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RESEARCH ARTICLE

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Chinese Returnees from Overseas Study: An Understanding of Brain Gain and Brain Circulation in the Age of Globalization

Abstract Among discussions on international academic mobility, a persistent challenge is to understand whether education abroad can become a source of brain gain, and whether globalization can offer source countries the hope that they might enjoy the benefits of freer cross-border flows in information and personnel. With reference to China, this article provides an understanding of these two issues. It reveals practical factors affecting returnees' decision to return, their contribution to specific areas, and obstacles that limit their contribution and career opportunities. In addition, it sheds light on an emerging brain circulation between China and foreign countries, along with the increased cross-border flow of academic talent from and into China.

Keywords Chinese returnees, brain gain, brain circulation

Introduction

For historical reasons, political, economic and social development is unequal among the nations of the world. A substantial body of literature concerning education and development has argued that global systemic political and economic imbalances result in worldwide educational inequality, which is maintained and reinforced by a continuous flow of academic talent from lesser- to more-developed countries. The resulting brain drain is suffered by source

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countries. Recent literature on globalization and international academic mobility, however, has identified two remarkable changes in the routes of international academic mobility. One is a reverse flow in which many scholars—having obtained education and experience in developed countries—have returned to their source countries to pursue new career development opportunities (Zikopoulos, 1991; Engardio, 1994, November). The other is the more rapid movement of highly-skilled personnel—especially individuals with higher education background in well developed countries—in the international labour market (Saxenian, 2002). These changes have raised two questions regarding the consequential impact of international academic talent on source countries.

The first question is whether education abroad can become a source of brain gain. This question has been widely discussed in both academic studies and policy debates since the 1990s (Kehm & Teichler, 2007). Much attention has been paid to the deliberate attempts, efforts, programs and projects made by governments and/or institutions to draw highly skilled personnel to a given country or organization (Nash, 1994, November 21; Brunet, 1998, December 10; Jałowiecki & Gorzelak, 2004; Manda, 2004, December; Singh, 2005, May 19). Works by Altbach (2004a, 2004b) and Namgung (2008) suggest that quantitative brain gain (i.e., an increased return rate) does not necessarily mean qualitative brain gain (i.e., the returnees contribute to local development). To understand whether a source country can benefit from brain gain, one should examine not only the governments' policies and strategies for enticing some of their brightest people to return, but also domestic and institutional factors that affect returnees' contribution and career opportunities. However, this issue is under-researched.

The second question is whether globalization can offer source countries the hope that they might enjoy the benefits of freer cross-border flows in information and personnel. It is widely noticed that globalization has led to freer and quicker cross-border flow of human activities, together with flows of goods, capital, services and people in economic, political, and cultural dimensions (Featherstone, 1995; Held, McGrew, Goldblatt, & Perraton, 1999; Giddens & Hutton, 2000; Altbach, 2004b). Some studies (e.g., Saxenian, 2002; Hart, 2006) suggest that human capital flow in the globalized world could be better understood through the concept "brain circulation," which refers to the ability of individuals—especially highly-skilled personnel with marketable expertise—to move freely in the international labor market. Unlike brain drain or brain gain,

suggesting a one-way flow of human capital, brain circulation suggests the exchange of human capital that may benefit both home and host countries (Tung, 2008; Lee & Kim, 2010; Freeland, 2011, October; Zhou & Hsu, 2011; Welch & Hao, 2013).

Given that one's physical location is immaterial in the global economy, so long as developing economies are able to draw upon one's expertise, regardless of where one lives, proponents of the "brain circulation" concept optimistically portray it as a "win-win situation" in which source and receiving countries both benefit from the freer cross-border flow of human capital, information, knowledge, and services. In contrast, others, such as Altbach (2004a, 2004b) and Rizvi (2005), argue that, although advanced information and communication technologies make "virtual mobility" possible, access to these assets is still unequal. Works by Rosenzweig (2008), Docquier (2008), and Tomas (2008) show that brain circulation favors highly-skilled professionals taking advantage of skill-price differentials in the international labor market; there is little flow of human capital to poor countries with low skill prices. Therefore, it might be relatively easy for brain exchange to occur among the industrialized market economies of Western Europe and North America because they enjoy similar stages of development, as Salt (1992) and North (1992) have observed, but brain exchange between more- and lesser-developed countries continues to be unequal.

