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China's global growth in social science research: Uncovering evidence from bibliometric analyses of SSCI publications (1978–2013)

Weishu Liu^a, Guangyuan Hu^b, Li Tang^{b,*}, Yuandi Wang^c^a Antai College of Economics and Management, Shanghai Jiao Tong University, Shanghai 200052, China^b School of Public Economics and Administration, Shanghai University of Finance and Economics, Shanghai 200433, China^c School of Business, Sichuan University, Chengdu 610064, China

ARTICLE INFO

Article history:

Received 3 January 2015

Received in revised form 26 May 2015

Accepted 26 May 2015

Available online 16 June 2015

Keywords:

Large-scale bibliometric analysis

Research evaluation

Social sciences development

China

Science and technology policy

ABSTRACT

The phenomenon of China's rise as an emerging scientific power has been well documented, yet the development of its social science is less explored. Utilizing up-to-date Social Science Citation Index (SSCI) publication data (1978–2013), this paper probes the patterns and dynamics of China's social science research via bibliometric analyses. Our research indicates that despite the national orientation of social science research and the linguistic obstacle of publishing for an international audience, China's publications in the SSCI dataset have been rising in terms of volume, world share, and global ranking. But China is still not yet a major player in the arena of social sciences, as is evidenced by the number of Chinese journals indexed in SSCI and the lack of Olympic players. Team research features China's international publishing in social science, but the research outputs are highly unbalanced at regional and institutional levels.

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1. Introduction

One hundred years ago, Chen Duxiu, then one of China's most influential intellectual leaders of the New Culture Movement, personalized democracy and science as “Mr. Democracy” and “Mr. Science.” He appealed that “only these two gentlemen can save China from the political, moral, academic, and intellectual darkness in which it finds itself” (Chen, 1919). One century later, while the debate surrounding Mr. Democracy and Mr. Science has not totally settled, the discussions of parallel developing basic science versus applied science, natural science versus social science, have intensified in alignment with the allocations of China's escalating research and development funds (Gu, 2001; Rao, 2014).

Undisputedly, social science research has been playing an increasingly active role in national and international policy making. Unlike natural science, which focuses on the natural world, social science studies the “society and the manner in which people behave and influence the world around us.”¹ It is expected to promote and secure social and economic sustainable development by providing insights, responses and solutions to the interacting processes of social and environmental change (ISSC, 2013).

* Corresponding author. Tel.: +86 15000465884.

E-mail address: tang.li@shufe.edu.cn (L. Tang).

¹ Source: UK Economic and Social Research Council definition, <http://www.esrc.ac.uk/about-esrc/what-is-social-science/>.

When measured by the quantity of journal articles, China has risen as a global scientific power (Kostoff, 2012; Leydesdorff, 2005; Zhou & Leydesdorff, 2006; Zhou, Thijs, & Glänzel, 2009b). Accordingly, voluminous bibliometric studies focusing on China have tried to evaluate the country's scientific research performance from a variety of research domains and perspectives (Tang, Shapira, & Youtie, 2015; Zhou & Leydesdorff, 2009). In spite of some insightful studies such as that by Zhou, Thijs, & Glänzel (2009a), it remains unclear to date whether China has also risen as a global scientific power when it comes to social science development. To fill the research gap, this paper uses China's publications indexed in the Social Science Citation Index (1978–2013) to profile the current status and dynamics of China's research performance in general social sciences at a more granular level.

This topic is important for at least two reasons. First, Chinese social scientists are becoming interpreters and even “legislators” of social change in China (ISSC, 2010, 2013). Focusing on issues with which both the public and policy makers are concerned, their scholarly publications can serve as a prism to reflect on what is happening and the impacts on China's sustainable development. Second, because China is the largest developing country, its social science development can and should add more open debates on a variety of global critical issues. A greater engagement by Chinese scholars and attention to Chinese social science development can and will add a plurality of opinions bridging the east-west knowledge divide (ISSC, 2013; Liu, Tang, Gu, & Hu, 2015).

The remainder of this paper is organized as follows. Section 2 briefly reviews the existing literature on social sciences and the novelty of our study. Next we describe the data set for analysis. Then we combine both bibliometric analysis and visualization techniques to illustrate the intellectual structure of China's social science research among five categories: (1) general trends, (2) key actors, (3) co-authorship, (4) research foci, and (5) funding sources. We conclude with major findings, limitations, and policy implications.

2. Literature review

Using large-scale bibliometric analysis as a tool for research evaluation is well received among academics and policy makers (Hicks, Wouters, Waltman, de Rijcke, & Rafols, 2015). The majority of the burgeoning literature, however, focuses mainly on natural sciences, with very few exceptions investigating social sciences. For example, using 40,000 monograph records in the International Bibliography of the Social Sciences files, Kishida and Matsui (1997) conducted a scientometric analysis of selected domains in social science literature published from 1981 to 1985. They found that national gross domestic product (GDP) is highly correlated with the number of monographs. Ingwersen (2000) discussed the usefulness and caveats of applying the Social Sciences Citation Index (SSCI) to evaluate Scandinavian research. He posited that using SSCI publications is valid for selected social sciences. Later, country-level analysis on social science and humanity research emerged. For example, Kavunenko, Khorevin, & Luzan (2006) analyzed the rapid expansion of Ukraine journals in the fields of social sciences and the humanities. They observed a trend of decentralization evidenced by a notable growth of publications outside the capital of Kiev. Gulgoz, Yedekcioglu, & Yurtsever (2002) explored Turkey's SSCI publications in the period of 1970–1999. They argue that Turkey's social sciences achieved considerable progress in the examined period, as evidenced by publication counts and global rankings.

There are also some pioneering efforts focusing on China (Ma, Li, & Chen, 2014; Zhou & Glänzel, 2010; Zhou & Leydesdorff, 2006; Zhou, Thijs, & Glänzel, 2009a). Utilizing SSCI publications, Zhou and colleagues examined China's performance in social science research from 1974 to 2007 to answer the intriguing question of whether China is “becoming a giant in social sciences” (Zhou, Thijs, & Glänzel, 2009a). They speculated that four factors may affect China's development of the social sciences and predicted that China will become more internationally visible in social science domains. Stimulated by that study's finding of a dramatic disparity of performance between natural sciences and social sciences, Zhou, Su, & Leydesdorff (2010) further examined the citation network of Chinese social science research, drawing upon publications in both SSCI and Chinese Social Sciences Citation Index (CSSCI) in the single year of 2007. They appealed for the establishment of a more objectifying system of research evaluation and internationalization of Chinese domestic journals to upgrade the international impact of Chinese social science development. Recently, bibliometric analyses focusing on special domains in social sciences, such as management and entrepreneurship, have begun to appear (Zhai, Yan, Shibchurn, & Song, 2014; Zhai, Su, & Ye, 2014). For example, in one study conducted by a research group at Wuhan University, the researchers explored the collaboration patterns of China's social science research in national journals drawn from publications indexed in CSSCI from 1998 to 2011 (Ma et al., 2014).

