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Funding ratios in social science: the perspective of countries/territories level and comparison with natural sciences

Xin Xu[1] · Alice M. Tan[2] · Star X. Zhao[1]

Abstract Research funding plays a key role in current science, thus it has become an aggregative interesting level in scientometric analysis. In this work, we try to explore the funding ratios of 21 major countries/territories in social science based on 813,809 research articles collected from the Web of Science and indexed by the Social Sciences Citation Index covering the period from 2009 to 2013. The results show that the funding ratios of sample countries/territories in social science are far below that in natural science and some specific subjects (chemistry, engineering, physics, neurosciences). However, there is a positive correlation between them. The funding ratios of People's Republic of China, Sweden and Japan rank the top 3 (over 30 %). Generally, the funding ratios of the top 1 % and top 10 % highly cited articles are higher than those of the rest of articles, and for most cases, the high funding ratio of all articles is related to the high funding ratio of the highly cited articles.

Keywords Funding ratio · Science funds · Citation analysis · Bibliometrics · Scientometrics

Introduction

Currently, research funding is emerging as one of the most important public resources of scientific development. By providing financial supports for research projects, institutions and scientists, research funding plays a crucial function on research innovation, discipline development, career of scientists, as well as social and economic development (Lane

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✉ Star X. Zhao
xzhao@infor.ecnu.edu.cn

[1] Department of Information Science, Business School, East China Normal University, Shanghai 200241, China

[2] Department of Information Resource Management, Zhejiang University, Hangzhou 310027, China

2009). Thus research funding makes great contributions to knowledge production. During the period from 2009 to 2010, 1,165,276 articles (56.54 %) in the 2,060,838 research articles indexed by Science Citation Index Expanded (SCI) are funded by at least one kind of research funding (Tan et al. 2012a). It is therefore meaningful to ascertain how to assess the outputs and effects of research funding.

However, it seems very difficult to evaluate the effects of research funding based on such a large number of articles in traditional ways such as peer review. Thus one of the best alternative solutions might be Bibliometrics. In recent years, with the development of bibliographic database for recording the funding information, numerous funded articles lead to an interesting aggregative level in scientometrics. Most previous studies can be divided into two main categories: (A) Fundamental analysis methods and indicators, such as innovative analytical frameworks of acknowledge information (Costas and van Leeuwen 2012; Diaz-Faes and Bordons 2014; Shapira and Wang 2010), h-index of research funding (Zhao et al. 2009) and concise input–output measure (Zhao and Ye 2011); (B) The empirical investigations in a specific subject or aggregative level, for instance, the funded nano research (Wang and Shapira 2011), funded collaborations in mathematics (Zhou and Tian 2014), the feature of funded SCI articles of Iran (Jowkar et al. 2011), funding analysis of SCI articles at the country level (Wang et al. 2012) and the funded collaboration network of countries/territories (Tan et al. 2012b). These studies mainly deal with the research articles in natural sciences.

Although the pattern of cost in social science research seems different from that in natural sciences, research funding is also of vital importance to the procedures in the social science, e.g., the expenditure of human resource, the organizing of research team, the spending on investigation, material preparation and conservation, etc. Thus in this paper, we mainly focus on the funded articles in social science. By drawing the funding information from Thomson Reuters' Web of Science (WoS), we try to explore the distribution of funding ratios of 21 major countries/territories in social science and compare the difference between the funding ratios of all articles and that of highly cited articles.

Sources and methods

Our data are collected from WoS database in October 2014. We use SSCI and SCI indexed articles as the data sources. Just the research articles published from 2009 to 2013 are included in the analysis, since they typically represent original knowledge contribution to scientific communities and subjects. From 2008, the Web of Science has begun to index the funding information of articles. By combining the address information and funding information, a large-scale analysis of countries/territories' funding status can be conducted.