In the midst of the global competition for talent, the People's Republic of China is rising as a new competitor. Though it continues to be the largest source country for internationally mobile students (accounting for one-seventh [15%] of the total [UNESCO Institute for Statistics, 2009]), the country is emerging as a new destination for international academic talent. In particular, there has been an increased return of foreign-trained Chinese nationals to work in China. Some works have noted that, since the 1990s, China has offered a variety of incentives to entice its foreign-trained nationals to return (Orleans, 1989; Hvistendahl, 2008). The recent works on Chinese knowledge diaspora have explored the impact of cross-border academic mobility on China's rise in world economic and academic communities (Welch & Zhang, 2008; Yang & Welch, 2010).

Although China's brain gain phenomenon has sparked heated discussions, the topic remains under-researched in two major aspects. First, academic studies on China's brain gain mainly focus on policy which has enabled the Chinese government, market and universities to offer funding and job opportunities to

entice its expatriate academic talent to return (Englesberg, 1995; Cao, 2004a; Cheng, 2006b; Zweig, 2006). Relatively little is known about the practical factors affecting returnees' decision to return, their contribution to specific areas, and obstacles that limit their contribution and career opportunities. Second, there is a lack of academic studies examining an emerging brain circulation between China and foreign countries, along with the increased cross-border flow of academic talent from and into China.

This article attempts to fill this research void. In particular, it aims to provide empirical data to address three specific questions:

(1) Why have so many Chinese scholars with PhD and MBA qualifications from Western universities returned to China in recent years?

(2) What contribution have those returnees made to China after they return?

(3) What kinds of difficulties and obstacles remain for returnees?

The next section will explain the research methodology. This is followed by an interpretative analysis of the research findings. The paper concludes by discussing the implications of the Chinese experience for our understanding of international academic mobility in the context of globalization.

Research Methodology

This paper uses the concept of brain gain and brain circulation to discuss Chinese mainland students and scholars who have returned to China after completing their higher education or training abroad, since the adoption of the open-door policy in China in 1978. In Chinese, full-time returnees from overseas with advanced education are often called *hai gui* or "sea turtles"; while those who do not give up their positions abroad but return part-time, are often named *hai ou* or "seagulls" since they fly back and forth frequently from shore to shore (Wang, 2007; Freeland, 2011, October). The two groups of returnees are chosen as the subject of this study, because their return is often regarded as China's brain gain, at least from a quantitative perspective. This study uses empirical data to examine the returnees' contribution to China's scientific research, technological economy, and political system, in order to understand the qualitative aspect of China's brain gain. All data in this paper were based on online information collected in 2013 from official organizations or public websites. Official organization websites took priority in the search for returnees' resumes. The

largest Chinese search engine *Baidu* was the second source, while some returnees' academic backgrounds and affiliations were obtained from public websites such as *Wikipedia*, *Sina*, and *NASDAQ*. Research subjects were Chinese, born on the Chinese mainland and having had some education before going abroad, returned and worked either full-time or part-time, after receiving an advanced degree overseas (bachelor's, master's, or doctoral) or professional training as visiting scholar or postdoctoral fellow, no matter whether they had permanent resident status overseas or became foreign citizens. Overseas studies or training could be obtained from any foreign countries as well as Chinese Hong Kong and Chinese Macau. Subjects were otherwise not part of this study unless they had stayed overseas for at least one year cumulatively before returning. All Chinese names are given with the surname followed by first name. The following sections will present findings regarding the aforementioned three research questions.

Reasons for Returning

Since Deng Xiaoping announced in 1978, "We [Chinese] are going to send thousands or tens of thousands of students to receive overseas education" (Xinhua News Agency as cited in Gu, 2011, p. 137), more than three million Chinese students or scholars have received foreign higher education or training. Like many other developing countries, China has also suffered a severe brain drain over the past decades, especially during the 1990s (Zweig & Chen, 1995); however, after a decade with a low rate of return, the number of returnees has significantly risen from the beginning of the 21st century. The return rate has increased to more than 20% for 13 consecutive years between 2000 and 2012, and was even higher than 50% in 2008 and 2009 (Chinese Education Online, 2014). Why do they return home after obtaining overseas degree? Push-pull theory indicates that human capital migration is driven by push and pull factors in source and receiving countries (Altbach, 2004a; Li & Bray, 2007). However, studies have reported that the returning of Chinese talent from overseas study in the recent decade is mainly motivated by pull factors in China, but not by push factors in the receiving countries (Kellogg, 2012; Tharenou & Seet, 2014). In this section, the authors will focus on the analysis of China's pull factors, including both economic and non-economic forces.