However, some interesting aspects such as regional distribution, China-related research, and the like have been left unexplored. Additionally, the extant studies do not go much further than observations in speculating the factors (including institutional incentives and government funding) driving China's most recent social science research development. Built upon previous research, this paper further explores China's social science research and examines these under-explored topics. We benchmark China's social science development against its natural science cohorts to see whether any unique patterns emerge. Our data covers a 36-year span—1978 to 2013, a period of rapid expansion of China's science base. This enables us to ascertain whether any new developments have arisen or shifted in China. For a country still in a rapid transitional period, we pay more attention to the status quo, but we also assess the dynamics of China's research trends.

3. Methods

Following common practice, the data source of this research is the Web of Science Social Science Citation Index (WoS-SSCI) (Glänzel, 1996; Zhou, Thijs, & Glänzel, 2009a). We judge that the SSCI data set provides a sufficiently large and diverse sample to analyze China's social science research at the global stage.² This is particularly true in the time period when the Chinese government highly values and provides a package of incentives for WoS indexed publications (Li, Miao, & Yang, 2015; Zhang & Zhou, 2007).

Another potential data set for China's social science research is CSSCI. This national publication dataset covers about 500 journals (Su, Han, & Han, 2001; Zhou, Thijs, & Glänzel, 2009b). From 1998, the first year when data are available, to 2013, a total of 1,306,294 publications were indexed in CSSCI. We chose to use SSCI instead of CSSCI as our main data set for analysis based on two considerations: international visibility and the comparatively transparent selection of indexed journals. That is also why the Chinese science community still treats SSCI as a credible data source of knowledge creation, even though the community is aware of the limitations of only considering SSCI indexed articles (China Youth Daily, 2014; Liang, 2012). When applicable, some descriptive data on CSSCI publications are also benchmarked to give a more complete picture of China's social science development.

The whole counting method was adopted in identifying China's SSCI publications based on author-reported affiliated countries. We searched "China" or "Hong Kong" or "Macao" in the country field, and this returned 54,134 hits. Full bibliographic information was downloaded on May 8, 2014, in plain text format. It was then imported into VantagePoint, a text-mining software, for substantial cleaning and standardization through thesauri and manual checks.³ Only four document types (articles, letters, notes, and reviews) are included (Tang, 2013; Zhou, Thijs, & Glänzel, 2009a). Web of Science categorization is adopted to depict the main research areas of China's social science research. We follow the geographic location method introduced by Tang and Shapira (2011) to allocate all of China's SSCI publications to its 33 provincial regions: 22 provinces, 4 municipalities, 5 autonomous regions, and 2 special administrative regions.⁴ After several rounds of thorough cleaning, we finalized 51,264 of China's SSCI publications for analysis in the examination period of 1978 to 2013.⁵

3.1. Analyses

3.1.1. General trends

Our data show that the number of SSCI publications affiliated with China appear to increase substantially over the study period. The number of Chinese SSCI articles rose from 64 in 1978 to 8040 in 2013, with an annual growth rate of 14.81%.

To further understand the dynamics of China's SSCI publications, we split the study period into three 12-year phases: 1978–1989, 1990–2001, and 2002–2013. As depicted in Fig. 1(a), China's social science research in the first phase is barely visible at the global stage: the average number of publications per year is only 167. Between 1990 and 2001, the number of Chinese publications indexed by SSCI increased from 281 to 1096, an almost fourfold increase. This leads to a total of 7260 articles in this period. China's SSCI publications boomed during the last 12-year phase. The whole volume of this phase reached over 42,000 articles, with an annual growth rate of 19.67%.

China's increased visibility in social science research is also demonstrated by the rise of its world share of SSCI publications. China's SSCI publications originated at only 0.11% of the world total in 1978 but by 2013 leaped to 4.30% with a factor of almost 40. Although this is still not a big share, the growth trajectory, especially after 2002, seems likely to continue into the future. Our data reveal that China's global ranking of SSCI indexed articles has jumped from 26th, to 13th, and then to 8th in these three successive phases.

Many factors contribute to China's fast development in social science publication. The first is its rapid expanding researcher base. According to the Educational Statistics Yearbooks of China (Educational Statistics Yearbook of China, 2001; Educational Statistics Yearbook of China, 2012), the number of Chinese full-time equivalent social science researchers almost doubled within 12 years, from 261,174 in 2001 to 482,050 in 2012. Second, China's rising status triggered more interests in China around the globe. As documented by Liu et al. (2015), interest in and knowledge about China has developed rapidly over the years. This, intuitively, partially explains an increasing number of publications from China being accepted into international journals. From an institutional perspective, the Chinese university policy of encouraging more international publication matters. In spite of specific promotion criteria varying across different institutions and disciplines, in many Chinese universities and research institutes, a greater emphasis has been placed on Social Science Citation Index (SSCI) or Science Citation Index (SCI) indexed journals in addition to governmental grants and official competitive research awards

² We did not include the Arts & Humanities Citation Index (A&HCI) data set in our analysis due to the differences between social science and humanities research (Hicks and Wang, 2011).

³ This process consisted of a series of steps such as removing duplicate records based on WoS unique identifiers; merging affiliation variations such as England, Scotland, and North Ireland into the United Kingdom; and the like.

⁴ Note that Hong Kong and Macau returned to China in 1997 and 1999, respectively. In order to have a consistent comparison base, we include both special administrative regions throughout the whole examination period.

⁵ Our online search shows that China's SSCI publications are rather sporadic until 1977; thus, we confined the data coverage from 1978, the initial year of China's Reform and Open-door Policy, to 2013.

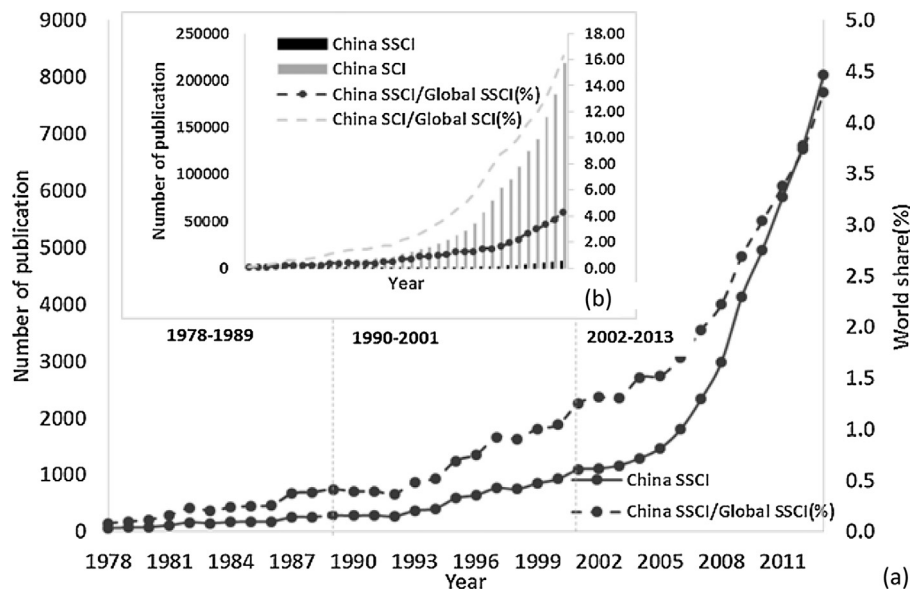


Fig. 1. China's SSCI publications by Year, 1978–2013.