In this research, we put emphasis on exploring funding ratios of highly cited articles (including top 10 % and top 1 % cited articles in a specific subject). The number of top 1 % articles should not be too small. Therefore, we take a total amount of 10,000 articles as the threshold to select samples of countries/territories. From 2009 to 2013, there are 21 countries/territories which have published more than 10,000 SSCI articles. During the 5 years, total SSCI articles of these 21 countries/territories (715,287) accounted for 87.4 % in number of all the SSCI articles. The key measure is the proportion of funded articles for major countries/territories, namely the funding ratio (F_r, see Eq. 1).

$$F_r = N_F/N \tag{1}$$

where N is the total number of articles and N_F denotes the total number of funded articles. F_r occurs as a basic indicator of funding analysis in macro aggregative levels, such as institutions or countries/territories. From the perspective of scientometrics, 'highly cited' is generally accepted as the feature of 'high impact' (Tijssen et al. 2002; Pislyakov and Shukshina 2014). Therefore, we also draw the data of highly cited articles of the 21 countries/territories and compute their funding ratios using Eq. 2.

$$F_{r\_x\%} = N_{F\_x\%}/N_{x\%} \tag{2}$$

where $x\%$ denotes top $x\%$ highly cited articles which are taken into account. For a country/territory, Eq. 2 can provide a specific view for observing whether its research funding supports the 'right' scholars and groups.

The steps to collect the basic data in our study are as follows:

(a) We retrieved six groups of funded articles, respectively involving social science (SSCI), science (SCI), chemistry, engineering, physics and neuroscience. Among these groups, social science is the main research object in this work; science includes all the subjects of SCI for overall comparison to social science; chemistry, engineering and physics are three subjects with most articles and neuroscience is the subject category with most articles related to life sciences and medical science in WoS.

(b) In a specific database (SSCI/SCI) or subject ('Research Areas' in WoS), we retrieved all articles, obtaining the top 1 % and 10 % articles by ranking their citations in a descending order.

(c) In a specific database or subject, taking 'PY = 2009–2013 AND CU = 'Countries/Territories's name' AND FO = (a* or b* or c* or d* or e* or f* or g* or h* or i* or j* or k* or l* or m* or n* or o* or p* or q* or r* or s* or t* or u* or v* or w* or x* or y* or z* or 0* or 1* or 2* or 3* or 4* or 5* or 6* or 7* or 8* or 9*)' as search strategy, we collected funded articles of each country/territory, and the funded article collections in top 1 and 10 % article collections were determined.

Results and analysis

Funded articles in social science

From 2009 to 2013, in SSCI, there were 182,469 articles funded by at least one kind of research funding. The overall funding ratio of social science is 22.42 %, and the average funding ratio of the 21 major countries/territories is 25.95 %. Funding ratios of Turkey, Israel and Brazil are below the average level of world. Previous research shows that the funding ratio of People's Republic of China in natural sciences ranks first in major countries/territories: 70.34 % in 2009 (Wang et al. 2012) and 76.1 % during 2009–2010 (Tan et al. 2012b). According to the result of our study, the funding ratio of People's Republic of China in social science also ranks top 1 in major countries/territories. There are two main reasons can account for this result. First of all, with the rapid economic growth, the investment of research funding in People's Republic of China also grows rapidly (Cyranoski 2014). S&T spending by the Chinese central government was 12.6 billion US Dollar in 2006 but jumped to 38.6 billion US Dollar in 2013 (about 60 % of this

spending is competitive funding; Cyranoski 2014). Secondly, in recent years, Chinese domestic research system encourages outstanding social science researchers (usually also be funded) to publish their research fruits in international English journals (Li and Li 2015; Liu and Ding 2014).

On the other hand, USA, as the superpower in science, publishes a large number of articles in social science. Its funded articles in social science account for 44 % of the world, and the total number is 4 times bigger than that of the country/territory in the second place (England). It reveals that USA also provides a great deal of investments in social science. However, both USA and England don't show significant advantage in their funding ratio. As shown in Table 1, besides People's Republic of China, there are other countries have high funding ratio, like Sweden (36.23 %), Japan (32.97 %) and Canada (30.92 %).