Economic Growth

After the fast economic development over the past 30 years, with annual growth rates averaging 10%, China's economy has become the world's second largest economy by nominal GDP and the world's largest economy by purchasing- power-parity, according to a 2014 estimate from the International Monetary Fund (IMF, 2014). From 1978 to 2014, China's GDP per capita increased almost by 30-fold, from USD 226 to 6,995 (National Bureau of Statistics of China, 2013), which has led to an emerging middle class who have rising wages and can afford consumer items including cars, consumer electronics, household appliances, and large homes. Zeithammer and Kellogg's study has showed that when wages and living conditions are comparable between the US and China, most Chinese PhD students in the US, especially in technology, engineering, and mathematics, prefer to return home (Tharenou & Seet, 2014). In addition, improved working conditions and advanced research facilities also entice overseas talent back. In the 1990s, one of the important reasons for many Chinese students or scholars to stay abroad was because poor working conditions and research facilities in China prevented them from carrying out cutting-edge research at home (Zweig & Chen, 1995). However, during the past decades, Chinese scientists and scholars' working conditions have significantly improved, and a considerable number of new up-to-date research facilities have been purchased, particularly in the national key laboratories in Chinese universities and research institutions. This is thanks to strong economic growth that has made it possible for China to increasingly invest in research and development (LaFraniere, 2010, January; Elsevier, 2013; Thibodeau, 2014). In summary, China's strong economic growth is considered one of the major factors that pulls returnees back.

Admission to the WTO

China's admission into the World Trade Organization (WTO) serves as another factor attracting people back. After a lengthy process of negotiation with Western countries, mainly the US, the WTO's door finally opened to China in 2001, twenty years after it applied to gain membership in the 1980s. For China, the admission is an enormous achievement, but at the same time, also a great

challenge, for it has required China to make significant changes to its economic system. After admission, China has had to improve or even reform its prior system and engage in global competition in the world according to preexisting rules. Under these circumstances, China needs returnees' contributions, since they are familiar with foreign languages and international rules and laws and have advanced knowledge, technologies, and skills, all of which are important to help the state's transformation. A great number of excellent career and economic opportunities have appeared for overseas talent at home since then. According to interviews with returnees in the mass media, along with improving domestic social condition, China's increasing engagement in the global economic community was a strong factor that encouraged many overseas Chinese scholars to return, in the hope of building up their own businesses in China (Xiao, 2005).

Government Incentives

The Chinese government and universities have issued a series of preferential policies, namely on funding, promotion, and tax breaks, to attract overseas talent back home, although many are similar to the programs successfully employed in Chinese Taiwan, Singapore, and South Korea in the 1980s (Wang, 2007; Pan, 2011; Hao & Welch, 2012; Kellogg, 2012; Tharenou & Seet, 2014). For example, the state established new programs to aid China's premier universities' recruitment activities, such as the Changjiang Scholars Program, which helps Chinese universities recruit leading overseas scholars in selected disciplines who are young and middle-aged (Ministry of Education, 2004) and the Start-Up Research Grant Program, which enables returnees to start laboratories, buy equipment, and hire research assistants (Cheng, 2006a). Many universities have introduced systems that make overseas educational background and visiting scholar experience key criteria for hiring and promotion (Tongji University, 2006), and holders of overseas PhDs can be made full professors immediately upon their return (Huasheng News Reporter, 2004). Armed with new high technology and skills, returnees could also apply for start-up funds and create companies with tax breaks in science parks (e.g., Beijing's Zhongguancun Technology Park and Shanghai's Zhangjiang Hi-Tech Park; Wang, 2007; Pan,

2011). A large majority of returnees are drawn back by these privileges (Wang, Wong, & Sun, 2006; Tharenou & Seet, 2014).

Continuing Open-Door Strategy

China's continuing open-door strategy has encouraged many talented people to return. In Zweig and Chen's (1995) study, a few years after the 1989 Tiananmen Incident, some overseas Chinese students and scholars decided not to return because they feared that China would close its door and they would have never been allowed to leave again if they had returned. However, China's door stayed open continually over the past two decades, even after the state began to suffer a severe brain drain when Western countries such as the US and Canada approved all students attending universities in their countries at the time of the protests for permanent residence status (Zweig & Chen, 1995; Kellogg, 2012). During the eras of Jiang Zemin and Hu Jintao, China's politics were stable and the government adopted an even more proactive open-door strategy to develop the economy and begin globalizing, by joining the WTO and hosting such international events as the 2008 Beijing Olympic Games and the 2010 Shanghai World Expo. This strategy signalled that returnees could always come and go freely across borders.

Returnees' Contribution

Empirical data presented in this section shows how homecoming Chinese talent contributed to China's scientific research, technological economy, and academic leadership, suggesting that for China their return signifies not only quantitative but also qualitative brain gain. This section also shows that the returnees' mobility to and from China has led to brain circulation, favoring not only China's but also international or world academic and economic communities.