(Shao & Shen, 2012). Under such a reward structure, rational Chinese social scientists naturally tend to shift their efforts and concentrate on more valued international publishing.

Yet China is still not a major player in the arena of social sciences. Very few Chinese journals are selected into WoS-SSCI in spite of its continuous expansion of adding new journals to its coverage (Waltman, Tijssen, & van Eck, 2011). According to Journal Citation Report (2013), 162 publishers out of 8539 SCI journals are in China, while only 13 out of 3080 SSCI indexed journals are registered in China. In the field of library and information science (LIS), not a single Chinese LIS journal is listed among 84 WoS-indexed LIS journals (Thomson Reuters, 2014). In July 2014, Thomson Reuters released a list of 3072 Highly Cited Researchers for 2002–2012 covering 22 broad fields of the sciences and social sciences.⁶ Among them, 132 unique researchers are affiliated with Chinese universities and research institutes.⁷ In sharp contrast, no Chinese scientists appeared in three social science domains: psychiatry/psychology; social sciences, general; and business & economics. This indicates that China does not have Olympic players, or globally recognized players in these social science domains.

When compared to China's SCI publications, China's social science research has a noticeably lower growth rate.⁸ As shown in Fig. 1(b), the disparity between these two intellectual domains is widening in terms of both absolute number and global share. There are a couple of reasons accounting for China's imbalanced development in natural and social sciences. To begin with, in contrast to natural sciences, social sciences are more imbedded in and thus affected by the national system to which they are oriented (culturally, economically, and politically) (Zhou et al., 2010). This posits restraints for publications appealing to a global audience. Second but related, social sciences require a greater mastery of the English language than natural sciences, which poses harder challenges for non-English-speaking scholars in countries such as China. These striking differences between natural sciences and social sciences may not be limited to China. Further comparative study of social science development in other countries would worthy of exploring.

3.1.2. Concentration of research output

3.1.2.1. Key actors at regional level. We examined the concentration of China's social science research at both regional and institutional levels. Following Tang and Shapira (2011), the regions discussed here are defined by provincial administrative boundaries. Table 1 identifies the key regional players of China's SSCI publications. As can be seen, China's distribution of SSCI publications is highly skewed: the top three most productive regions account for 77% of all publications in the examined period. But different from regional hubs in science domains (Chen, Chen, Hwang, & Chou, 2007; He, Zhang, & Teng, 2005; Li, Yi, Guo, & Qi, 2012), Hong Kong, rather than any other mainland city, leads with 24,304 papers (about 47%), followed by Beijing (13,208, or about 26%) and Shanghai (4587, or about 9%). The ten least productive regions only authored 886 SSCI publications together, occupying 1.7% of the total.

⁶ For a detailed description of Thomson Reuters' method, please refer to <http://highlycited.com/>.

⁷ Please note there are about 135 researchers who are highly influential in more than one research domain.

⁸ To benchmark the development trajectory of China's social science research, we also recorded and calculated yearly publications of SCI papers in China and worldwide using WoS online analyzing tools.

Table 1
Regional actors of China SSCI publications.

Phase			1978–2013		1978–1989		1990–2001		2002–2013	
Rank	Region	#	National share, %	International collaboration, %	#	%	#	%	#	%
1	Hong Kong	24,304	47.41	38.9	1058	52.98	5184	71.40	18,062	43.00
2	Beijing	13,208	25.76	54.2	516	25.84	1114	15.34	11,578	27.56
3	Shanghai	4587	8.95	54.4	172	8.61	327	4.50	4088	9.73
4	Guangdong	2396	4.67	43.2	35	1.75	110	1.52	2251	5.36
5	Jiangsu	2020	3.94	43.7	43	2.15	123	1.69	1854	4.41
6	Zhejiang	1816	3.54	49.5	13	0.65	68	0.94	1735	4.13
7	Hubei	1531	2.99	43.6	23	1.15	106	1.46	1402	3.34
8	Sichuan	1217	2.37	54.4	14	0.70	64	0.88	1139	2.71
9	Shaanxi	1134	2.21	46.6	15	0.75	40	0.55	1079	2.57
10	Liaoning	926	1.81	48.5	22	1.10	53	0.73	851	2.03
11	Shandong	879	1.71	50.5	11	0.55	74	1.02	794	1.89
12	Hunan	840	1.64	48.5	26	1.30	50	0.69	764	1.82
13	Macau	731	1.43	41.3	8	0.40	11	0.15	712	1.69
14	Tianjin	761	1.48	42.3	12	0.60	62	0.85	687	1.64
15	Fujian	700	1.37	51.3	4	0.20	24	0.33	672	1.60
16	Chongqing	693	1.35	42.0	6	0.30	22	0.30	665	1.58
17	Anhui	696	1.36	40.1	5	0.25	42	0.58	649	1.54
18	Yunnan	461	0.90	64.6	9	0.45	39	0.54	413	0.98
19	Heilongjiang	375	0.73	48.5	5	0.25	17	0.23	353	0.84
20	Henan	368	0.72	51.9	3	0.15	24	0.33	341	0.81
21	Jilin	318	0.62	53.8	6	0.30	22	0.30	290	0.69
22	Jiangxi	205	0.40	48.8	4	0.20	6	0.08	195	0.46
23	Gansu	202	0.39	51.5	3	0.15	5	0.07	194	0.46
24	Guangxi	207	0.40	63.3	4	0.20	14	0.19	189	0.45
25	Hebei	161	0.31	50.9	5	0.25	14	0.19	142	0.34
26	Shanxi	141	0.28	54.6	5	0.25	8	0.11	128	0.30
27	Xinjiang	122	0.24	45.9	1	0.05	8	0.11	113	0.27
28	Inner Mongolia	72	0.14	56.2	1	0.05	0	0.00	71	0.17
29	Guizhou	73	0.14	56.2	4	0.20	14	0.19	55	0.13
30	Hainan	54	0.11	64.8	0	0.00	1	0.01	53	0.13
31	Qinghai	45	0.09	62.2	2	0.10	6	0.08	37	0.09
32	Ningxia	39	0.08	46.2	1	0.05	4	0.06	34	0.08
33	Tibet	40	0.08	82.5	1	0.05	9	0.12	30	0.07
	Total	51,264	100	Ave. = 46.4	1997	100	7260	100	42,007	100

Table 1 also breaks down regional outputs of SSCI publications into the three successive phases previously defined. As can be seen, Hong Kong ranks first in all three phases. With just 0.5% of the Chinese population, Hong Kong accounts for 47% of research output in social sciences.^{9,10} It is interesting to point out that the relative share of the mainland in China's SSCI publications plummeted from 47% in the first phase (1978–1989) to 31% in the second phase (1990–2001) and then rose to 64% in the last twelve years. In the third phase, the mushrooming of China's SSCI publications is actually driven by research activities in both mainland China and Hong Kong. From 2007 the number of SSCI publications of mainland China has surpassed that of Hong Kong.

One speculation for this dynamic is that after the 1989 Tian-An-Men Square Event, many Chinese intellectuals on the mainland became more cautious and more reluctant to be critical toward social and political issues, while in more recent years, with the rise of the Chinese economy and the government's policies of attracting overseas talents, more voices were heard and suggestions were uttered by social science researchers residing in mainland China. Judging by the high growth rate, it seems that Beijing will replace Hong Kong as the leading SSCI producer in terms of the volume of publications.