Funding ratios of social science and whole natural science at country/territory level

Although People's Republic of China, Sweden and Canada have high funding ratio in both natural science and social science, not all the countries/territories maintain a high funding

Table 1 Funding ratios of major countries/territories in *social science* (2009–2013)

Countries/ territories	Total articles (N)	Funded articles (N_F)	Funding ratio (F_r, %)	F_r of 1 % ($F_{r\_1\ \%}$, %)	F_r of 10 % ($F_{r\_10\ \%}$, %)	Rank of F_r
USA	326,776	80,279	24.57	47.44	39.52	13
England	88,791	21,479	24.19	55.09	43.24	14
Canada	51,823	16,024	30.92	52.73	43.85	4
Australia	50,900	13,614	26.75	59.22	43.97	10
Germany	44,866	10,268	22.89	56.78	42.92	17
Netherlands	35,554	9726	27.36	49.30	41.57	8
Spain	29,951	7097	23.70	57.14	47.37	16
Peoples Republic of China	28,981	10,937	37.74	53.47	49.62	1
France	22,980	5555	24.17	63.52	46.92	15
Italy	20,933	4704	22.47	63.81	41.88	18
Sweden	18,048	6539	36.23	62.70	50.25	2
Brazil	16,057	3347	20.84	68.52	49.20	19
Taiwan	15,684	3895	24.83	42.29	36.29	12
Switzerland	13,553	3932	29.01	64.75	47.34	6
Japan	13,270	4375	32.97	66.42	53.12	3
Belgium	13,124	3335	25.41	53.03	40.90	11
Scotland	11,566	3296	28.50	60.00	47.23	7
South Korea	11,391	3111	27.31	38.66	36.97	9
Norway	11,091	3224	29.07	53.64	38.17	5
Turkey	10,901	747	6.85	21.36	15.72	21
Israel	10,010	1909	19.07	50.96	37.05	20
Avg. of 21 countries/ territories	40,298	10,352	25.95	54.32	42.53	–

ratio in the two aspects (see Tables 1, 2). The typical case is Spain, which has a high funding ratio (74.09 %) in natural sciences but low funding ratio (23.7 %) in social science. The former one is 3 times bigger than the latter one. This difference partly reflects that Spain lays particular stress on the investment in natural sciences than the average level of the world. Table 2 indicates that, overall, the funding ratio of highly cited articles in natural science is higher than the funding ratio of all articles. In the 21 countries/territories, the funding ratio of top 1 % articles is 1.26 times of that of all articles on average.

As shown in Fig. 1, for all the 21 countries/territories, the funding ratios in natural sciences are far higher than that in social science. The former is 1.76–4.76 times of the latter. Turkey shows the largest disparity in this situation. Another peculiarity of Turkey is that its funding ratios in both natural sciences and social science are lower than that of other main countries/territories. The case which has the smallest gap between these two ratios is Japan. Though its funding ratio in natural sciences (58.06 %) seems lower than that in the world level, its funding ratio in social science (32.97) appears as 1.47 times of the world's level. The reason why Japan invests relatively more resources in social science

Table 2 Funding ratios of major countries/territories in *natural sciences* (2009–2013)