Contribution in Scientific Research

To provide a snapshot of the returnees' contribution to scientific research, we have selected the journal *Nature*, a leading journal of high quality academic articles in the natural sciences, and analyzed its publications in in the biological sciences in 2013. We found that in this journal no biological articles had Chinese

mainland scholars as first authors in 1993, but in 2013, eighteen publications were from the Chinese mainland.[1] Then, we examined how much contribution returnee scientists or scholars had made to these scientific publications.

Important biological discoveries are regularly contributed by many researchers (e.g., students, postdoctoral fellows, and professors) who are from different laboratories. In biological sciences, a student or postdoctoral fellow who has completed the most important part of the research work is usually listed as first author, while a professor or laboratory's principal investigator who has provided research funds and location, and led the whole project often serves as a corresponding author. Based on the fact that overseas degree-receiving returnees are typically awarded start-up research funds and lead their research team, this paper looks at the corresponding authors of the 18 biological publications.

The 18 publications are found to have 31 corresponding authors in total, since some professors, like Dr. Shi Yigong, is a corresponding author in more than one publications, while some publications like that of Xue Zhigang et al., have more than one corresponding author. Among all the corresponding authors, except Peter Daszak, Li Zhensheng, Zhang Aimin, and Wang Jun, 27 (87%) were "sea turtles" or "seagulls", working full- or part-time in China. The 27 corresponding authors' personal information, including names, overseas education or training experience, and affiliation(s), are shown in Table 1.

Table 1 Twenty Seven Corresponding Authors in Biological Sciences in *Nature* in 2013

Name	Overseas Education/Training	Affiliation
[1] Bi Shundong	Howard University, Washington, D.C.-PhD	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China Indiana University of Pennsylvania, Pennsylvania, IN
[2] Cao Chunmei	Hong Kong University, Hong Kong, China-Postdoc	Peking University, Beijing, China
[3] Chen She	Iowa State University, Ames, IA-MSc UTSMC at Dallas, Dallas, TX-Research Associate	National Institute of Biological Sciences, Beijing, China

(*To be continued*)

[1] The 18 publications are listed in the Appendix 1: Publications in Biological Sciences by Chinese mainland scholars in *Nature* in 2013. please refer to www.brill.com/fedc or http://journals.hep.com.cn/fed.

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Name	Overseas Education/Training	Affiliation
[4] Chou James J.	Harvard University, Cambridge, MA-PhD	Harvard University, Cambridge, MA Shanghai Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences, Shanghai, China
[5] Fan Guoping	Case Western Reserve University, Cleveland, OH-PhD	University of California at Los Angeles, Los Angeles, CA Tongji University, Shanghai, China
[6] Gao George F.	Oxford University, Oxford, England-PhD and Postdoc Harvard University, Cambridge, MA-Postdoc	Institute of Microbiology, Chinese Academy of Sciences, Beijing, China
[7] Li Jiayang	Brandeis University, Waltham, MA-PhD	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China
[8] Ling Hongqing	Christian-Albrechts-University of Kiel, Kiel, Germany-PhD	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China
[9] Liu Jiayin	Cincinnati University, Cincinnati, OH-Visiting Scholar	Nanjing Medical University, Nanjing, China
[10] Meng Jin	Columbia University, New York, NY-PhD	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China American Museum of Natural History, New York, NY
[11] Qi Hai	University of Texas Medical Branch, Galveston, TX-PhD National Institute of Health, Bethesda, MD-Postdoc	Tsinghua University, Beijing, China
[12] Shao Feng	University of Michigan, Ann Arbor, MI-PhD	National Institute of Biological Sciences, Beijing, China
[13] Shi Yigong	Johns Hopkins University, Baltimore MD-PhD Princeton University, Princeton, NJ-Professor	Tsinghua University, Beijing, China
[14] Shi ZhengLi	Montpellier 2 University, Montpellier, France-PhD	Wuhan Institute of Virology, Chinese Academy of Sciences, Wuhan, China
[15] Shu Yuelong	University of California at Los Angeles, Los Angeles, CA-Postdoc Mount Sinai School of Medicine, New York, NY-Postdoc	National Institute for Viral Disease Control and Prevention, Beijing, China
[16] Sun Bing	National Institute of Health, Bethesda, MD-Postdoc	Shanghai Institutes for Biological Sciences, Shanghai Institute of Biochemistry and Cell Biology, Chinese Academy of Sciences, Shanghai, China

