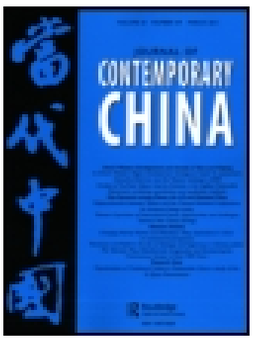

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'The Best are yet to Come:' State Programs, Domestic Resistance and Reverse Migration of High-level Talent to China

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ABSTRACT

Reverse migration has mitigated the brain drain for many Asian countries. But can developing countries actually bring back their best overseas talent? How can this studymeasure the quality of that talent? And, if the best are not returning, why not? Is the 'institutional culture' within the scientific and academic institutions the cause? The authors address these questions by comparing full-time and part-time returnees in three national programs, using each scholar's h-Index, the impact factor of the journals in which they publish, and the annual number of publications by each researcher. The findings show that, circa 2012–13, the strongest researchers returned only part-time. Second, returnees to the Chinese Academy of Sciences were weaker than returnees under national programs at universities. And third, universities whose presidents reformed the institutional culture at the school attracted better overseas talent than other universities. The findings, then, show that resistance to institutional change can undermine a state's effort to promote its research and development while domestic reform can promote that endeavour.

Introduction

All developing countries suffer an ongoing loss of educated talent, typically referred to as a brain drain, and while discussions of the 'brain gain' and 'brain circulation' reflect the positive perspective that a significant flow of human talent has been flowing back to some developing countries,[1] we know little about the quality of the returnees as compared to those who remain abroad. States invest significant resources in programs to attract their own nationals living abroad to return in the hope that they will transfer the skills and knowledge that they have gained overseas,[2] and national development is now often discussed in terms of the global competition for talent, a state's human capabilities, or as a global 'talent war.'[3] Studies do suggest that, contrary to traditional wisdom, most developing countries experience a net gain from skilled emigration.[4] But many people worry that the

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[1]Jean M Johnson, 'The Reverse Brain Drain and the Global Diffusion of Knowledge', *Georgetown Journal of International Affairs* 3(2), (2002), pp. 125–31; Anna Lee Saxenian, *The New Argonauts: Regional Advantage in a Global Economy* (Cambridge, MA: Harvard University Press, 2007); Koen Jonkers, *Mobility, Migration and the Chinese Scientific Research System* (New York: Routledge, 2010).

[2]Bang-soon L. Yoon, 'Reverse Brain Drain in South Korea State Led Model', *Studies in Comparative International Development* 27(1), (1992), pp. 4–26.

[3]Huiyao Wang, *Rencai zhanzheng: quan qiu zui xique ziyuan de zhengduo zhan* [Talent War: The fierce competition over the world's most scarce resource] (Beijing: China Citic Press, 2009).

[4]Tito Boeri, Herbert Brucker, Frederic Doquier, and Hillel Rapoport eds., *Brain Drain and Brain Gain: The Global Competition to Attract High-Skilled Migrants* (Oxford: Oxford University Press, 2012).

money is not well spent,[5] and that despite the creation of a serious reverse flow, the best may not be returning.[6]

So, are the very best overseas nationals returning to their home country, or do the most talented sojourners from developing countries stay abroad? From a methodological perspective, how can we measure the relative quality of those who return home on a full-time basis versus those who return only part-time or not at all? Countries, such as China, have introduced numerous programs to encourage part-time reverse migration, assuming that some part time connections are better than no connections. But there are serious doubts about the quality of those people's contributions.[7]

This article seeks answers to several questions. First, can developing countries, by investing time and money, actually bring back their best overseas talent? Second, what indicators can measure the quality of that talent? Third, if the best are not returning, why not? Does the 'culture' within the scientific and academic institutions in developing societies undermine the reverse migration of top talent?[8] Is there a 'partial reform equilibrium' at work,[9] where social groups which benefited from initial reforms resist further changes that would transform the institutional culture from which they benefit?

