fields of science	14.97%	57.59%
Natural sciences and engineering	16.36%	57.16%
Natural Sciences	29.77%	36.14%
Engineering and technology	9.45%	71.93%
Medical and Health sciences	21.10%	30.81%
Agricultural Sciences	38.17%	26.33%
Social sciences and humanities	23.52%	12.02%
Social Sciences	21.79%	14.78%
Humanities	28.69%	10.22%
Not elsewhere classified	23.51%	13.44%

Source: OECD.Stat, Datasets: Gross domestic expenditure on R-D by sector of performance and field of science, in PPP dollars – current prices, total intramural, Data extracted on September 2, 2015, http://stats.oecd.org/Index.aspx?DataSetCode=GERD_SCIENCE#, Joint OECD-Eurostat international data collection on resources devoted to RD, last updated April 2015.

Most OECD countries provide data by sector, which makes the first data row more reliable than the others. This shows that the business sector outspends the government sector 1 to 4. This follows a similar trend than the total numbers for natural sciences and engineering (16% for government and 57% for business), also reflecting the decisive share of this field in overall R&D spending. There is more variation if we look at the various subfields, again with the caveat that many countries do not provide data at this level of detail. The available data show, on the other hand, a higher percentage of government spending for social sciences and humanities, 23.5%, and a considerably lower, but still important share of the business sector, around 12%.

The limitation of internationally comparable data suggests that at this level of detail, we should look at the actual funding bodies, at the national or regional level. Accordingly, we will continue our exploration with the share of scientific fields in the funding practice of bodies behind the 'government spending' label, using taxpayers' money, like the US National Science Foundation, the UK Research Councils or the European Commission.

3.4. Data from individual countries and the European Commission

Looking behind the numbers requires a more thorough examination of the research and development field of the countries in question, and we should consider the decisions of the funding bodies. Within the scope of the present chapter it is only possible to indicate some trends in some of the most important countries.

The US is the leading country in terms of funds spent on research and development, accounting for almost 30% of global spending in 2011, so I will start with this country. By way of comparison, the share of European Union countries was 22% in 2011 (26% in 2001). The leading three countries altogether cover more than half of the global R&D spending: US, China and Japan with shares of 30%, 15%, and 10% respectively in 2011.[19]

The federal government's research spending is heavily leaning towards the life and physical sciences and engineering (altogether 78.8%), with social sciences only accounting for 2.1% of the research budget that is, in absolute numbers, globally the largest.

TABLE 8. • *US federal obligations for research, ratio of various scientific fields, 2011.*

Field	*Percentage of federal obligations for research, 2011*
Environmental sciences	5.4%
Life sciences	51.9%
Mathematical and computer sciences	5.6%
Physical sciences	9.5%
Psychology	3.3%
Social sciences	2.1%
Other sciences (not classified)	4.8%
Engineering	17.4%
Total	100%

Source: National Science Board, Science and Engineering Indicators 2014, Table 4-37.

The total federal obligation amounts to $58,167M, out of which $1,222M goes to social science research. The total 2011 US research funding totalled at $424.4B, 69% of which came from the business sector. Both government sources and funding from business fluctuated roughly with the same tendency, putting research and development funds at around 2.6 to 2.9% of the GDP from 2001 to 2011.[20]

If we only look at funds distributed through the National Science Foundation, social sciences account for 4% of the total (Table 9). This is half of the budget that the relevant UK bodies spend to Social Sciences and Hu-

[19] National Science Board, "Chapter 4: Research and Development: National Trends and International Comparisons," in Science and Engineering Indicators 2014, http://nsf.gov/statistics/seind14/content/chapter-4/chapter-4.pdf, p. 4-4.

[20] National Science Board, "Chapter 4: Research and Development: National Trends and International Comparisons," in Science and Engineering Indicators 2014, http://nsf.gov/statistics/seind14/content/chapter-4/chapter-4.pdf, p. 4-4.

manities combined (Economic and Social Research Council and Arts & Humanities Research Council), with 5 + 3%. (Table 10, data from both tables is from 2011)

TABLE 9. • *US National Science Foundation funds distribution by field of research, 2011.*

Field of research	*Amount*	*% of total*
Biological Sciences	511	13
Computer & Information Science & Engineering	457	11
Engineering	548	14
Geosciences	636	16
Mathematical & Physical Sciences	940	24
Social, Behavioral & Economic Sciences	178	4
Other Programs	728	18
Cyberinfrastructure	151	4
International Science & Engineering	35	1
Polar Programs	355	9
Other	188	5

Note: The amounts are in millions of euros. 2011 average exchange rate USD/EUR: 0.7188.

Source: Full-year Appropriations Bill Passed, NSF Funded at $6.8 Billion for FY 2011, NSF Congressional Highlight, National Science Foundation, May 23, 2011, http://www.nsf.gov/about/congress/112/highlights/cu11_0523.jsp. Table in: Source: Ryanne van Dalen, Sultan Mehmood, Paul Verstraten, Karen van der Wiel, Public funding of science: An international comparison, CPB Netherlands Bureau for Economic Policy Analysis, CPB Background Document, March 2014, http://www.cpb.nl/sites/default/ files/publicaties/download/cpb-background-document-march-2014-public-funding-scienceinternational-comparison.pdf, p. 99, Table 9.9.