The geographic information system software MapInfo 11.0 was used to visualize the changing pattern of China's SSCI publications by region (Liu et al., 2014). The results of this visualization are shown in Fig. 2. Again we can see the growth rate of China's social science research masks the huge variations in geographical concentrations of research output. As depicted in the figure, during the first and second phases, only a few regions located on the eastern coast of China are relatively active in SSCI paper production. In the third phase, regions from the midwest of China, such as Sichuan and Shaanxi, became involved in the knowledge production of social sciences, as evidenced by the darkened shades. But overall the expanding

⁹ Source: National Bureau of Statistics of China, <http://data.stats.gov.cn/>.

¹⁰ This is in sharp contrast to its publication shares in CSSCI. From 2002 to 2013, Hong Kong scholars only published 3531 papers in CSSCI and account for 0.3% of all the CSSCI indexed publications. However, during the same period Hong Kong scholars have published 18,062 SSCI papers which occupies for 43% of China SSCI publications.

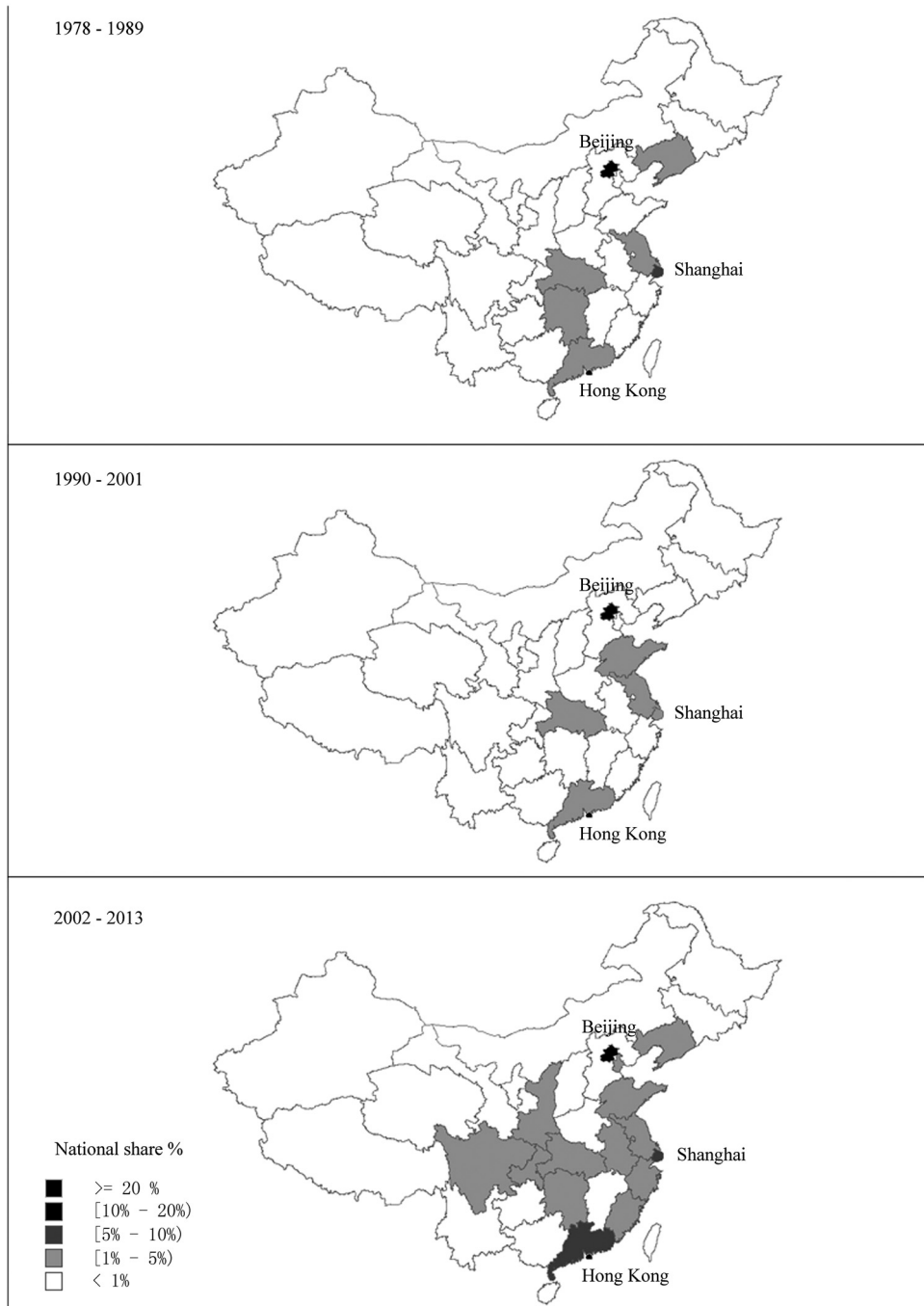


Fig. 2. Regional distribution of China's SSCI publications: Three phases.

clusters have strengthened among more developed coastal provinces, thereby intensifying China's coastal-interior divide in social science research.

3.1.2.2. Key actors at organizational level. China's concentration of social science research is also reflected at the organizational level. During the studied period, more than 5000 Chinese organizations contributed to the knowledge production of social sciences by publishing in international journals. The number, which was only about 500 in the first phase, doubled in

Table 2
Top 20 prolific institutions in China's SSCI publications.

Period	1978–1989			1990–2001			2002–2013		
	Institution	Region	#	Institution	Region	#	Institution	Region	#
1	Univ Hong Kong	Hong Kong	492	Chinese Univ Hong Kong	Hong Kong	1634	Univ Hong Kong	Hong Kong	4851
2	Chinese Univ Hong Kong	Hong Kong	409	Univ Hong Kong	Hong Kong	1287	Chinese Univ Hong Kong	Hong Kong	4555
3	Chinese Acad Sci	N/A	163	City Univ Hong Kong	Hong Kong	753	Hong Kong Polytech Univ	Hong Kong	3515
4	Chinese Acad Social Sci	Beijing	79	Hong Kong Univ Sci Technol	Hong Kong	702	City Univ Hong Kong	Hong Kong	2837
5	Peking Univ	Beijing	77	Hong Kong Polytech Univ	Hong Kong	528	Chinese Acad Sci	N/A	2687
6	Fudan Univ	Shanghai	54	Hong Kong Baptist Univ	Hong Kong	297	Peking Univ	Beijing	2460
7	Hong Kong Polytech Univ	Hong Kong	23	Peking Univ	Beijing	253	Hong Kong Univ Sci Technol	Hong Kong	1496
8	Shanghai Jiao Tong Univ	Shanghai	23	Chinese Acad Sci	N/A	250	Tsinghua Univ	Beijing	1466
9	Beijing Normal Univ	Beijing	22	Lingnan Univ	Hong Kong	117	Beijing Normal Univ	Beijing	1198
10	Cent S Univ	Hunan	18	Chinese Acad Social Sci	N/A	91	Fudan Univ	Shanghai	1053

the second phase and increased four times in the phase of 2002–2013. Table 2 identifies the top 10 most productive Chinese institutions in social science research.¹¹

The University of Hong Kong leads the production of SSCI publications with 6630 papers for the studied period. It is closely tailed by Chinese University of Hong Kong (6598), which is followed by Hong Kong Polytechnic University and City University of Hong Kong, with 4066 and 3602 papers, respectively. Chinese Academy of Sciences, the giant in scientific research, occupies only the fifth place with 3100 papers. Chinese Academy of Social Sciences has declined relatively in publication ranking. One speculation for the reason is that over the last two decades, via offering conditions attracting top social scientists and students, an increasing number of Chinese research universities have developed significant research activities in the social sciences (Hong, 2008; ISSC, 2010). The data also disclose that 6 out of the top 10 are located in Hong Kong. And in each of the three phases at least 70% of the top 10 prolific institutions are located in Hong Kong, Beijing, or Shanghai. In addition, the top 20 most prolific institutions contribute over 70% of China's SSCI paper production. All these data suggest a high concentration of Chinese social science research at both the regional and organizational levels.