The authors address these broader questions by analyzing China's efforts to recruit its top overseas talent and replace the 'brain drain' with a 'brain gain'. First, the authors compare the quality of returnees in three nationally funded programs and explore the differences between those who participate in these programs full-time—i.e., they give up their overseas posts entirely—and those who keep a foot overseas in some foreign institution and return only on a part-time basis. To compare these cohorts the authors use each scholar's h-Index, as well as the average annual impact factor (AAIF) of the journals in which these individuals published, and recheck the robustness of the authors' results by using the number of articles published by each researcher annually. Based on this analysis, the authors can say confidently that circa 2012–13, full-time returnees were simply not as strong researchers as those who chose to maintain overseas posts and work in China only part-time. Second, the authors show that returnees to China's major research institute, the Chinese Academy of Sciences, under that institute's program to promote reverse migration, were weaker in terms of the quality of their publications than returnees under national programs at universities. The authors assert that the major problem was the continuing resistance to reform within the Chinese Academy of Sciences. Finally, the authors compare the flow of China's best overseas talent into its top universities and show that universities whose presidents were more amenable to reforming the institutional culture, and, in fact, introduced such reforms, introduced more overseas talent to work in their universities. The authors' findings, therefore, show unambiguously that resistance to institutional change in developing societies, such as China, can undermine a state's effort to enhance state power through the promotion of research and development.

The Role of the State in Stimulating Reverse Migration

To enhance the reverse flow of human talent and strengthen national capacity in science and technology, states must invest heavily in R&D, as well as transform the institutional research culture, such as the scientific environment, laws and regulations that create disincentives for return migration. According to Saravia and Miranda, 'when real opportunity exists within the context of coherent internal policies and investments in science and technology, returning to the home country becomes an attractive option for emigrants'.[10] But investment may not be enough. According to the OECD,

[5]Xuefei Chen, et. al., *Liuxue jiaoyu de chengben yu xiaoyi: Wo guo gaige kaifang yilai gong pai liuxue xiaoyi yanjiu* [Costs and returns: A study of the efficiency of government-sponsored overseas education since 1978] (Beijing: Jiaoyu kexue chubanshe, 2003).
[6]Cong Cao, 'China's brain drain at the high end: Why government policies have failed to attract first-rate academics to return', *Asian Population Studies* 4(3), (2008), pp. 331–45.
[7]Xin Hao, 'Frustrations Mount over China's High-Priced Hunt for Trophy Professors', *Science* 313(22), (2006), pp. 1721–23.
[8]Francesco P. Cerase, 'Expectations and reality: a case study of return migration from the United States to Southern Italy', *International Migration Review* 8(2), (1974), pp. 245–62.
[9]Joel S. Hellman, 'Winners Take All: The Politics of Partial Reform in Post-communist Transitions', *World Politics* 50(2), (1998), pp. 203–34.
[10]Nancy Gore Saravia and Juan Francisco Miranda, 'Plumbing the brain drain', *Bulletin of the World Health Organization* 82(8), (2004), pp. 608–615.

sending countries must 'develop an adequate scientific, technological and business environment that will provide rewarding opportunities for the return of individuals who have upgraded their skills abroad'.[11] Similarly, Newland believes that to facilitate circular migration, governments must at a minimum create an 'enabling environment in the country of origin', including 'establishment of the rule of law, property rights, open and transparent government, lack of corruption and other attributes of good governance, including dual citizenship or eliminating visa requirements for members who are citizens of another country.[12]

In fact, China has invested heavily in R&D as a share of GDP over the past 20 years, and has pulled up even with the European Union (2.07 vs. 2.05 respectively) and drawn much closer to the U.S. (2.07 vs. 2.79 respectively). Thus while China's investment in R&D in 1997 was only three percent of American investment, by 2015 it was 45 percent of US investment.[13] This increase in R&D/GDP has occurred despite enormous growth in China's GDP, which means that the total amount invested by the Chinese state in US dollars has increased even more significantly. (Figure 1 and Table 1)

The Three National Programs under Review

Since the mid-1990s, the Chinese government, universities and scientific organizations have established a series of programs targeted at attracting high end talent from the Mainland, who are working and studying overseas, to return to China.[14] The Chinese Academy of Sciences has sent scientists abroad since 1978, so in 1995 it decided to promote reverse migration through a '100 Talents Plan' (百人计划: HTP), the first such program to attract international talent, which in 1998, the American Chemistry Society called an attempt to 'attract fresh blood into its institutes'.[15] The HTP offers each returnee a package up to 2 million RMB, which was a huge sum in the late 1990s.[16]