TABLE 10. • *UK Research Council funds by scientific field, 2011.*

	2011	*% of total*
Engineering and Physical Sciences Research Council	854	26
Medical Research Council	672	20
Science & Technology Facilities Council	542	16
Biotechnology and Biological Sciences Research Council	488	15
Natural Environment Research Council	417	13
Economic and Social Research Council	180	5
Arts & Humanities Research Council	99	3

Note: The amounts are in millions of pounds.

Source: Ryanne van Dalen, Sultan Mehmood, Paul Verstraten, Karen van der Wiel, Public funding of science: An international comparison, CPB Netherlands Bureau for Economic Policy Analysis, CPB Background Document, March 2014, http://www.cpb.nl/sites/default/files/publicaties/download/cpb-background-document-march-2014-public-funding-scienceinternational-comparison.pdf, p. 88, Table 8.5.

Staying with the UK, if we look at how research funds going to universities are distributed among the various disciplines (now combining all, not only government sources), we see that the share of arts, humanities and social sciences goes up to 20% (with social sciences proper at 14%). (Table 11)

TABLE 11. • *Research grants and contracts to UK universities, estimated value, 2010-11, by type of donor and discipline area.*

Source of funding (in £ millions)	*Creative Arts and Design*	*Humanities*	*Social Sciences*	*Science, Technology, Engineering, and Maths*	*All Disciplines*
Quality-related (QR) research funding from HEFCE	78	135	312	1 033	1 558
Government research councils	14	45	138	1 428	1 625
Total internal government	92	180	450	2 461	3 183
Total as percentage (%)	3	6	14	77	1
UK civil society	2	19	53	838	912
UK government	6	4	144	622	776
Government outside the UK	4	6	90	293	393
UK industry	3	1	47	224	275
Other sources	2	4	37	111	154
Industry outside the UK	–	–	15	122	137
Civil society outside the UK	1	3	15	106	125
Total external funding	18	37	401	2 316	2 772
Total as percentage (%)	1	1	14	84	1
Total for all internal and external sources	110	217	851	4 777	5 955
Percentage of total grants and contracts	2	4	14	80	1

Source: HESA Statistics, 2010?11. Table in: Simon Bastow, Patrick Dunleavy, Jane Tinkler, The Impact of Social Sciences, How academics and their research make a difference, Sage, 2014, http://www.uk.sagepub.com/upm-data/59598_Bastow__Impact_of_the_social_sciences.pdf, p. 11, Figure 1.6.

Note: Data for Quality-related (QR) research funding is for 2012?13. Data for is taken from the most recent available year, 2010?11, and includes all funding from Medical Research Council, Engineering and Physical Sciences Research Council, Biotechnology and Biological Sciences Research Council, Economic and Social Research Council, Natural Environment Research Council, Science & Technology Facilities Council, and Arts & Humanities Research Council, plus the Royal Society, British Academy and the Royal Society of Edinburgh.

In Denmark, one in every four euros (krones) of public sector research spending goes to social sciences and humanities (the exact ratio is 24.7%, see Table 12). This should be compared to the fact that Denmark has a high share of business sector funding 61.16% and a relatively lower social science spending ratio, in the overall R&D spending, of 8.04% (data from 2011, see Table 5 above).

TABLE 12. • *R&D expenses in the public sector by field of research, Denmark, 2011.*

Field of research	*Amount*	*Percentage*
Natural sciences	487,8	20,0
Technical sciences	329,4	13,5
Health sciences	854,3	35,0
Agricultural and veterinary sciences	164,6	6,8
Social sciences	418,4	17,2
Humanities	183,0	7,5
Total	2 437,5	100,0

Note: The amounts are in millions of euro (current prices). 2011 average exchange rate DKK/EUR: 0.134.

Source: Source: Statistics Denmark website. Table in: Ryanne van Dalen, Sultan Mehmood, Paul Verstraten, Karen van der Wiel, Public funding of science: An international comparison, CPB Netherlands Bureau for Economic Policy Analysis, CPB Background Document, March 2014, http://www.cpb.nl/sites/default/ files/publicaties/download/cpb-background-document-march-2014-public-funding-scienceinternational-comparison.pdf, p. 78, Table 7.4.

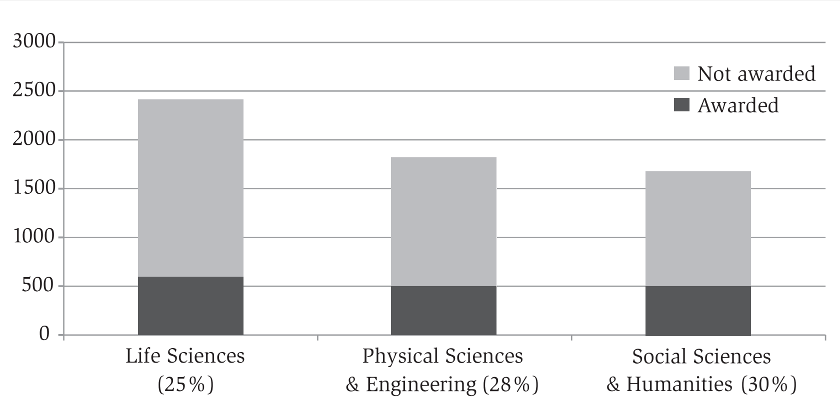
The Hungarian Scientific Research Fund (OTKA) – that recently ceased to exist as a separate entity, as a result of centralization, see the relevant chapter in this volume – applied a pretty constant ratio that put Social Sciences and Humanities at 22–24% of the funds (Table 13). This is exactly the ratio that the OECD data shows for average government spending ratio for these fields: 23.52% (from all R&D government funding, 2011; see earlier, Table 7).