3.1.3. Coauthorship analysis

3.1.3.1. General analysis. As one of the most tangible forms of research collaboration, coauthorship is a widely accepted indicator in the bibliometric community (Cronin, Shaw, & Barre, 2004; Glänzel & Schubert, 2004). Anecdotal evidence repeatedly reports that collaboration is playing an increasingly important role in academic research (Wuchty, Jones, & Uzzi, 2007; Zhou & Glänzel, 2010). This is also true for China's SSCI publications. In our data, over 80% of the publications are multi-authored. Among them, about two-thirds indicate collaboration by at least two institutions, and 46% show international collaboration. This number is twice high as China's international copublication rate in natural sciences (23%).

Fig. 3 depicts the international collaboration dynamics of China's SCI and SSCI articles. The international coauthorship rate of SSCI papers experienced a rapid growth in the first phase. Since 1992 it remains relatively stable between 40% and 50%. As shown in Fig. 3, during the entire 36-year study period, China's articles in SCI with international collaboration number far more than those in SSCI, while the proportions of international collaboration in SSCI publications are consistently higher than those of SCI publications except in 1981. This suggests that Chinese social scientists are more likely to collaborate with international partners than their counterparts in the natural sciences domain.

When benchmarking against CSSCI publications, the collaboration rates of China's SSCI publications are much higher than those indexed in CSSCI at individual, institutional, and international levels. Ma et al. (2014) found that during 1998–2011, about 36% of CSSCI indexed publications were coauthored. Su and Zou (2008) disclosed that about 33.9% of CSSCI publications from 2004 to 2006 were coauthored by different organizations. Through an online analyzing tool, we found that the international collaboration rate is as low as 1.7% in CSSCI indexed publications in the period from 2002 to 2013. The striking difference in international collaboration rates between SSCI and CSSCI publications is because by nature SSCI indexed articles are more internationally oriented compared to the rest of the subset of Chinese social science research.

¹¹ Please note that although headquartered in Beijing, the Chinese Academy of Sciences consists of a variety of institutes distributed among different regions of China. Thus we do not specify one region for its institutions in Table 2.

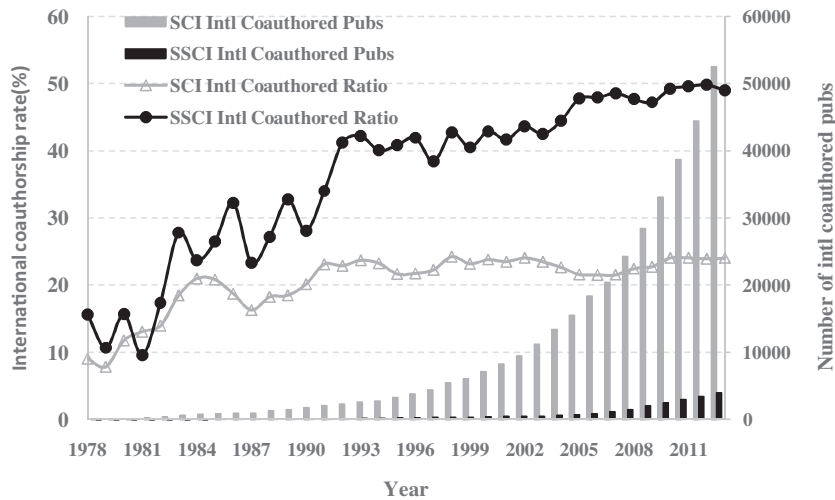


Fig. 3. International coauthorship dynamics of China, SCI vs SSCI.

Table 3
Top 20 international collaborators.

Period	1978–1989			1990–2001			2002–2013		
Rank	Country	#	(%)	Country	#	(%)	Country	#	(%)
1	USA	287	59.05	USA	1701	57.84	USA	10,700	52.61
2	UK	82	16.87	UK	394	13.40	UK	2820	13.86
3	Canada	39	8.02	Canada	357	12.14	Australia	2259	11.11
4	Australia	23	4.73	Australia	259	8.81	Canada	1911	9.40
5	Taiwan	14	2.88	Japan	115	3.91	Singapore	955	4.70
6	Japan	14	2.88	Singapore	70	2.38	Taiwan	893	4.39
7	Germany	13	2.67	Taiwan	66	2.24	Japan	829	4.08
8	France	9	1.85	Germany	63	2.14	Germany	728	3.58
9	Singapore	7	1.44	Netherlands	48	1.63	Netherlands	712	3.50
10	New Zealand	7	1.44	France	45	1.53	South Korea	521	2.56
11	Netherlands	5	1.03	New Zealand	41	1.39	France	426	2.09
12	Sweden	4	0.82	Sweden	40	1.36	New Zealand	349	1.72
13	India	4	0.82	Israel	37	1.26	Belgium	347	1.71
14	Switzerland	3	0.62	South Korea	32	1.09	Switzerland	341	1.68
15	Thailand	3	0.62	Switzerland	31	1.05	Spain	283	1.39
16	Philippines	3	0.62	India	26	0.88	Sweden	278	1.37
17	Indonesia	3	0.62	Finland	24	0.82	India	267	1.31
18	South Korea	2	0.41	South Africa	21	0.71	Italy	238	1.17
19	Italy	2	0.41	Nepal	18	0.61	Austria	166	0.82
20	Austria	2	0.41	Belgium	15	0.51	Israel	163	0.80

One interesting finding is that in spite of its leading position in SSCI papers, Hong Kong turns out to have the lowest international collaboration rate among 33 regions with 39%, which is 15 percentage points less than Beijing and Shanghai. One possible reason for this is that there exists a large pool of excellent scholars within Hong Kong and thus there is no need for them to go abroad seeking collaborators. This conjecture is partially supported by our data. When grouping Hong Kong's SSCI publications by Chinese versus non-Chinese surnames based on the thesauri developed by Tang and Shapira (2012), we found that about 86% involve at least one researcher with a Chinese family name over the examined period. When excluding foreign institutions, the figure remains at the same rate.