In the academic realm, the Changjiang Scholars Plan (长江学者: CJSP) emerged after then-President Jiang Zemin's speech in 1998 honoring Peking University's 100th anniversary.[17] In response, the Ministry of Education (MOE) launched the '985 Program' and 'Changjiang Scholars Program' (CJSP) both targeted at establishing world-class universities. Funds first went to nine top universities and the program required that 20 percent of those funds be used to improve the quality of the faculty by importing overseas talent.[18] The CJSP, which received support from Hong Kong tycoon Lee Kai-Shing (李嘉诚), offers a competitive salary to overseas returnees and an annual subsidy of 200,000 RMB per year (US $25,000) over their wage.[19] The early version of the plan required that scholars return permanently, but when the number of full-time participants did not

[11]OECD Observer, 'International Mobility of the Highly Skilled', *Policy Brief*, July 2002.
[12]Kathleen Newland, *Circular Migration and Human Development*, Human Development Research Paper 42, (2009), *United Nations Development Programme*, accessed 23 November 2019, http://hdr.undp.org/en/content/circular-migration-and-human-development.
[13]World Bank, *World Bank Statistics of Research and Development Expenditure*, 2015, accessed 25 June 2016, https://data.worldbank.org/indicator/GB.XPD.RSDV.GD.ZS.
[14]In this article, the authors use three of the top four state programs encouraging reverse migration. The authors do not include the 'Distinguished Young Scholars' program, established in 1994 by the Natural Science Foundation of China, which gives awardees 2 million RMB.
[15]Michael Freemantle, 'A makeover for science in China: World's most populous country undertakes massive effort to develop and revitalize science, technology, and education', *CENEAR* 76(34), (1998), pp. 1–80, accessed 23 November 2019, http://pubs.acs.org/cen/hotarticles/cenear/980824/china.html.
[16]Zhang Xinmin, '纪念'百人计划'实施20周年——我的科学人生' [Commemorate 20 years of implementing the 'Hundred Talents Plan'—my life as a scientist:], accessed 14 May 2015, www.cas.cn/zt/sszt/jnbr/yxzw/201412/t20141202_4266217.shtml.
[17]Jiang Zemin, '江泽民在庆祝北京大学建校一百周年大会上讲话–继承和发扬五四运动的光荣传统', [Jiang Zemin's speech in the Great Hall to commemorate the 100th anniversary of the establishment of Beida: continue and develop the glorious spirit of the May 4th Movement] 人民日报 [*Peoples' Daily*], 4 May 1998, accessed 20 June 2003, http://politics.people.com.cn/GB/8198/153609/153613/9219608.html.
[18]David Zweig, 'Learning to Compete: China's Efforts to Encourage a Reverse Brain Drain', *International Labour Review* 145(1–2), (2006), pp. 65–90.
[19]Guangming Daily, '长江学者奖励计划即将实施' [The plan of awarding the Changjiang Scholars Plan and its implementation] 光明日报 [*Guangming Daily*], 30 June 1998, accessed 16 July 1998, http://www.gmw.cn/01gmrb/1998-06/30/GB/17739%5EGM2-3013.htm.