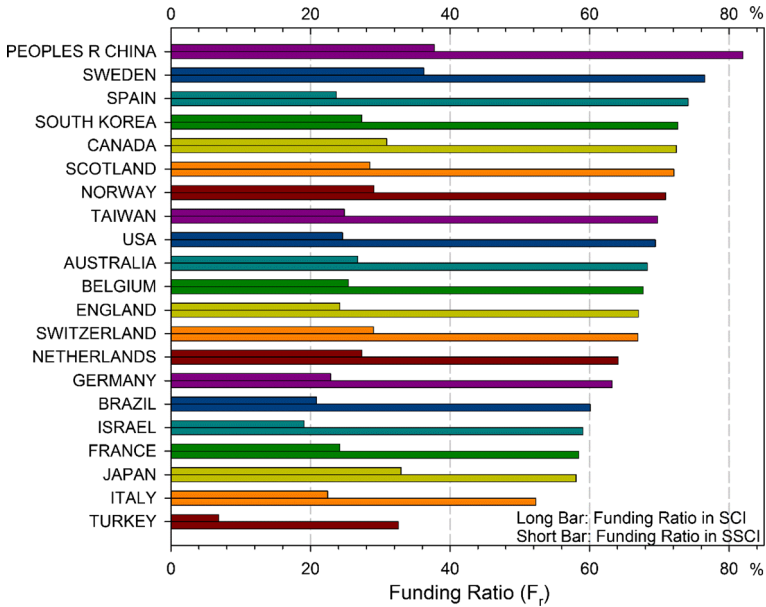| Countries/territories	Total articles (N)	Funded articles (N_F)	Funding ratio (F_r, %)	F_r of 1 % ($F_{r\_1\%}$, %)	F_r of 10 % ($F_{r\_10\%}$, %)	Rank of F_r
USA	1,469,552	1,019,967	69.41	84.40	82.01	9
Peoples Republic of China	802,583	657,967	81.98	91.70	89.97	1
Germany	418,146	264,832	63.33	82.91	79.49	15
Japan	366,367	212,714	58.06	81.71	76.60	19
England	334,518	223,997	66.96	82.71	80.89	12
France	301,534	176,001	58.37	81.65	76.11	18
Italy	246,950	129,167	52.30	78.62	70.45	20
Canada	244,289	176,905	72.42	82.03	80.49	5
Spain	215,397	159,596	74.09	84.86	84.74	3
South Korea	215,215	156,083	72.52	88.58	83.16	4
Australia	180,814	123,426	68.26	83.29	79.52	10
Brazil	162,992	97,956	60.10	84.02	80.11	16
Netherlands	137,384	88,057	64.10	80.84	76.86	14
Taiwan	120,497	84,020	69.73	84.68	79.74	8
Turkey	109,977	35,801	32.55	61.93	52.17	21
Switzerland	107,078	71,683	66.94	83.75	79.65	13
Sweden	94,604	72,369	76.50	83.79	83.23	2
Belgium	78,164	52,860	67.63	80.61	78.31	11
Scotland	54,648	39,400	72.10	83.73	83.31	6
Israel	51,595	30,445	59.01	86.92	79.06	17
Norway	44,314	31,416	70.89	80.93	78.42	7
Avg. of 21 countries/territories	274,125	185,936	65.58	82.56	78.78	–

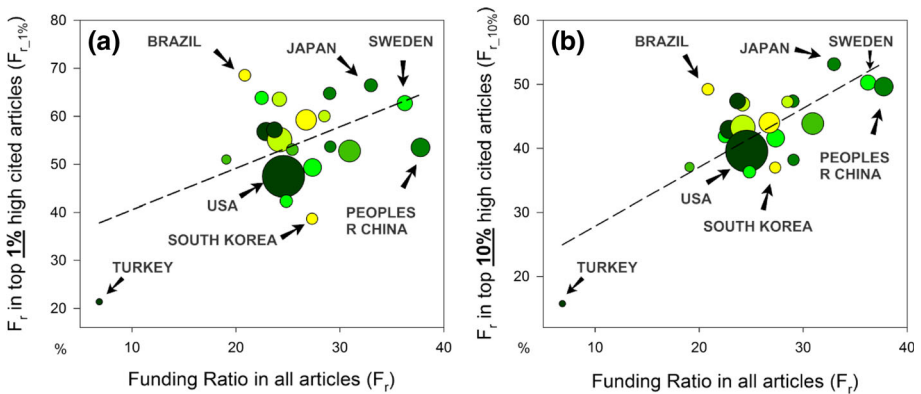**Fig. 1** Comparing the funding ratios of major countries/territories in SSCI and SCI