TABLE 13. • *Share of scientific fields from funds distributed by the Hungarian Scientific Research Fund.*

	Life Sciences	*Physical Sciences & Engineering*	*Social Sciences & Humanities*
2011	44.0%	32.0%	24.0%
2012	45.0%	33.0%	22.0%
2013	44.9%	32.0%	23.1%

Source: OTKA Annual Report 2013 http://otka.hu/download?file=dd530de6af5a95b7c369f1f648814dc3.pdf, p. 12; OTKA Annual Report 2012 http://otka.hu/download?file=fa2682f0819b13b8fbe6c55878b80272.pdf, p. 14; OTKA Annual Report 2011 http://otka.hu/download?file=b645c49fafb40013b75a0bf5fe6eacdc.pdf, p. 29.

The data also shows that the success rates by fields fall between 25 and 30%, and it is slightly more likely for applications in the Social Sciences and Humanities field to succeed (Figure 9).



Source: European Science Foundation, Organisational Evaluation of the Hungarian Scientific Research Fund (OTKA), Evaluation Report, November 2014, http://www.esf.org/uploads/media/otka_evaluation_01.pdf, p. 21, Data calculated from Table 2. Application overview by gender and research programme activity, 2009-2013.

FIGURE 9. • *Applications success ratio by fields of sciences, Hungarian Scientific Research Fund, 2009-2013 (with the percentage of successful applications).*

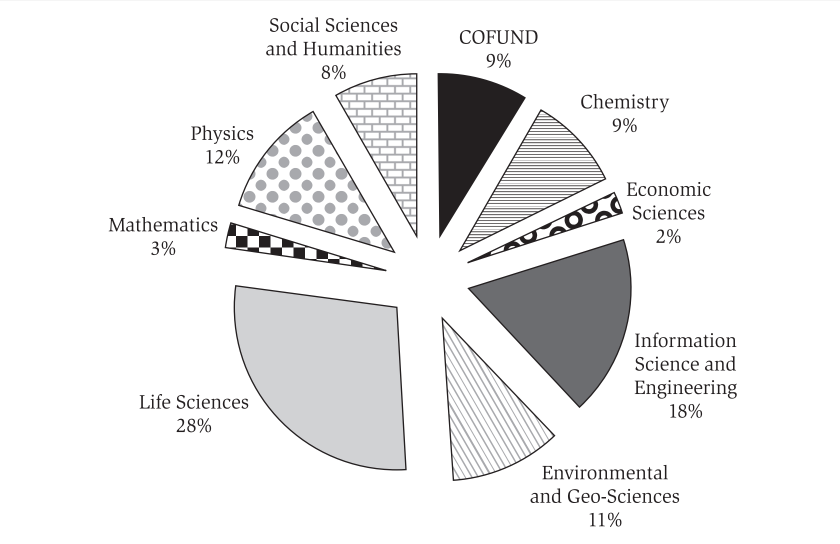
We have seen earlier that funds 'from abroad' are in some countries an important part of the picture. We also saw that in the EU member states an important part of these funds come from the European Commission, which makes it an important player in defining how resources become available among the various disciplines. The European Research Council (ERC) publishes data on the applications received that is indicative of the relative size of the fields in Europe, at least their ability and capability to apply for ERC funds.

TABLE 14. • *Share of three main scientific fields from ERC grant submissions.*

	Physical Sciences and Engineering	*Life Sciences*	*Social Sciences and Humanities*	*Total*	*Physical Sciences and Engineering*	*Life Sciences*	*Social Sciences and Humanities*
(indicative budget / awarded, € million)	*percentage*			*No. of submissions*			
2011 ERC Starting Grant, submissions (661 / more than 670)	41 %	35 %	23 %	4,080	1,690	1,440	950
2012 ERC Starting Grant, submissions (730 / more than 790)	43 %	35 %	22 %	4,741	2,058	1,653	1,030
2011 ERC Advanced Grant, submissions (661 / about 700)	40 %	35 %	25 %	2,284	917	789	578
2012 ERC Advanced Grant, submissions (680 / about 720)	42 %	34 %	24 %	2,304	978	773	553
2011 ERC Proof of Concept, eligible for evaluation, first and second deadline (indicative budget: 10)	58 %	34 %	8 %	N/A			
	61 %	34 %	5 %				

Sources: European Commission, Report from the Commission to the Council and the European Parliament on the European Research Council's operations and realisation of the objectives set out in the Specific Programme "Ideas" in 2011 COM(2012) 297 final, Brussels, June 19, 2012, http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri = CELEX:52012DC0297&from = EN, p. 3-4; European Commission, Fifth FP7 Monitoring Report, Monitoring Report 2011, August 29, 2012, http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/fifth_fp7_monitoring_report.pdf, p. 53-54; European Commission, Sixth FP7 Monitoring Report, Monitoring Report 2012, August 7, 2012, http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/6th_fp7_monitoring_report.pdf, p. 52.