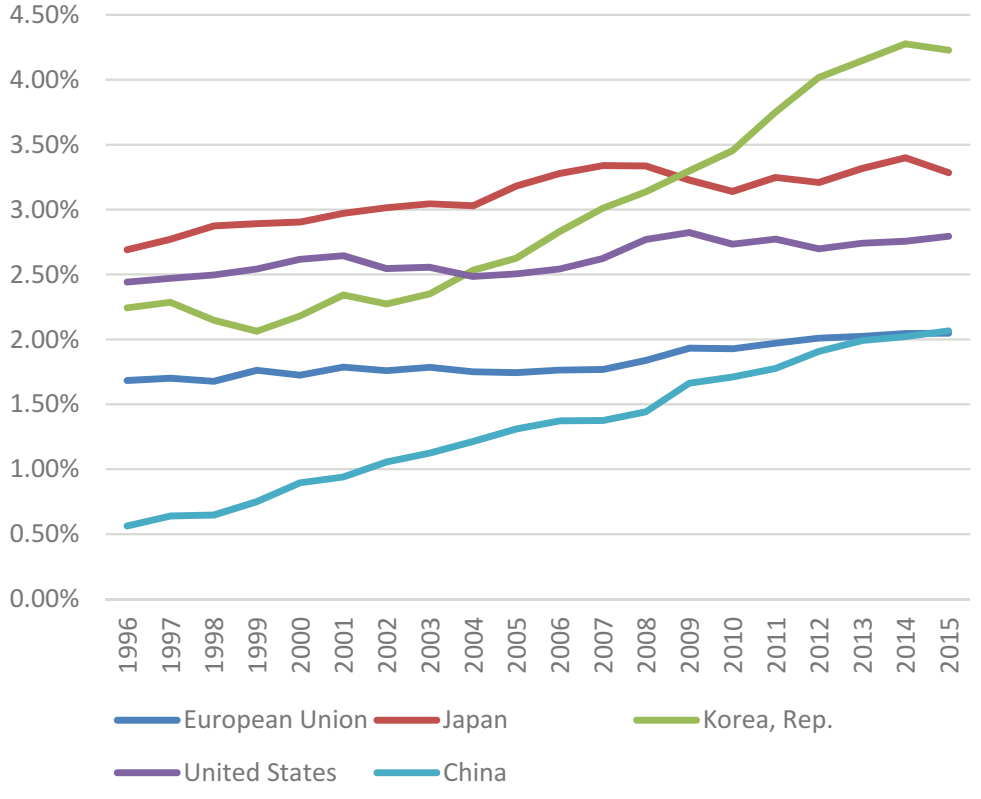

Figure 1. R&D expenditure as percentage of GDP by countries, 1996–2015

Table 1. R&D expenditure (current US$, billion US$), 1997–2015

	1997	2001	2005	2009	2011	2013	2015
European Union	157.9	160.9	251.7	330.3	361.6	364.6	336.0
Japan	122.3	127.9	151.3	168.9	200.0	171.0	143.9
Korea, Rep.	12.7	12.5	23.6	29.7	45.1	54.1	58.5
United States	212.7	280.8	328.0	406.9	430.3	457.4	506.3
China	6.1	12.6	29.9	85.0	134.5	191.3	228.5

Source: Worldbank statistics.

meet expectations, returnees were divided into full-time and part-time returnees. Between 1998 and 2002, the ratio was 11:1 (488 vs 43), with few part-time returnees. But after the quota for part-time returnees was increased, the ratio of full-time participants decreased to 3:2—between 2003 and 2011 there were 901 full-time versus 615 part-time returnees—but between 2012 and 2015, the ratio shifted to 3:1, with 602 full-time and 187 part-time participants.[20]

The leadership of the Chinese Communist Party (CCP), however, was not satisfied with the Ministry of Education's failure to bring back the very best talent. In 2003, they set up a coordinating organization to unite the efforts of the fragmented bureaucracies that managed the returnee project, called the Central Coordination Group on Talent (CCGT), but it too met with limited success. Ultimately it fell to Li Yuanchao (李源潮), the director of the Organization Department under the 17th Central Committee, to establish the 1000 Talents Plan (千人计划: TTP),

[20]Ministry of Education, 教育部启动'高层次创造性人才计划' [The Ministry of Education institutes a plan for high quality creative talent] accessed 1 December 2004, http://www.edu.cn/20040617/3108244.shtml.

in February 2008,[21] which tried to use the CCP's mobilizational skills to bring back the very best, overseas Chinese talent. Targeting China's institutional or research culture, Li called for 'new ways of thinking' (新思路*xin silu*), 'new methods', greater flexibility, more rapid promotions and a much more aggressive effort, as he sought to transform the culture within China's research and academic organizations. This plan addressed returnees' residential status, jobs for spouses, and schooling for children. Returnees received a 1 million RMB bonus, plus welfare and medical benefits. Salaries in China were to reflect their salary overseas. Initially, all returnees were to spend at least six months per year on the job in China, but when this program, too, was undersubscribed, Li accepted a part-time option which quickly became popular, generating what Saxenian, et. al., calls 'brain circulation'[22] not reverse migration. Among the original 501 people who had joined the program by the summer of 2011, 74.7 percent were academics and researchers, among whom over 73.5 percent were part-time participants.[23]