Fig. 2 Bubble chart of funding ratios of all articles, top 1 % articles and top 10 % articles in *social science* (the *size of bubble* denotes the number of funded article in social science)

could be an interesting issue. Generally, we find a statistically significant positive correlation between funding ratios of major countries/territories in social science and natural sciences (Pearson's correlation coefficient = 0.809, $p < 0.01$). In other words, usually, if a country/territory has a high funding ratio in natural sciences, its funding ratio in social science will also be high.

Research funding agencies always try to support research projects that might have broad academic impact. Therefore, we investigate the funding ratio of highly cited articles in social sciences (see Tables 1; Fig. 2). The results indicate that, for each case of the 21 countries/territories analyzed, its funding ratios of top 1 % highly cited articles and top

10 % highly cited articles are all higher than that of its all articles, and the funding ratio of top 1 % is usually higher than that of top 10 %. Thus for the main countries/territories, the financial support of research funding shows relevance with the productions of high impact studies in social sciences. Furthermore, as shown in Fig. 2, the funding ratios of all articles and highly cited articles seem consistent in the country/territory level. Namely, in general, the higher the funding ratio of all articles is, the higher the funding ratio of highly cited article will be (Pearson's correlation coefficient (F_r, F_{r_1} % = 0.513, $p < 0.05$; Pearson's correlation coefficient (F_r, F_{r_10} % = 0.760, $p < 0.01$). It should be noted that the values of these two correlations are all not high, so it means that there should be exceptional cases in the sample. As shown in Fig. 2, compared with the general trend of other countries/ territories, the funding ratios of top 1 % articles of People's Republic of China and South Korea are not high, but this situation has been improved in their top 10 % articles. Meanwhile, Brazil and Japan get higher funding ratios in their highly cited articles.

By comparing Figs. 2 and 3, we can observe that the distribution of funding ratios at country/territory level is different between social science and natural sciences. Comparatively speaking, in social science, there is greater difference between the distributions of all articles and highly cited articles in each country/territory. However, in natural sciences the distribution has stronger consistency. On average, for the 21 countries/territories, the funding ratio of top 1 % articles is 2.10 times of that of all articles (this number for natural sciences articles is 1.26 times).

In the social or natural sciences, Turkey occurs as a singular point far from the general trend of other countries/territories. People's Republic of China has high funding ratios both in all articles and highly cited articles. On the distribution, China's funding ratio can be described as follows: in natural sciences, it is in line with the main trend of each sample country/territory, but in social science it deviates from the main trend. In social science, People's Republic of China has not funded more highly cited articles, which is different from Brazil or Japan.

Funding ratios of social science and specific subjects at country/territory level

In this section, the comparisons of funding ratios in social science and representative subjects of the natural sciences, applied science and life science at countries/territories
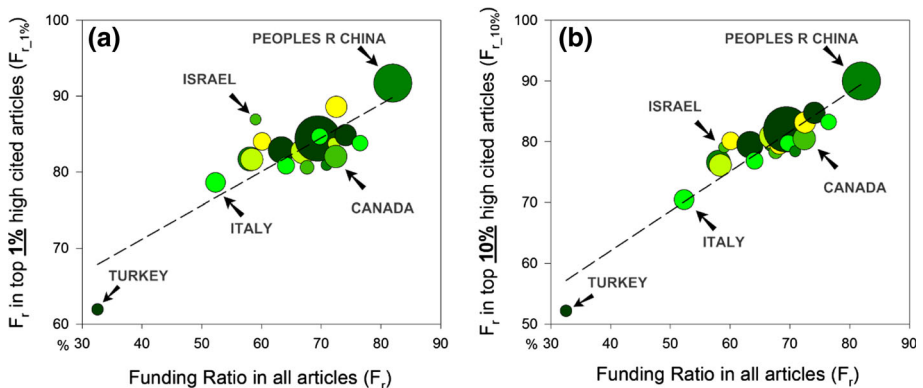