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Name	Overseas Education/Training	Affiliation
[17] Wan Jianmin	Kyoto University, Kyoto, Japan-PhD	Nanjing Agricultural University, Nanjing, China
[18] Wang Daowen	John Innes Center, Norwich, England-PhD and Postdoc	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China
[19] Wang Haiyang	Yale University, New Haven, CT-Postdoc Cornell University, Ithaca, NY-Assistant Researcher Yale University, New Haven, CT-Researcher	Chinese Academy of Agricultural Sciences, Beijing, China
[20] Wang Yonghong	HKUST, Hong Kong, China-Visiting Scholar	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China
[21] Wu Jiawei	Princeton University, Princeton, NJ-Postdoc	Tsinghua University, Beijing, China
[22] Xiao Rui-Ping	University of Maryland at Baltimore, Baltimore, MD-PhD National Institute on Aging, Bethesda, MD-Investigator	Peking University, Beijing, China
[23] Xue Zhigang	University of California at Los Angeles, Los Angeles, CA-Postdoc	Tongji University, Shanghai, China
[24] Yan Ning	Princeton University, Princeton, NJ-PhD and Postdoc	Tsinghua University, Beijing, China
[25] Xu H. Eric	Duke University, Durham, NC and University of Texas Southwestern Medical Center, Dallas, TX-PhD Massachusetts Institute of Technology, Cambridge, MA-Postdoc Glaxo Wellcome, Stevenage, England-Research Investigator	Van Andel Research Institute, Grand Rapids, MI Van Andel Research Institute/Shanghai Institute of Material Medica, Shanghai, China
[26] Zhang Peng	Swiss Federal Institute of Technology Zurich, Zurich, Switzerland-PhD	Shanghai Institutes for Biological Sciences, Chinese Academy of Sciences, Shanghai, China
[27] Zhu Min	Museum für Naturkunde, Berlin, Germany-Postdoc National Museum of Natural History, Paris, France-Research Fellow	Institute of Genetics and Developmental Biology, Chinese Academy of Sciences, Beijing, China

Source: For references in full, please visit www. brill.com/fedc or http://journal.hep.com.cn/fed

In Table 1, seventeen authors have received PhD degrees from overseas (mainly from the US; see 1, 4–8, 10–14, 17–18, 22, 24–26), and seven have undergone postdoctoral training (see 2, 15–16, 19, 21, 23, 27), but only one has studied for a masters degree (see 3) and two have gone abroad as visiting scholars (see 9, 20). Their Chinese affiliations revealed that 22 authors were full-time returnees, but five worked part-time in China given the fact that they had both positions at home and abroad (see 1, 4–5, 10, 25). Since a majority of

corresponding authors of the 18 biological publications are returnees, it is clear that returnees have made a greater contribution than local peers in biological sciences and have become a source of brain gain for China. This research also indicates that Chinese talent returning from overseas is not simply a zero-sum game: China's brain gain is the other country's brain drain. However, contributions made in China benefit the entire global biological sciences community when published in international journals.

Contribution to the Technological Economy

China's economy, particularly its technological sector, has been greatly improved by returnee entrepreneurs and returnee venture capitalists after their introduction of new high technologies and foreign capital into China. They have helped bridge China's economy with international or global economic markets through their products and services. In this section, returnee entrepreneurs whose companies have been listed on *NASDAQ* will be studied, as will venture capitalists, helping us understand the nature of China's brain gain and brain circulation in the sphere of technology.

Except for Ding Jian (4), Wu Shangzhi (16), and Xiong Xiaoge (18), all those listed in Table 2 are returnee entrepreneurs; their *NASDAQ*-listed technological companies are also recorded. Vanhonacker et al.'s study found that Chinese returnees were four times as likely as locals to possess the latest international technology and almost 50% as likely to have technology that was new for China, even though it was not the newest internationally (Agunias, 2006). In the list, for example, Zhang Chaoyang, a Massachusetts Institute of Technology PhD graduate, used IT technologies that he learned from the US and pioneered the first Chinese language search engine *Sohu* after he returned to China in 1996 (see No. 20 in Table 2). China's first production line capable of making 200-km superconductor wires and the nation's first 33.5m, 35kV/2kV superconductor cable system were produced by *Innova Superconductor Technology*, foundered by Han Zhenghe who returned from Denmark after obtaining a PhD (see No. 6 in Table 2). Other Chinese technological companies listed on *NASDAQ*, including *Renren*, *eLong*, *Vimicro*, *Light In The Box*, *UTStarcom*, *Spreadtrum*, *Truckbow*, *Baidu*, *iSoftStone*, *Pactera*, *Autohome*, *Semiconductor Manufacturing*, *AsiaInfo*, *E-Commerce*, and *Actions Semiconductor*, were also built and/or operated by

returnees (see Nos. 1–3, 5–15, 17, 19, 21–22 in Table 2). Returnees' contribution to the development of China's technological enterprises cannot be overestimated. Their contribution is not restricted to China, but also influences international or global economic markets through product trading and *NASDAQ*-listed companies.