Based on data from ERC submissions, the share of social sciences is around 22–25 %, with considerably lower share for Proof of Concept submissions that are adjacent to other funds and that has a considerably lower budget size. Moving on to the actual awards, statistics on the distribution of funds from the Marie Curie Action show that social sciences and humanities, combined with economic sciences, have a share of 10 % (Figure 10, based on funded projects before 2012).



Source: European Commission, Fifth FP7 Monitoring Report, Monitoring Report 2011, August 29, 2012, http://ec.europa.eu/research/evaluations/pdf/archive/fp7_monitoring_reports/fifth_fp7_monitoring_report.pdf, p. 59, Figure 34.

FIGURE 10. • *Marie Curie Actions budget distribution per scientific panel, shares based on projects funded by the end of 2011.*

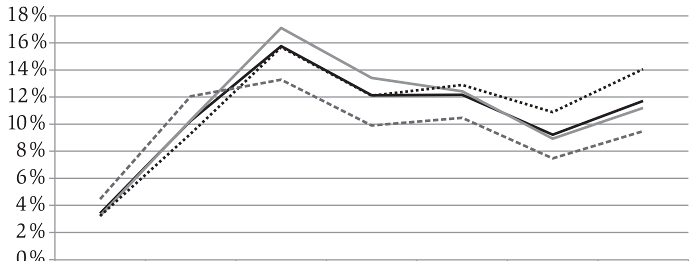
ERC statistics are available based on three domains, both on evaluated and granted proposals. Table 15 compares the share of evaluated and granted projects across scientific domains. This shows that the share of social sciences and humanities from successful projects is slightly lower than what the share of submissions would suggest (19% against 22–23% from 2010 to 2014).

TABLE 15. • *ERC funding distribution by domain, 2007 and 2009–2015.*

	2007	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*
Physical Sciences & Engineering, evaluated	48%	45%	42%	41%	44%	45%	45%	44%
Physical Sciences & Engineering, granted	46%	45%	46%	46%	45%	44%	43%	N/A
Life Sciences, evaluated	37%	37%	35%	35%	35%	32%	32%	32%
Life Sciences, granted	35%	33%	35%	35%	37%	38%	38%	N/A
Social Sciences & Humanities, evaluated	15%	18%	22%	23%	22%	23%	23%	24%
Social Sciences & Humanities, granted	19%	22%	19%	19%	19%	19%	19%	N/A

Source: European Research Council, Statistics, http://erc.europa.eu/projects-and-results/statistics, data downloaded on August 3, 2015.

This also means that the 'efficiency' rate of submissions in the social sciences and humanities field remains lower than the average or the rate for the two other domains, as can be seen from Figure 11.



	2007	2009	2010	2011	2012	2013	2014
Total efficiency	3 %	10 %	16 %	12 %	12 %	9 %	12 %
PE efficiency	3 %	10 %	17 %	13 %	12 %	9 %	11 %
LS efficiency	3 %	9 %	16 %	12 %	13 %	11 %	14 %
SH efficiency	4 %	12 %	13 %	10 %	10 %	7 %	9 %

Source: European Research Council, Statistics, http://erc.europa.eu/projects-and-results/statistics, data downloaded on August 3, 2015.

FIGURE 11. • *The ratio of successful ERC submissions ('efficiency') across the three domains (PE: Physical Sciences & Engineering, LS: Life Sciences, SH: Social Sciences & Humanities), 2007 and 2009 – 2014.*

The more or less constant share of the various fields of sciences in the practice of several funding bodies raises questions about how funds are distributed across scientific fields, what is the logic of distribution. While it is easy to see how qualitative criteria is used to select projects worthy of funding within specific scientific areas, it is harder to rely on individual assessment if we want to decide if a physics project on atomic structures is 'better or worse' than a sociological study dealing with the effects of an aging society. It would go beyond the scope of present chapter – and is thus an area for further research – to compare the practices of funders, both on the national and on the international level, how they decide on allocating money and how that influences the share of social sciences funding. As funders from the industry and charities usually have predefined goals that narrow their focus, it is especially important to bear in mind the responsibility of larger public funders and the role they can play in shaping national research scenes by thinking strategically about funding. With an emphasis on notions like 'excellence', 'impact' or 'social benefits', debates around funding and scientific fields tend to centre around arguments on some inherent differences in how scientific research in the different disciplines contribute to wider social goals. The concluding section will look into these questions, with a focus on social sciences, heavily building on the debates in the UK as a country where these issues have been addressed quite extensively.

4. ASSESSING THE IMPACT OF SOCIAL SCIENCES IN THE CONTEXT OF FUNDING

4.1. Debating the 'output', 'impact', 'value', 'worth', 'benefit' or 'use' of scientific research

In search of the raison d'être of social sciences, it has become unavoidable to address the question of what use these disciplines have and what justifies funding research in these areas. Emilia Aiello and Mar Joanpere argue that this approach is simply about finding our way back to what social sciences are about, as set out by pioneers like August Comte, Emile Durkheim and Max Weber.[21] One way to reflect on the 'output', 'impact', 'value', 'worth', 'benefit' or 'use' of social sciences and humanities is to look at the type of challenges that donors seek to resolve through distributing funds in this area. To cite titles in a recent edition of the (UK) Academy of Social Sciences,[22] these can include parenting and child development, health and well-being, the social challenges of climate change, recycling economies, poverty and inequality, financial stability and sustainable growth, food security and rural life, family and marriage, crime and policing, the Arab Spring, international migration. The European Commission publishes calls around widely defined challenges, and applicants need to demonstrate that the academic fields present in the submission are in fact capable of dealing with those questions in a meaningful way. Trying to capture the wider impact of research, the UK Arts and Humanities Research Council talks about contribution to 'civil capital' or enhancing the 'knowledge base' of society, informing public debates. Scientific advances themselves stimulate new ethical debates, requiring more research into the possible social impact on technological improvements, e.g., in the field of genetics.