Fig. 3 Bubble chart of funding ratios of all articles, top 1 % articles and top 10 % articles in *natural sciences* (the *size of bubble* denotes the number of funded articles in natural sciences)

level are discussed. As shown in Table 3, the funding ratios of each country/territory in chemistry, engineering, physics and neurosciences are also generally higher than that in social science. For the comparison among the four subjects, the funding ratio of each country/territory in engineering is relatively low, but relatively high in other basic disciplines. Compared with social science, the funding ratios of the four subjects on highly cited articles are very prominent. For example, in the top 1 % articles of chemistry, there are 8 countries/territories whose funding ratios are more than 90 %, 18 countries/territories whose funding ratios are higher than 80 %, while in social science, the country/territory with the highest funding ratio of the top 1 % articles only accounts for 68.52 % (Brazil, see Table 1). In contrast, Norway, known as an innovative country in northern Europe, has a funding ratio of 100 % for the top 1 % articles in neurosciences, which demonstrates commendable efficiency of its funding system in this subject.

We also find that, although the funding ratios in social science are quite different from that in other four subjects, there are still statistical correlations among them. As shown in Table 4, the funding ratio in social science has a positive correlation with that in other four subjects (Pearson's correlation coefficient: 0.51–0.80, $p < 0.01$). As shown in Fig. 2, the distribution of the funding ratio in social science is more dispersed on highly cited articles, so its funding ratio of highly cited articles has weak correlation with that of other four subjects. Funding ratios of the four subjects have strong correlation between each other, and most of them present statistical significance. It suggests that, compared with other specific subjects, there are significant differences in the funding structure and output between social science and other four subjects.

Discussion and limitation

Funding culture and funding ratio

The study tries to explore funding ratios based on the paradigm of scientometrics and standardized data in WoS. In many of the scientific powers, science funding is an important science resource, but there is a big difference in culture of science among each country/territory. Thus, funding ratio is only an observation measure, not an absolute evaluation indicator for 'good or bad'. Some countries/territories have lower funding ratios, partly because the countries/territories invest less competitive funding. On the other hand, it may be because many funding of the countries/territories is allocated in the form of regular block funding, and such funding sometimes doesn't need to be listed in the acknowledgments of research articles. Therefore, existing studies based on data of WoS and methods of scientometrics are mainly the observation of competitive funding.

Meanwhile, the funding system itself is very complex. And there are many complicated behaviors related to science production. For example, the orientation of science policies, peer review, networking and prestige of scholars will have a significant impact on the science output and funding. In some countries, receiving funding from the research agencies may highly due to the scientists' academic reputations, which will also affect the results of funding analysis. Thus, the results of this paper show a big difference in the funding ratios of the same country/territory for different subjects, and the funding ratios of highly cited articles also show a different distribution.

The third point is that different subjects have their own specific characteristics in funding. For example, life sciences, medical science and some experimental sciences

Table 3 Funding ratios of 21 countries/territories in chemistry, engineering, physics and neurosciences (2009–2013)