Table 2 Chinese Returnee Entrepreneurs and Venture Capitalists

Name	Company and Title	Overseas Education
[1] Chen Yizhou	Renren Inc.-Chairman, Co-Founder and CEO	Massachusetts Institute of Technology, Cambridge, MA-MSc Stanford University, Stanford, CA-MBA
[2] Cui Guangfu	eLong Inc.-CEO	Northwest University, Kirkland, WA-MBA
[3] Deng Zhonghao	Vimicro International Corp.-CEO and Co-Founder	University of California at Berkeley, Berkeley, CA-PhD
[4] Ding Jian	GSR Ventures Management Co. Ltd.-CEO	University of California at Los Angeles, Los Angeles, CA-MSc University of California at Berkeley, Berkeley, CA-EMBA
[5] Guo Quji	LightIn TheBox Holding Co., Ltd.-CEO and Co-Founder	University of Illinois Urbana-Champaign, Champaign, IL-MSc Stanford University, Stanford, CA-MBA
[6] Han Zhenghe	Innova Superconductor Technology-Founder	Copenhagen University, Copenhagen, Denmark-PhD
[7] Huang Shaoqiu	UTStarcom Inc.-CEO	University of California at Berkeley, Berkeley, CA-MSc
[8] Li Liyou,	Spreadtrum Communications Inc.-CEO	Maryland University College Park, MD-PhD
[9] Li Qiang	Trunkbow International Holdings-Founder	Nanyang University, Singapore-MBA
[10] Li Yanhong	Baidu.Com Inc.-CEO and Co-Founder	The State University of New York, Buffalo, NY-MSc
[11] Liu Tianwen	iSoftStone Holdings Ltd.-Founder	Massachusetts Institute of Technology, Cambridge, MA-MBA
[12] Lu Zhequn	Pactera Technology International Ltd.-CEO	National University of Singapore, Singapore-BSc
[13] Qin Zhi	Autohome Inc.-CEO	Harvard University, Cambridge, MA-MBA
[14] Qiu Ciyun	Semiconductor Manufacturing-CEO	University of California at Berkeley, Berkeley, CA-PhD
[15] Tian Suning	AsiaInfo Linkage Inc.-Co-Founder	Texas Tech University, Lubbock, TX-PhD
[16] Wu Shangzhi	CDH Investments-Chairman and Managing Partner	Massachusetts Institute of Technology, Cambridge, MA-MSc, PhD

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Name	Company and Title	Overseas Education
[17] Wu Ying	UTStarcom Inc.-Founder	New Jersey Institute of Technology, Newark, NJ-MSc
[18] Xiong Xiaoge	Technology Venture Investment Fund-Founder	Boston University, Boston, MA-MSc
[19] Yu Yu	E-Commerce China Dangdang Inc.-Founder	New York University, New York, NY-MBA
[20] Zhang Chaoyang	Sohu.com Inc.-CEO and Founder	Massachusetts Institute of Technology, Cambridge, MA-PhD
[21] Zhang Zhenqing	AsiaInfo Linkage Inc.-CEO	University of Pisa, Pisa, Italy-PhD
[22] Zhou Zhengyu	Actions Semiconductor Co. Ltd.-CEO	University of South California, Los Angeles, CA-PhD

Source: For references in full, please visit www.brill.com/fedc or http://journal.hep.com.cn/fed

Returnee venture capitalists have also made a considerable impact on the growth and success of many technological enterprises in China. Cheng Siwei, a returnee from MBA study at the University of California at Los Angles in the US, is frequently regarded as the father of venture capitalists in China, because of his proposal in a national meeting, *On the Development of China's Venture Capital as Soon as Possible* (Xie, 2005). Since this policy shift, returnees have brought foreign capital into China and created companies such as *GSR Ventures Management*, *CDH Investments*, and *Technology Venture Investment Fund* (see 4, 16, 18 in the Table 2), providing financial support to early-stage, small and medium high-potential Chinese enterprises in high technology areas like biotechnology and IT. Companies including *Baidu* and *Sohu* received investment from returnees' venture capital at the early stage when they were too small to raise capital in the public markets and had not reached the point where they were able to secure bank loans or complete a debt offering. The venture capitalist industry which has helped the growth of Silicon Valley ventures in the US has also assisted the growing of many technological companies in China. Returnee venture capitalists' contribution has been gaining recognition by the public in recent years.