3.1.3.2. Key collaborating countries. Worldwide, from 1978 to 2013 Chinese researchers coauthored with researchers from 140 countries/regions to publish SSCI papers. Fig. 4 and Table 3 show the top 20 international partners in the three 12-year phases.¹² In the first phase of 1978–1989, China collaborated with 33 countries on 486 SSCI papers. The international

¹² Given the large variation of publication counts in the 36 years, the bar charts in Fig. 4 are drawn on a logarithmic scale for the purpose of better demonstration.

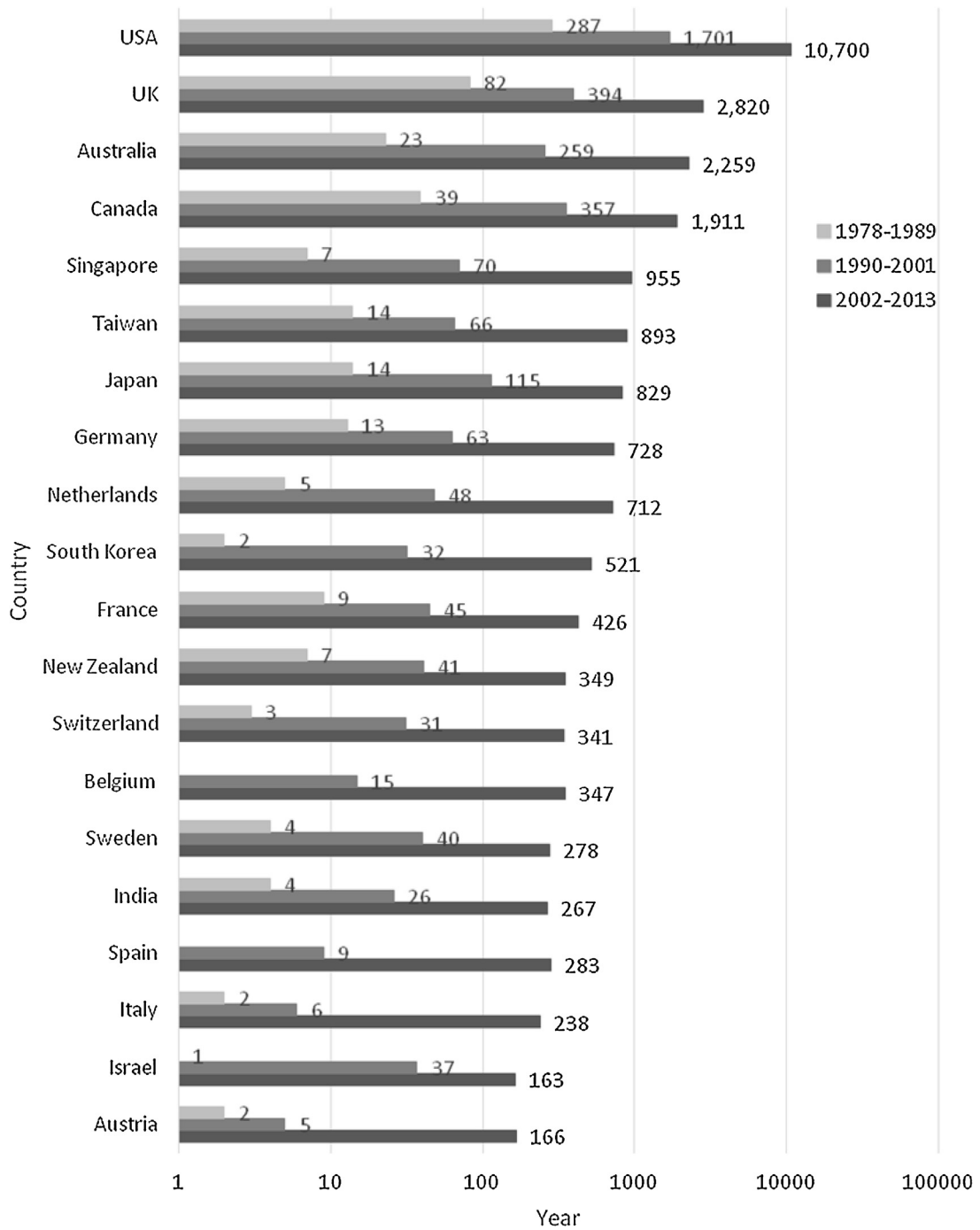


Fig. 4. China's rising trends of international collaboration.

collaboration intensifies in the next two phases, as evidenced by the number of collaborating countries, which rises to 75 and 136 with 2941 and 20,339 internationally coauthored papers, respectively.

As shown in Fig. 4, unsurprisingly, the United States is China's most important partner in social science research collaboration. Over half of China's internationally collaborated SSCI publications involve at least one scholar from the U.S. This is followed by the U.K., Canada, Australia, and Singapore, with shares of 13.87%, 10.69%, 9.71%, and 4.34%, respectively. The top 10 international partners account for 92.51% of all the internationally collaborated papers.

Table 4
China's SSCI publications by WoS categories.

A	B	C	D	E	F
Phase	WoS Category	Number	Share (%) China	Share (%) Global	Diff D–E
1978–1989	Economics	175	8.8	8.5	0.2
	Area Studies	138	6.9	1.4	5.5
	Psychiatry	127	6.4	7.3	–0.9
	Anthropology	125	6.3	2.2	4.0
	Education & Educational Research	120	6.0	5.7	0.3
1990–2001	Economics	988	13.8	9.2	4.6
	Management	791	11.0	4.1	7.0
	Psychiatry	436	6.1	9.1	–3.0
	Operations Research & Management Science	422	5.9	1.6	4.3
	Education & Educational Research	421	5.9	4.5	1.4
2002–2013	Economics	5478	13.0	9.7	3.2
	Management	3780	9.0	4.6	4.4
	Operations Research & Management Science	2401	5.7	1.5	4.2
	Public, Environmental & Occupational Health	2326	5.5	8.0	–2.4
	Psychiatry	2177	5.2	7.9	–2.7

3.1.4. Research foci

3.1.4.1. Research categories. Our data set encompasses 232 WoS categories. Table 4 illustrates the distribution of the top five WoS categories in the studied period.

From 1978 to 1989, Chinese researchers published in 160 WoS categories. The WoS category Economics leads, with 175 publications and a share of 8.8% of China's total SSCI publications,¹³ followed by Area Studies (138, 6.9%), Psychiatry (127, 6.4%), Anthropology (125, 6.3%), and Education & Educational Research (120, 6.0%). As shown in column F of Table 4, compared to the world average category distribution of SSCI publications, Chinese researchers were much more active in Area Studies and Anthropology in the first phase.

In the second phase, China's SSCI publications cover 195 categories. Economics again leads with 988 publications and a share of 13.8%. Replacing Area Studies and Anthropology, two new categories, Management (ranked 14th in the first phase) and Operations Research & Management Science (ranked 23th in the first phase), rose to the second and fourth places, respectively. When compared with the global mean,¹⁴ the shares of China's SSCI publications in Economics, Management, and Operations Research & Management Science are much higher than those of the world average. This suggests that when measured by relative publication share, China possesses comparative strengths in these domains.