In the sections that follow, the authors first compare full-time versus part-time returnees to see if the best are or are not returning. The authors then look at problems in the Chinese Academy of Sciences' institutional culture, as well as compare the quality of their returnees to those in the two other programs. Finally, the authors look at the institutional culture in China's top universities from a variety of perspectives, to see if different research cultures in different universities affect the scale of reverse migration.

Hypotheses

Given that many people are not returning full-time, whether there is a significant difference between full-time and part-time returnees becomes highly important because if the quality of the publications of the full-time returnees equals that of the part timers, China need not be concerned about a major brain drain of world-class talent. However, if part-time returnees are significantly better researchers than full-time returnees, China's program to bring back the best has run up against serious constraints.

Therefore, this study's first hypothesis is: *H1. The quality of the people who have returned part-time, and maintain a fulltime academic post overseas, are better researchers than those who have returned full-time.*

This is the authors' most important hypothesis in that the inability to refute it will confirm that the best are not returning. There are several reasons this hypothesis may be true. People who have an overseas post have a better overseas network so they may participate in better projects; also they may be less overloaded with cumbersome administrative affairs as occurs in China, spending more time on research rather than on endless hours building 'relationships'. Finally, part timers may publish most of their work in international journals, as compared to full-time returnees who may publish in local journals, which could affect the authors' measure of their 'quality'. Still, due to bias and weaker personal ties, recent returnees may have serious difficulty funding their research programs in the early years after returning.

Although the Chinese Academy of Sciences' HTP is more generous than the Ministry of Education's CJSP, qualitative analysis suggests that the research climate at CAS is more problematic than the culture at some of China's top universities. Also, the criteria for joining the CJSP and the TTP are more competitive than the demands of the HTP, as the latter only involves internal vetting within CAS, while the former two programs insist on having global experts review applicants to the program. Therefore, after outlining CAS' problems, this study tests hypothesis 2: *H2. The quality of talent at universities surpasses the talent at the Chinese Academy of Sciences.*

[21]Miao Dangguo, 出国留学六十年 [Sixty years of going overseas to study](北京: 中国文献出版, 2010), p. 957.
[22]Anna Lee Saxenian, Yasuyuki Motoyama and Xiaohong Quan, *Local and Global Networks of Immigrant Professionals in Silicon Valley* (San Francisco, CA: Public Policy Institute of California, 2002).
[23]David Zweig and Huiyao Wang, 'Can China bring back the best? The Communist Party organizes China's search for talent', *The China Quarterly* 215, (2013), pp. 590–615.

Finally, hypothesis 3 addresses institutional culture and reforms in universities and it tests the argument that a university's internal culture affects its ability to attract top international talent. Thus, we suggest: H3: *Universities whose presidents have (a) more intensive overseas experiences (measured by having a foreign PhD), (b) are not homegrown to the university (therefore have no network within the school to protect from high quality returnees), or (c) have significantly reformed their institutional culture, are more attractive to top overseas talent*. However, as this hypothesis does not relate to the three national programs, the article introduces the data set for this analysis in the third part.

The Data Set and Sampling Strategy

To test theses hypotheses the authors collected all the CVs they could find on-line from the participants in these three national programs. Collecting the total population of participants in each program was impossible, but the authors did collect most of the respective populations. For example, even though the authors' request to the Foreign Affairs Office of CAS for a list of their HTP recipients was rejected due to 'confidentiality', the authors did find 25 percent of the program's awardees (Table 2) within a fixed number of years, giving them some confidence as to the representativeness of the sample.