Contribution to Academic Leadership

Early studies report that returnees have dominated academic leadership in Chinese higher education and 78% of presidents of universities under the direct administration of China's Ministry of Education once studied abroad (Wang,

2007; Welch & Hao, 2013). The result of this research is consistent with their finding. Of 39 key institutes in the prestigious "985" group of universities, 25 presidents have overseas education or training experience. Table 3 lists the 25 university presidents and their overseas degrees (see Nos. 1, 3, 6–7, 10, 14, 16–17, 22–23), postdoctoral fellowship posts (see Nos. 2, 4, 5) or informal higher education training as guest professor, visiting scholar, or research fellow (see Nos. 8–9, 11–13, 15, 18–21, 24). With more academic leaders having overseas education or training experience, academic exchange and co-operation between China and foreign countries has been increasingly strengthened, and the internalization and globalization of Chinese universities has been advanced.

Table 3 Returnee Presidents in the "Project 985" Universities

President	University	Overseas Education
[1] Chen Jining	Tsinghua University	Imperial College, London, England-PhD and Postdoc
[2] Wang Enge	Peking University	University of Lille Nord de France, Lille, France-Postdoc University of Houston, Houston, TX-Postdoc
[3] Zhu Chongshi	Xiamen University	University of Belgrade, Belgrade, Yugoslavia-PhD
[4] Chen Jun	Nanjing University	Imperial College London, England-Postdoc
[5] Yang Yuliang	Fudan University	Max Planck Institute for Polymer, Mainz, Germany-Postdoc
[6] Li Jiajun	Tianjin University	University of Wales Swansea, Swansea, England-PhD
[7] Gong Ke	Nankai University	Graz University of Technology, Graz, Austria-PhD
[8] Li Xiaohong	Wuhan University	University of California at Los Angeles, Los Angeles, CA-Research Assistant
[9] Zhang Jie	Shanghai Jiao Tong University	Oxford University, Oxford, England-Researcher
[10] Li Shouxin	Shandong University	London University, London, England-MSc
[11] Chen Yulu	Renmin University of China	Eisenhower Foundation, Abilene, KS-Senior Fellow University of Columbia, New York, NY-Research Fellow
[12] Li Yanrong	University of Electronic Science and Technology	Karlsruhe National Research Center, Karlsruhe, Germany-Guest Professor
[13] Xie Heping	Sichuan University	University of Utah, Salt Lake City, UT-Guest Professor
[14] Xu Ningsheng	Sun Yat-Sen University	Aston University, Birmingham, England-PhD
[15] Wang Yingjun	South China University of Technology	Himeji Institute of Technology, Himeji, Japan-Guest Researcher University of Florida, Gainesville, FL-Visiting Scholar

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President	University	Overseas Education
[16] Wang Cheng	Lanzhou University	Massachusetts Institute of Technology, Cambridge, MA-PhD University of Illinois, Urbana and Champaign, IL-Postdoc
[17] Wu Dexing	Ocean University of China	Washington University, St. Louis, MO-PhD
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Difficulties and Obstacles Facing Returnees

Although China has made a great effort to create a "relaxed," "tolerant," and "lenient" environment to attract overseas talents, returnees' transition is not always smooth but encounters many challenges. Returnees in different fields, including scientific research, business, and politics, are facing different kinds of difficulties and obstacles.

Pressure on Returnee Scientists and Scholars

Many returnee scientists and scholars complain of high pressure while working in China and some even suffer from psychological problems after return. Cao Tingbing, for instance, a 39-year-old Harvard-educated professor, jumped to his death at Renmin University of China in 2012. Local media reported that he had suffered from severe depression since his return to China in 2008 (Wheeler, 2012). There are three main reasons that can explain why returnee scientists and scholars are facing high working pressure. First, new returnees must learn to cope with complicated interpersonal relationships. Although the Chinese scientific research environment has improved a lot, the allocation of research funds and academic promotion still largely depends on who you know, not what you know. "… [I]t is an open secret that doing good research is not as important as schmoozing with powerful bureaucrats and their favorite experts" (Shi & Rao, 2010, p. 1). To obtain big grants or have rapid promotion, returnees have to quickly adapt to the local environment and inevitably perpetuate the unhealthy research culture. Second, returnees are mostly hired on a working contract, such as a five-year contract in the latest "Thousand Talents" program. The lack of guarantee regarding contract renewal or higher salaries would cause them to feel unsafe both professionally and financially. Third, there are high expectations of them in their universities and departments. They not only compete with local peers to obtain research grants and scientific awards, but also have to work harder to compete with international scholars and scientists in international publication and patent applications.