In the third phase, China's SSCI publications expanded to 228 categories. Consistent with the previous phase, Economics and Management lead with 5478 (13.0%) and 3780 (9.0%) publications, respectively. Public, Environmental & Occupational Health rose to 4th place, while Education & Educational Research fell to 8th in this phase. Similar to the second phase, China's shares of the top three categories—Economics; Management; and Operations Research & Management Science—are much higher than the world averages, which indicates that China has relative competitiveness in these domains. Psychiatry, which consistently appeared in the top-five lists, and Public, Environmental & Occupational Health, which rose to 4th from 6th and 9th in the first and second phases are two WoS category in which China has a relatively smaller share than that of the global average. Overall our findings echo the discovery of Zhou et al. (2010) that the structure of the social sciences has remained rather stable over time.

3.1.4.2. Content related to China. Intuitively, social science research is contextual and, as expected, highly related to local social and political systems (Hicks, 2005; Zhou, Thijs, & Glänzel, 2009a; Zhou, Thijs, & Glänzel, 2009b). With this in mind, we set out to examine to what extent China's SSCI publications focus on Chinese issues. Assuming social science research related to Chinese issues contains text of Chinese geographical information in the fields of title, abstract, author keywords, or keywords plus, we constructed a thesaurus that contains the names of China, its 33 provinces, and their name variations and applied it to the topic fields of downloaded publications (Liu et al., 2015).¹⁵

Fig. 5 illustrates that the growth trend of China-related and non-China-related SSCI publications almost overlapped until 2001, the end of the second phase. Since then an increasing number of Chinese SSCI research dealt with Chinese issues. Our data shows that on average 55% of China's SSCI publications are China-related in content. This indicates that Chinese researchers conducted more social science research about China than about worldwide social sciences in general.

¹³ The percentage is computed by the number of Chinese articles in the category of Economics divided by the total number of China's SSCI publications.

¹⁴ The global mean (%) is computed by the number of articles in the category of Economics worldwide divided by the total number of global SSCI publications.

¹⁵ For more information on this method, see help for advanced search field tags available at <http://images.webofknowledge.com/WOK46/help/WOS/advanced.fieldtags.html>.

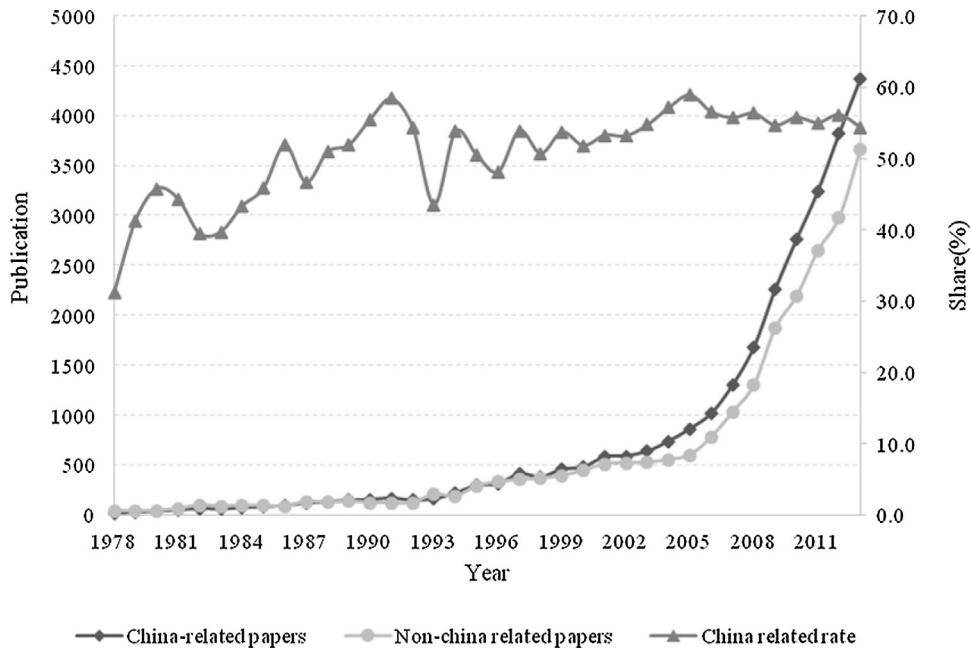


Fig. 5. Evolution of China-related papers.

We further differentiated China-related articles by regional focus. We found that out of 13,373 regionally related articles, less than 12% (1550 articles) deal with mid-China issues and about 7% (890 articles) focus on western China.¹⁶ The small proportion of articles on inland China are furthermore unevenly distributed among provinces. There are 13 provinces' issues discussed in fewer than 100 papers each during 36 years of examination. Given that mid- and western China together account for 61% of China's population (0.85 billion out of 1.4 billion) and 70% of its geographical area (6.7 million km²), we can conclude that Chinese social scientists' attention to and knowledge of inland China is disproportionately low compared with those regions' demographics and rising economic importance.

3.1.5. Funding analyses

An increasing number of researchers have begun to use funding acknowledgement (FA) to probe the driving forces behind research growth (Costas & Leeuwen, 2012; Cronin, Shaw, & La Barre, 2003; Shapira & Wang, 2010). In this research, we use FA analysis to identify the key funding agencies of Chinese SSCI publications during the five-year period of 2009 to 2013.¹⁷

Several intriguing findings emerge from FA analysis. One is the relationship of international collaboration and international co-funding. As shown in the top panel of Fig. 6, about 41% of funded international copublications are supported by Chinese funding agencies only, 31% are co-funded by both domestic and foreign funders, and 29% are supported solely by foreign funders.¹⁸ This indicates that both internal and external funding sources support internationally collaborated social science research from China. In sharp contrast, for papers authored by Chinese researchers only (see the bottom panel of Fig. 6), about 94% of the funded papers are supported by domestic funders only and 4% of them are co-funded by both domestic and foreign funders, while less than 2% are funded solely by foreign funders. This indicates that without the participation of international collaborators, it is not easy for Chinese social scientists to elicit foreign funding.

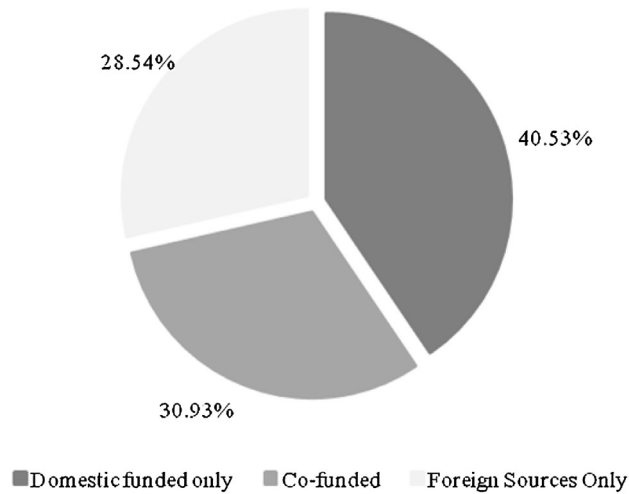
Our data show that the R&D funds for social sciences in China come from different levels of the government as well as from nongovernmental organizations. Table 5 lists the top 20 funding sources for SSCI publications from 2009 to 2013. Unsurprisingly, our data reveal that economically affluent regions provide the majority of the support for social science research. As listed in Table 5, prolific regions such as Hong Kong, Beijing, and Shanghai are also the places containing the top funding agencies. At the institutional level, Chinese Academy of Sciences, Hong Kong Polytechnic University, and University

¹⁶ We adopt the Chinese government's convention on definitions of eastern, central, and western China. Population and area data are based on information from the National Bureau of Statistics of China. The data were accessed on August 10, 2014.