Very generally speaking, the role of social sciences could be summed up by the goal of understanding complex social phenomena, from the highest, global level to the level of individuals. A more elaborated expression of this

[21] Emilia Aiello and Mar Joanpere: "Social Creation. A New Concept for Social Sciences and Humanities" *International and Multidisciplinary Journal of Social Sciences* 2014/3. 299–300.

[22] Jonathan Michie and Cary Cooper (eds.): *Why the Social Sciences Matter* (London: Palgrave Macmillan 2015).

contribution from the Russell Group (the UK's 'Ivy League') argues that research in social sciences and humanities can bring about policy shifts that in turn contribute to the development of democratic societies:

> The broader contribution which research makes to a 'civilised' society, from exploring questions on the origin of our species and our universe to pondering the models of a successful multi-cultural society, is undoubtedly vast. Through exploring our cultural norms and researching their history, basis and role in society, research has led social debates on our ethical values, making a vital contribution to fundamental shifts in attitudes and policy and promoting a stable and progressive society …. Human rights research is one such area that exemplifies links between research and the tenets which underpin a modern democratic society. Research in law, social sciences and philosophy undertaken by the UK's research-intensive universities has been integral to the development of human rights legislation within the UK, Europe and around the world.[23]

These are all questions that require policy responses, an adequate design of which requires scientific understanding. This is not to say that social science research would fulfil this goal by default, it is rather an expectation to be assessed. Finally, the goal of understanding should be seen in light of the aspiration to improve certain aspects of social life. It seems natural that funders increasingly stress the importance of research impact, see, e.g., the debate around the distribution and cuts of H2020 programmes. The FP7-funded project IMPACT-EV uses the terms dissemination (others get to know), transfer (actual application), impact (implying social improvement) and a new concept, 'social creation' (transforming society regardless of the means of conveying the message, thus a painting or a poem can qualify as much as a 'proper' publication).[24]

The widely discussed new UK system called Research Excellence Framework rests on three elements, one is academic impact ('output', with a 65% weight), the other is social, economic and cultural impact ('impact', 20%) and the third is the impact on sustaining the research environment ('envi-

[23] Russell Pioneering Research Group: "The social impact of research conducted in Russell Group universities" *Russell Group Papers* 2012/3. http://www.russellgroup.ac.uk/uploads/SocialImpactOfResearch.pdf. 27, para. 3.10.

[24] Evaluating the impact and outcomes of EU SSH research (2014-2017), http://impact-ev.eu/.

ronment', 15%).[25] The LSE Policy Group published a handbook on 'Maximising the Impacts of Your Research: A Handbook for Social Scientists[26]) that goes beyond the debate whether social science research has an impact and helps to understand how a particular research could have (more) impact.

What should be clarified upfront is what research impact is and how it should be measured. There seems to be a general understanding, even consensus that funds should be distributed according to 'quality' (based on 'excellence'), 'impact', 'output', 'result'. There is less agreement on what these mean in fact and how to measure these and who should be involved. While a funder with a smaller influence on research in general can disregard how the conditions set will influence academic research, larger donors like governments and national scientific funding bodies have a recognized responsibility in assessing how their behaviour will influence the national, or even international, academic space. Add to all this that it is extremely hard to find reliable and operationalizable standards that would tell how to distribute funds across the various fields of sciences, e.g., what ratio should go to natural sciences and what should social sciences get.

The Research Councils UK differentiates, for its own funding purposes, between academic, and economic and societal impacts. The latter is 'the demonstrable contribution that excellent research makes to society and the economy' including 'all the extremely diverse ways in which research-related knowledge and skills benefit individuals, organisations and nations' that can happen through economic benefits, increasing effectiveness, or 'enhancing quality of life, health and creative output'.[27] However, it should be recognized that impact in the social sciences might not be easily measured by the metrics most widely used, including "job creation, patents, or spin-outs".[28] There is a pay-off between the straightforward tools of showing impact and how far these can go in demonstrating the actual scope of social and economic impact. It can prove to be especially burdensome to go after a fuller impact of social science research, an attempt that seeks to do more justice to social sciences, and also research in general. It is thus not surprising that many national reports only include numbers of more direct economic impact, as in the US debate on the 2009 economic stimulus pack-

[25] Research Excellence Framework, Assessment framework and guidance on submissions, July 2011, updated January 2012, http://www.ref.ac.uk/media/ref/content/pub/assessmentframeworkandguidanceonsubmissions/GOS%20including%20addendum.pdf. 6., para. 25.

[26] LSE Public Policy Group: *Maximising the Impacts of Your Research: A Handbook for Social Scientists, Consultation Draft* 3, April 2011, http://www2.lse.ac.uk/government/research/resgroups/LSEPublicPolicy/Docs/LSE_Impact_Handbook_April_2011.pdf.