Challenges Facing Returnee Entrepreneurs

A shortage of capital is a major challenge facing returnee entrepreneurs. Apart from government start-up funds, Chinese returnees mainly rely on capital accumulated overseas or loans from family and friends to start businesses. Since their enterprises are in the non-state and private sector, they are often unable to receive financial assistance from China's centralized financial system, monopolized by state-owned banks. Although they can seek venture capital investment, it is sometimes insufficient and can only partially compensate for financial shortages. Lack of sufficient capital becomes the most important factor

that inhibits the growth of returnees' enterprises (Zhou & Hsu, 2011; Zweig & Wang, 2013). According to Wang (2007), about one third of returnees' firms have gone bankrupt due to financial difficulties.

Constraints on Returnees' Political Participation

There are also factors that limit returnees' participation in Chinese politics. Many political positions are open to the members of Communist Party of China (CPC) only. A lack of political network is another critical obstacle that returnees encounter. In China, returnees' political network is much more important than their foreign education credentials. Elites who have a political network could be selected by the government to go abroad and receive foreign education credentials. Each year, numerous local officials or managers of state-owned companies are sent to foreign universities (e.g., Nanyang Technological University in Singapore and Harvard University), and after their returning from short- or long-term programs overseas, they get appointed or promoted to a higher-level political position (Li, 2005, 2006). By contrast, those returnees who have been self-financed for foreign study have fewer chances to be hired or appointed to political positions, although they have studied politics and related majors abroad. Lots of returnees who are non-CCP members and have no political network are discouraged from contributing to the state's political system.

Conclusion

This paper has examined issues surrounding Chinese students or scholars who have returned to China on completing their overseas higher education or professional training, in the period since China's open-door policy began in 1978. It has explored reasons that have brought returnees back and difficulties and obstacles facing them. It has provided empirical data to show in what aspects China has gained benefits from returnees' contribution.

The case of China has three major implications for our understanding of international academic mobility in the context of globalization. First, this study reveals the advantages and limitations of China's brain gain. China has experienced an increased return rate of foreign-trained Chinese nationals, in

either full-time or part-time positions. Findings from this research suggest that China's strong economic growth, admission to WTO, government incentives, and continuing open-door strategy play an important role in attracting foreign-trained Chinese nationals to return and work for China. However, reintegration into today's fast-changing China is a challenge for returnees and they may encounter difficulties and obstacles including social pressure, shortage of capital, or lack of chances to participate in China's politics. All of these can provide Chinese policy-makers with insight into how to better attract overseas talent back and prevent them from leaving again upon returning.

The second implication of this study supplements existing literature on the issues of China's brain drain/gain. A number of studies (e.g., Kao, 1971; Orleans, 1989; Lin, 1994; Zweig & Chen, 1995; Cao, 2004b) suggest that China will suffer significant brain drain. However, from an optimistic perspective, Chinese-American Nobel laureate in physics Chen-Ning Yang, who returned to work in China in the late 1990s, comments that China has stored a large amount of talent abroad (China Youth Daily Reporter, 2008), incubated in universities in Western developed countries. This article has provided empirical data to support this prediction of China's brain gain. In China's history, returnees from overseas study have played important roles in national development. For instance, in the early 1950s, returnee scientists were important sources of knowledge and technology needed by China's socialist endeavors. The inflow of returnees since 1978 has helped link China with the rest of the world in the fields of scientific research, economic development, and higher education. At the same time, returnee scholars have also contributed to world science by publishing their scientific discoveries in international journals; returnees' products and companies have helped China's economy merge into the global market.

The third implication of this study responds to the question raised in recent literature on international academic mobility: Do globalization and the increased return rate of homecoming international students bring a hope for source countries to enjoy brain gain? (Saxenian, 2002, 2006; Hart, 2006). Findings from this study support Hart's (2006) postulate, i.e., if "managed wisely," a global knowledge economy might foster "mutual gain" and enable source countries to "absorb knowledge and extract benefits from it, and nurturing knowledge spillovers from receiving countries to source countries" (p. 53). As shown in this study, foreign-trained Chinese returnees contribute to China's international

competitiveness by transferring knowledge and technology from foreign countries to China, developing domestic high technology sectors, increasing China's value in international economic markets and developing internet services, all of which enhance China's role in the international competition for global capital.

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