¹⁷ WoS began including funding acknowledgement data in their publication record in August of 2008. We retrieved funded research articles in SSCI using the following searching strategy: FT=(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*) AND CU=(CHINA OR HONG KONG OR MACAO) AND DOCUMENT TYPES=(ARTICLE OR LETTER OR NOTE OR REVIEW)

¹⁸ The total is greater than 100% due to rounding issues.

International collaborated articles



Domestic articles

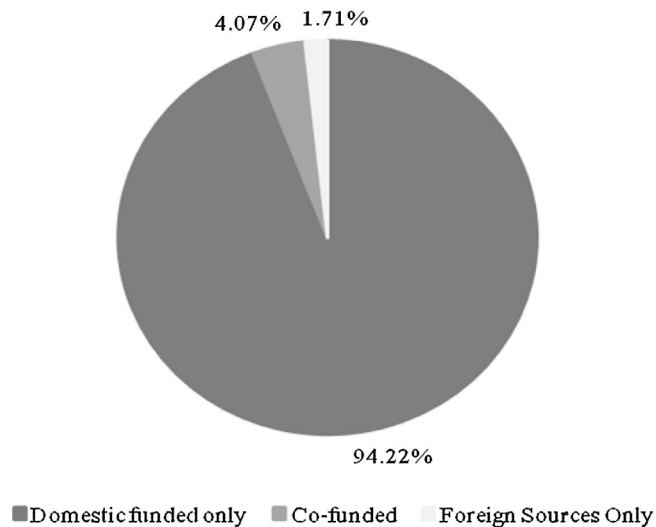


Fig. 6. Funding sources of China's social science research, international vs domestic.

of Hong Kong are among the top funding sources. Two foreign funding agencies, National Institutes of Health and National Science Foundation, both from the U.S., are among the top 10 funding sources.

Another interesting fact arising from our FA analysis is that National Social Science Foundation of China (NSSFC) plays only a limited role in funding China's SSCI publications. Nationally there are two major funding agencies that contribute to Chinese social science development: NSSFC and the Management Science Branch of National Natural Science Foundation of China (NSFC). The R&D funding from these two sources increased 20 times from 2001 to 2012. The grant support from the division in charge of NSSFC and the Management Science Branch of NSFC rose, respectively, from 60 and 31.42 million Yuan in 2001 to 1195.89 and 661.9 million Yuan in 2012 (NPOPSS, 2011; NSFC, 2013). As shown in Table 5, NSFC leads with 17% of China's SSCI papers, followed by Ministry of Science and Technology of China (7%) and Ministry of Education of China (6%). Surprisingly, only 1% of Chinese SSCI publications acknowledged financial support from NSSFC. This discrepancy between NSSFC public funding and research output in the international research community deserves further exploration.

Table 5
Top 20 funding agencies for China's social science research, 2009–2013.

Rank	Funding source	Country/Region	Record	Share (%)
1	National Nature Science Foundation of China	China	5214	17.48
2	Ministry of Science and Technology of China	China	2014	6.75
3	Ministry of Education of China	China	1916	6.42
4	Hong Kong Government	HK	1241	4.16
5	<i>US National Institutes of Health</i>	US	792	2.65
6	Chinese Academy of Sciences	China	636	2.13
7	Shanghai Municipal Government	China	446	1.49
8	<i>US National Science Foundation</i>	US	398	1.33
9	Hong Kong Polytechnic University	HK	368	1.23
10	National Social Science Foundation of China	China	312	1.05
11	University of Hong Kong	HK	298	1.00
12	Beijing Municipal Government	China	293	0.98
13	Guangdong Provincial Government	China	269	0.90
14	China Postdoctor Science Foundation	China	238	0.80
15	Jiangsu Provincial Government	China	234	0.78
16	Zhejiang Provincial Government	China	216	0.72
17	China Scholarship Council	China	165	0.55
17	<i>European Union</i>	EU	165	0.55
19	City University of Hong Kong	HK	158	0.53
19	<i>NSERC of Canada</i>	Canada	158	0.53

4. Discussion

This study has some limitations. The first is related to the caveats of WoS-SSCI in exploring China's social science development. We stated the reasons we did not choose CSSCI to analyze China's social science research development. But we are also aware that WoS-SSCI is biased toward Anglo-American publications and English articles that have been discussed by bibliometricians (Nederhof, 2006). This suggests there is an underestimation of social science research activities in China (Glänzel & Schoepflin, 1999; Hicks, 2005; Zhou, Thijs, & Glänzel, 2009a; Zhou, Thijs, & Glänzel, 2009b). And this might partially account for why very few studies have examined social science research using bibliometric analysis.

In addition, while FA analysis is an enhanced tool for examining the relationship between research input and performance, it is highly possible that Chinese researchers overreport or underreport their financial supporting information, either subconsciously or deliberately, under the pressure of fulfilling specific funding requirements. In this sense, to what extent FA analysis can reflect the driving forces behind research deserves a more detailed investigation.

In spite of these limitations, this research has some interesting findings. With more recent data, our analyses update and extend an earlier investigation on China's social science research (Zhou, Thijs, & Glänzel, 2009a; Zhou, Thijs, & Glänzel, 2009b; Zhou et al., 2010). Our analyses reveal that Chinese social scientists are increasingly active in publishing in international journals. The distribution of research output is highly skewed at both regional and organizational levels. Hong Kong dominates China's SSCI publications, but its leading role is declining over time with the rise of Beijing and Shanghai. Without world-leading minds, China is not yet a major contributor in the social sciences. Given the scale and growth of Chinese R&D researchers, especially the existence of overseas diaspora and reverse immigration (Jin, Rousseau, Suttmeier, & Cao, 2007; Wang, Tang, & Li, 2014), we can reasonably predict the increasing significance of China, especially mainland China, in the social sciences.

As reflected by the proportion of China-related publications, China's social science research is equally nationally and globally oriented; its research structure has been rather stable over the years. Our findings also indicate that the internationalization of Chinese social science has incrementally improved with broadening collaborators, with the dominating role of the U.S and growing relationships with Australia and Singapore. Internationally coauthored publications receive financial support from both China and foreign sources.

The Chinese government is struggling with unbalanced development in natural and social sciences. With the Ten-Year Cultural Revolution, especially the "Talent Fault" of academia caused by the long-term Cultural Revolution (Jin, Li, & Rousseau, 2004), and the 1989 Tian-An-Men Square Event, Chinese social science research languished for a while. Yet with the deepening of China's opening up and reform, social science research has been and will continue playing a critical role in China's modernization in the context of globalization. This provides both opportunity and challenge to China's social science development.

Acknowledgments

This research is supported by National Natural Science Foundation of China (#71303147, #71132006 and #71302133), Shanghai Pujiang Talent's Program (#13PJ052) and Shanghai Soft Science Key Project (#14692102900). The views expressed herein are those of the authors and not necessarily those of the funders listed here. This study has benefited greatly from the insightful comments from anonymous reviewers. We are responsible for any errors.

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