[27] Research Councils UK, Typology of Research Impacts, updated March 2011, http://www.rcuk.ac.uk/RCUK-prod/assets/documents/impacts/TypologyofResearchImpacts.pdf.

[28] Russell Pioneering Research Group (n 23) 21, para. 2.30.

age, where the impact of research was measured based on job creation data.[29] The Dutch and the New Zealand systems are more inclusive, reaching beyond (internal) research excellence, focusing on wider impact. The Australian Research Quality Framework attempted to extend the understanding of research impact considerably. This also meant that there should be an agreement on what to measure and how, if one wants to see the social, economic, environmental and cultural side of research impact. The failure to find such an agreement also meant the end of the experiment and the Research Quality Framework.[30]

One widely debated example for funding research is the UK system that distributes recurring research funds ('block grants' in addition to specific grants by research councils, the EU etc.[31]) in higher education based on a four-step process, through the Higher Education Funding Council for England (HEFCE). Here a quality-driven classification in steps 1 and 2 is followed by steps 3 and 4 that divide funds across (broader) subject areas (called 'units of assessment') and individual institutions, respectively.[32] The latter stage is also a quality-based assessment, but step 3 applies cross-field comparison as well. This means that the quality assessment may now result in changes of funding ratios across scientific areas. The new distribution system uses a 2008–09 baseline, and as part of the transition process, up to 2015–16, a fall-back provision made sure that the ratio between arts, humanities and social sciences on the one hand and science, technology, engineering and mathematics ('STEM') on the other. It was the second group that would have got a smaller share without the transitional measure, so arts, humanities and social sciences got less funding in the intermediary years. Yet, by 2015, the proportion has increased and 'STEM protection' seems no longer necessary and is being discontinued.[33] The relevant assess-

[29] Russell Pioneering Research Group (n 23) 21, para. 2.33.

[30] Russell Pioneering Research Group (n 23) 21, para. 2.33–34.

[31] This dual system means that around half of an English university budgets is covered from these block grants, covering (and assessing) both teaching and research activity, while the other half is mostly covered from funds distributed by the research councils. Various charities, foundations and industry are also potential sources. Natasha Gilbert: "English university funding unveiled" *Nature* 2009/458 http://www.nature.com/news/2009/090304/full/458012a.html. This study does not deal with funds for teaching that have seen a slight decline in the recent period, as opposed to stagnation in the research funding.

[32] Higher Education Funding for England, Guide to funding 2015-16. How HEFCE allocates its funds, 2015/4, http://www.hefce.ac.uk/media/HEFCE,2014/Content/Pubs/2015/201504/2015_04.pdf, p. 31.

[33] Higher Education Funding for England (n 32) 34. For a summary of these changes, see Holly Else: „Research funding formula tweaked after REF 2014 results" *Times Higher Education*, February 20, 2015, https://www.timeshighereducation.co.uk/news/research-funding-formula-tweaked-after-ref-2014-results/2018685.article: "arts, humanities and social science

ment looks at the ratio of top quality ('world-leading' and 'internationally excellent', '4*' and '3*' as opposed to 'internationally recognized' and 'nationally recognized', '2*' and '1*'[34]) activity within the group or institution, also weighing quality and cost.[35] This four-tier 'overall quality profile' is in turn measured based on the quality of research outputs (65%), the social, economic and cultural impact of the research (20%) and the research environment (supporting resources and infrastructure, 15%).[36]

It is at this point that we can link back the 'output' question to funding, based on experiences from the UK.

4.2. The use of the 'quality' component in research funding in the UK

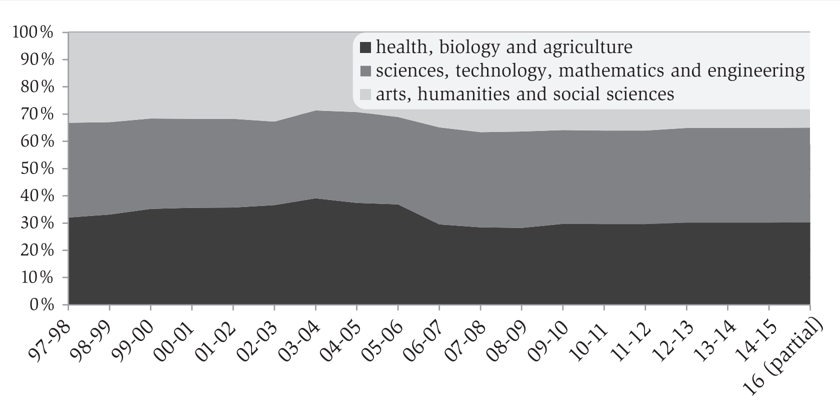
Given the rich and detailed source of data, it is worth taking a look at how the numbers changed in the past 18 years. The two tables below (Figure 12 and Figure 13) summarize the distribution of funding classified along three main fields, based on the largest pool from the UK funds distributed by the Higher Education Funding Council for England, the "Mainstream quality-related research (QR) funding". Currently this accounts for some 65% of the total funds from HEFCE. What we can see is that there was a slow (higher-than-inflation) growth up to 2003 when a sudden stop was followed by a decrease (approx. 15%), some catching up and another decrease. It was the period 2007–08 that saw a sudden increase (approx. 24%) that was followed by a slight decrease and stagnation (this meant a decrease in funding, considering inflation).

subjects could see a boost in funding from the REF compared with the RAE", i.e. with the transition to the new distribution system.