Countries/territories	Chemistry			Engineering			Physics			Neurosciences		
	F_r	F_{r_1} %	F_{r_10} %	F_r	F_{r_1} %	F_{r_10} %	F_r	F_{r_1} %	F_{r_10} %	F_r	F_{r_1} %	F_{r_10} %
USA	80.61	90.98	91.19	59.47	71.18	71.65	78.81	87.34	87.64	73.00	84.59	84.22
England	76.23	84.76	83.57	55.31	73.09	65.52	74.08	84.50	82.22	74.03	79.67	84.37
Canada	81.71	86.86	85.75	61.43	65.70	66.66	78.50	89.60	85.05	76.88	87.76	82.37
Australia	79.61	90.70	85.46	58.66	78.89	68.99	75.32	79.49	83.48	71.32	82.95	82.83
Germany	74.62	81.95	83.52	49.78	62.50	62.19	72.86	84.73	82.42	63.34	83.47	79.80
Netherlands	74.12	82.61	83.56	51.60	69.64	60.95	74.22	88.99	84.29	66.83	77.01	79.43
Spain	86.44	92.05	90.17	71.17	79.91	79.27	83.46	91.91	89.58	67.44	72.84	82.52
Peoples Republic of China	84.11	95.67	94.58	81.26	88.34	87.01	86.51	94.10	91.71	78.50	87.97	88.01
France	68.13	79.76	78.69	44.60	65.40	55.46	61.89	81.06	75.25	58.48	77.97	76.67
Italy	64.72	82.77	74.90	40.69	58.40	43.92	59.63	80.86	76.32	54.38	73.72	73.63
Sweden	81.42	93.51	88.24	64.71	77.78	69.25	78.49	93.94	86.43	82.13	80.43	86.05
Brazil	75.81	87.31	85.65	65.67	78.07	75.17	81.33	95.28	91.40	67.70	78.95	82.21
Taiwan	84.21	96.50	88.87	62.91	73.51	66.78	77.23	93.64	85.14	68.86	86.67	63.09
Switzerland	73.56	90.65	80.63	56.73	65.06	66.03	74.43	86.75	84.58	68.74	81.67	81.29
Japan	67.89	84.42	83.36	41.95	51.46	56.33	61.51	82.79	79.43	59.07	89.09	80.37
Belgium	76.68	83.12	84.71	58.94	61.64	64.63	72.47	84.88	82.25	71.12	78.38	80.68
Scotland	79.28	88.37	85.51	57.83	63.41	66.82	78.25	84.91	83.97	76.68	78.26	82.23
South Korea	83.08	93.85	93.08	71.36	84.59	75.31	73.45	92.90	88.24	66.05	92.00	84.06
Norway	74.86	68.00	78.05	59.59	66.67	67.20	75.83	93.10	86.45	68.85	100.00	78.65
Turkey	59.79	79.35	71.22	38.20	37.76	44.13	55.64	83.10	76.79	16.78	58.97	38.22
Israel	72.91	87.50	84.24	48.73	71.79	64.46	71.55	91.89	85.53	61.31	90.00	77.12

Table 4 Pearson's correlation matrix of funding ratios in different subjects

| | Social science | | | Chemistry | | | Engineering | | | Physics | | | Neurosciences | | |
	1 F_r	2 F_{r_1}	3 F_{r_10}	4 F_r	5 F_{r_1}	6 F_{r_10}	7 F_r	8 F_{r_1}	9 F_{r_10}	10 F_r	11 F_{r_1}	12 F_{r_10}	13 F_r	14 F_{r_1}	15 F_{r_10}
2	0.51*	*1*													
3	0.76*	0.90*	*1*												
4	0.55*	0.07	0.38	1											
5	0.32	0.01	0.28	0.65*	*1*										
6	0.56*	0.06	0.43	0.90*	0.76*	*1*									
7	0.53*	0.04	0.34	0.90*	0.59*	0.83*	1								
8	0.50*	0.22	0.46*	0.82*	0.60*	0.81*	0.84*	*1*							
9	0.52*	0.15	0.44*	0.88*	0.57*	0.87*	0.97*	0.86*	*1*						
10	0.51*	0.20	0.44*	0.90*	0.51*	0.79*	0.89*	0.79*	0.92*	1					
11	0.28	-0.11	0.09	0.59*	0.34	0.56*	0.71*	0.60*	0.67*	0.67*	*1*				
12	0.40	0.05	0.29	0.79*	0.50	0.78*	0.89*	0.77*	0.92*	0.91*	0.83*	*1*			
13	0.80*	0.53	0.73*	0.79*	0.42	0.70*	0.67*	0.72*	0.71*	0.79*	0.38	0.60*	1		
14	0.59*	0.21	0.33	0.43	0.03	0.43	0.38	0.44*	0.46*	0.39	0.42	0.43	0.57*	*1*	
15	0.75*	0.67*	0.83*	0.59*	0.28	0.63*	0.54*	0.69*	0.64*	0.62*	0.22	0.51*	0.88*	0.54*	*1*