[34] Higher Education Funding for England (n 32) 30 (para. 131).

[35] Higher Education Funding for England (n 32) 31 (para. 140). Cost-weighing is meant to account for how expensive it is to conduct research, on average, in a field of science, with a weight of 1.0 (most social sciences) to 1.6 (most natural sciences). For a full list of the most recent numbers, see the table: Assignment of REF 2014 units of assessment to HEFCE research cost bands, HESA cost centres and HEFCE teaching price groups, March 13, 2015, http://www.hefce.ac.uk/media/HEFCE,2014/Content/Funding,and,finance/Annual,funding/Funds,for,research/Mapping%20of%20REF2014%20UOAs%20to%20cost%20centres.xls.

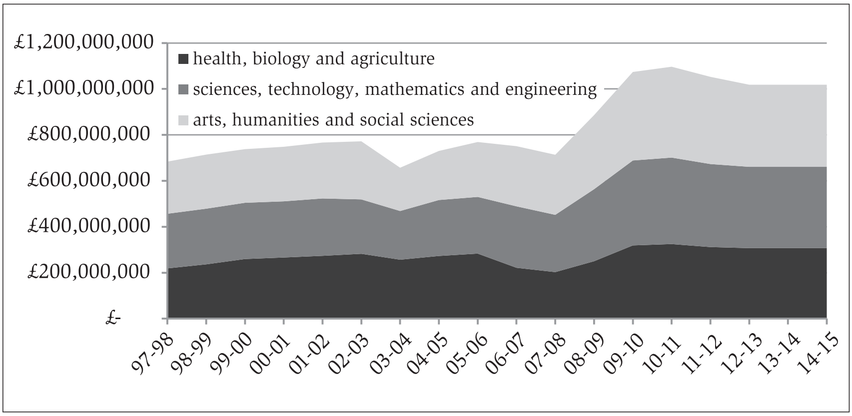
[36] Higher Education Funding for England (n 32) 30 (para. 132).



Source: Higher Education Funding Council for England, Mainstream quality-related research (QR) funding distribution per subject areas. The author's compilation based on data tables from the HEFCE archive of annual funding allocations, http://www.hefce.ac.uk/funding/annallocns/Archive/ and http://webarchive.nationalarchives.gov.uk/20100202100434/http://hefce.ac.uk/research/funding/qrfunding/previous.asp (for a detailed list, see Annex).

FIGURE 12. • *HEFCE (UK) mainstream quality-related research funding distribution per subject areas,*[37] *from 1997, percentage of total funds.*

[37] The subject areas are grouped into these three groups based on the following system: health, biology and agriculture 1–17 in the period 1997–99, 1–16 in the period 1999–2015 and 1-6 in the period 15/16; sciences, technology, mathematics and engineering 18–34, 17–31 and 7–16; arts, humanities and social sciences 35–69, 32–67 and 17–36, respectively, based on the typology in the source database.



Source: Higher Education Funding Council for England, Mainstream quality-related research (QR) funding distribution per subject areas. The author's compilation based on data tables from the HEFCE archive of annual funding allocations, http://www.hefce.ac.uk/funding/annallocns/Archive/ and http://webarchive.nationalarchives.gov.uk/20100202100434/http://hefce.ac.uk/research/funding/qrfunding/previous.asp (for a detailed list, see Annex).

FIGURE 13. • *HEFCE (UK) mainstream quality-related research funding distribution per subject areas,*[38] *from 1997, GBP nominal values.*

The data show the more or less steady share of the three disciplines, at or around 30–35–35%, with a lower share for the category 'health, biology and agriculture'. Given that there was explicit effort to maintain this ratio (see earlier), this is hardly surprising. However, we might see fluctuation in the future as the compensatory scheme, designed to benefit science, technology, engineering and mathematics, ceased to apply. This change would then be a result of cross-disciplinary race for funding, based on a detailed set of standards assessing quality, including research impact. More generally, the increased interest in the grand challenges of contemporary societies, or societal challenges (Horizon 2020), that requires social sciences contribution disproportionately, might also result in an increased share of arts, humanities and social sciences.[39]

There are independent attempts that seek to show the economic impact of social sciences. The calculations of the LSE Public Policy Group on the social sciences departments in the UK came with the number of £4.8bn value added or, on a broader take, including benefits through the mediation of

[38] The subject areas are grouped into these three groups based on the following system: health, biology and agriculture 1–17 in the period 1997–99, 1–16 in the period 1999–2015 and 1–6 in the period 15/16; sciences, technology, mathematics and engineering 18–34, 17–31 and 7–16; arts, humanities and social sciences 35–69, 32–67 and 17–36, respectively, based on the typology in the source database.

[39] I am grateful to Judit Mosoni-Fried for this observation.

experienced staff, £19.4bn.[40] Extended literature is available on how widely research impact should be understood. The UK based Academy of Social Sciences edited a series of publications, the 'Make the Case' series,[41] that present the added value of social sciences at various areas from management through crime or environment to wellbeing. One is, however, always reminded the limited capability of metrics or, rather, the need for responsible use thereof.[42] An area where such reminders are always legitimate is the use of metrics in publication data, often presented as the single most important measuring tool for scientific output, maybe combined with patents. This might or might not be legitimate, depending on the type of research, but there is always a danger that standardized assessment without due regard for the different publication cultures and strategies in the various disciplines end up discriminating against certain fields. Research also points to the danger of too much reliance on measuring publication output, as this might disparately impact innovation, an important goal of academic activity.[43]

We started off by saying that the most practical delimitation of what counts as social science, in terms of scientific output, comes from private parties providing citation data. It is more generally true that the availability of such complex sets of numbers has a huge impact of how we assess scientific work. This means that they might become de facto standards and bases for assessment without due regard to the limitations. Chi argues, based on data from two political science departments in Germany, that the exclusion of non-source items in the social sciences (i.e. items not indexed by major providers, e.g., non-ISI journal articles, conference papers, many sources in German only) disregards how publication and knowledge production works in that field, as 'the impact of non-source items is high but underestimated'.[44]

[40] LSE Public Policy Group, Assessing the Impacts of Academic Social Science Research. Modelling the economic impact on the UK economy of UK-based academic social science research, November 28, 2012, http://blogs.lse.ac.uk/impactofsocialsciences/files/2013/10/Impacts-of-academic-SSR-Cambridge-Econometrics-Nov-2012.pdf, p. 32, Table 19.

[41] See the list at https://acss.org.uk/publication-category/making-the-case/.

[42] For a thorough and critical study, see, e.g., "The Metric Tide: Report of the Independent Review of the Role of Metrics in Research Assessment and Management", July 2015, http://blogs.lse.ac.uk/impactofsocialsciences/files/2015/07/2015_metrictide.pdf.

[43] Jacob G. Foster, Andrey Rzhetsky and James A. Evans: "Tradition and Innovation in Scientists' Research Strategies" *American Sociological Review* October 2015/5. 875–908.

[44] Pei-Shan Chi: *The Characteristics and Impact of Non-Source Items in the Social Sciences – A Pilot Study Of Two Political Science Departments in Germany*, PhD dissertation (Berlin: Humboldt University 2014), http://edoc.hu-berlin.de/dissertationen/chi-pei-shan-2014-07-21/PDF/chi.pdf. 132.

Even in such cases, one could argue for standardization and show that this trend could be a positive phenomenon, pushing researchers to areas where there is more visibility and more citation. Yet, not only citations to non-source items are missed but also citations by non-source items, which makes the distortion even worse. The question is also how far bibliometrics should go in prescribing, rather than describing. (The thesis in question argues for the creation of a national database, adjusting bibliometrics to the peculiarities of the field, not vice versa.)

The distortion problem can impact disproportionately the social sciences and humanities, even though measurement of non-journal type publications has been evolving. Larivière et al. note that journal literature "accounts for less than 50% of the citations in several disciplines of the social sciences and humanities".[45]

Assessing impact usually links back to funding decisions. Technical (and practical) decisions about what data to use and how will have far-reaching consequences on how research is done in the various disciplines.

5. CONCLUSION

This chapter contributes to the debates around funding scientific research by analyzing recent international trends, and shows funding patterns from the perspective of funds devoted to social sciences. It is mostly a groundwork summarizing the key issues around the definition of scientific fields, the various statistics and the considerations behind policy decisions to fund research.

The first part of this chapter showed the complexity behind statistics, i.e. that even the basic categories of natural sciences and social sciences are not so clear-cut as it might first appear, and categories might change with time and vary across countries, even if international guidelines are available. While it is in itself a challenge to have comparative data, the somewhat sporadic statistics allowed us to present basic connections. It was suggested that simple geographical, regional patterns cannot explain variation, either in the natural/social sciences funding ratio or in funding intensity (social sciences funding in percentage of the GDP). A further line of inquiry sup-

[45] Vincent Larivière, Éric Archambault, Yves Gingras and Étienne Vignola-Gagné: "The place of serials in referencing practices: Comparing natural sciences and engineering with social sciences and humanities" *Journal of the American Society for Information Science and Technology* 2006/8. published online April 7, 2006, http://onlinelibrary.wiley.com/doi/10.1002/asi.20349/abstract;jsessionid=46E2FA94D0CAE1BBF51819AF0FED7D39.f01t04?deniedAccessCustomisedMessage=&userIsAuthenticated=false. 997.

posed that the share of the business sector might have a direct impact on social sciences spending. While this connection can be confirmed, it would be a mistake to conclude that more business funding is, in absolute numbers, bad for social sciences funding. The boost that more business funding gives to research funding in general also shows in social sciences funding, if measured in percentage of the GDP.

The financial crisis shook up earlier trends that showed a growing share for foreign business sources as well as a general decline of the share of government funding. If the earlier trends continue with the recovery, it will become more and more important for governments to take into account business preferences and focus on funding research, e.g., further away from applied sciences, that cannot compete for business funding. The chapter assessed recent datasets on specific (public) funding bodies. This seems to show the predefined preference of these entities rather than general trends. Looking into the arguments behind such policy choices, the final part of this chapter deals with the question of the 'use', 'output' or 'impact' of scientific research, and social sciences in particular. The relevant debates based on experiences in the UK show some of the challenges in this field.

The growing share of (foreign) business funding and the limited ability of governments to influence this means that government funds will have a more and more important role in shaping research beyond the areas with more direct economic benefits. Informed policy decisions should be based on the assessment of the various factors described by terms like 'output' or 'impact' of scientific research. The chapter presented the UK experience as a model that combines various forms of assessment and that could inform policy decisions elsewhere.