F_r, funding ratio; F_{r_1}, funding ratio of top 1 %; F_{r_10}, funding ratio of top 10 %

Italicized values indicate the correlation coefficients in the same subjects

* $p < 0.01$

require a lot of funding investments. For some basic disciplines and social science, although a single project does not always need a high investment, researchers may need more extensive support in order to guarantee long-term and continuous study. Our study shows that the funding ratio of social science in highly cited articles is relatively low. Therefore, for policy making, improvements according to subject features should be considered. E.g., using the funding form of 'post-funding', which takes peer review for existing outputs to determine whether to fund the program after researchers have done all or part of the research program.

Limitations and WoS for funding analysis

Accordingly, this study has some limitations. First of all, the funding ratio calculated by methods of scientometrics is only the overall result in a statistical sense. It is difficult to consider a variety of complex behaviors in the process of funding. The used data is mainly for competitive funding and could not fully cover the regular block funding. Similar to the articles and citations data indexed by WoS, the funding information in WoS is also not complete.

The recorded funding information in WoS database provides considerable data source for a future scientometric study of funded articles. As WoS is a widely used database in the field, many perspectives of scientometrics can be applied to the analysis of funding, e.g., citations and academic impact, collaborations and collaboration network, subject distribution, etc. Funding agencies may also make use of the recorded funding information in WoS for tracking and making a comparative evaluation of the output of papers they funded. In short, now WoS gives a relatively standardized funding data source, and science funding could become an aggregate level of scientometric study.

However, there are also some disadvantages when using the funding information in WoS database. (a) Like most scientometric studies using the data of WoS, their data coming from WoS covers only part of the papers produced by certain science entities (e.g. scientists, institution etc.). Although in general WoS may contain most of the important papers, such analysis theoretically do not include the complete collection of papers. (b) At present, WoS just includes the funding information after 2008, so it is not possible to use this database for analyzing the funding before 2008, which leads to the situation that the long time window study of funded articles would hardly be proceeded. (c) Another important limitation of funding acknowledgements in WoS is that usually the funding information in acknowledgements is just the requirement of funding agencies. The regular block funding does not always need to be listed. The analysis of funding information indexed in acknowledgements, in fact, is primarily aimed at the competitive funding given by the funding agency.

Conclusion

This paper discusses the funding ratios of main 21 countries/territories in social science. The results show that, in these countries/territories, People's Republic of China has the highest funding ratio in social science. Other countries whose funding ratios are higher than 30 % include Sweden, Japan, and Canada. The funding ratio in social science is much lower than that in natural sciences for all the case countries/territories, presenting Spain the largest gap, while Japan the smallest. However, in general there is a positive correlation between funding ratios in social science and natural sciences. Moreover, it usually happens

that the higher the funding ratio of all articles is, the higher the funding ratio of highly cited articles will be. For each country/territory, the funding ratio of the top 1 % articles is higher than that of the top 10 % articles, and the funding ratio of top 10 % articles is higher than that of all articles.

However, compared with the results of natural sciences, chemistry, engineering, physics and neurosciences, the funding ratios of the countries/territories in social science distribute dispersedly on all articles and highly cited articles. Also, the funding ratio of highly cited articles is much lower than that of the four specific subjects. Social science involves important subjects closely related to the welfare and happiness of human beings. Policy makers should consider how to strengthen funding investment for social science in their own country/territory and narrow the gap between the funding ratios of social and natural sciences.

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