This article's HTP awardees come from two periods. One group covers scholars who joined the program before 2010. All the recipients' names were published on the website of each CAS institute, so the authors were able to draw a stratified random sample by selecting a portion of them (one out of four) in each name list. This method yielded 298 CVs (or 25 percent), as the *Peoples' Daily* reported that CAS had awarded a total of 1,200 prizes.[24] Each CAS institute website also provides some education background and publications. The authors also searched Chinese web-sites, such as Baidu, for personal information which was released on conference electronic bulletin boards in China or in public notices of the award.

The second group of HTP scholars includes 110 awardees who received the award in 2011 and 2012, and who applied for 'further Hundred Scholar support in 2013', thereby representing what must be the best awardees of 2011 and 2012. In 2015, CAS published the numbers of HTP scholars awarded in 2010–2014. By adding the number of awardees in 2010–2012, the authors identified 450 recipients.

If one estimates that about 450 scientists received this award in 2011–12 as well, these 110 awardees again represent 25 percent of that population. These applications are particularly useful as they have great detail on the scientists' publication records. Also, given the authors' second hypothesis, that the CAS' HTP participants are weaker than participants in the CJSP or the TTP, the authors are generating a 'positive bias' by drawing their sample from CAS' best talent, strengthening the authors' argument if the CAS cohort proves weaker.

The names of all recipients of the CJSP award—both full- and part-time–-are published online every year. Due to the work involved in calculating the h-index, the AAIF, and the number of publications, of each participant in the CJSP, the authors selected 300 names randomly from the full name list of 2,337 awardees as of 2012, thereby matching the years of the other programs. However, the authors only found

Table 2. Our Sample of the National Talent Programs

Program	Sample Size	Total No. of Awardees	Sample as % of Total Awardees	Percent of TTP in CAS	Percent of TTP in Universities
100 Talents (pre-2009)	298	1200	24.8%	100%	0
100 Talents (2011–12)	110	450*	24.4%	100%	0
Changjiang Scholars (end of 2012)	248	2337	10.6%	0	100%
1000 Talents Plan (end of 2013)	733	1723	42.5%	11.8%	88.2%

Source: Downloaded directly from various websites.
Note: *Authors' estimation.

[24]David Zweig, 'Returning to the Chinese Academy of Sciences: shortage, environment and rewards', Huiyao Wang and Lu Miao, eds. *Handbook on China and Globalization* (Cheltenham, UK: Edward Elgar, 2019), p. 364.

248 CVs of the 300 selected names, so the authors worked with this number, which was 10.6 percent of the entire list, and downloaded their CVs from domestic institutes and their past affiliations overseas.

Finally, according to the authors' calculation, 1,723 scientists and academics had been awarded full- or part-time TTP awards under the 'Innovation Scheme' by 2013. The majority worked in universities, but some worked in CAS. However, while the full list is not public, universities in the early years of the program publicized the names of the TTP awardees on their institutional websites, giving us a yield of 733 or 42.5 percent. Though this is not a randomly selected sample, it represents a large number of academics and scientists that is mostly comparable to the HTP and CJSP. The TTP awardees working in SOEs or private companies as engineers are not included in this study.

Variables of Returnee Data

This article's returnee data drew the following variables from the scholar's CV, the department or personal website, the website of their laboratory, or newspaper reports.

- *Demographic information* includes age, gender and home province.
- *Education Background* includes when and where they obtained their degrees, as well as the field of their doctoral study.
- *Return related information* includes the *year of return* (the year they accepted a formal position in China), *year joining the program, first work unit* they joined after returning, their *work unit* when they received the award, their *academic position* and any *administrative position* they obtained in their first work unit.
- *Work experience* covers six variables: when and where they finished their post-doc training; the last (current)[25] university and department where they were/are working overseas before returning,[26] the last academic and administrative position they held before returning, and their current post in China.
- *h-index*: This metric measures the productivity and citation impact of a researcher's publications. It is based on the set of the scientist's most cited papers and the number of citations they received.[27] Having an h-index of 10 means a scientist has at least 10 papers which received more than 10 citations. H-index is a good measure for the quality of scientists because it accounts for both numbers and quality of their publications. The authors use the logged h-index in the analysis for a normal distribution.
- *Average Annual Impact Factor of publications* (AAIF): The authors measure the academic performance of each scholar by their AAIF. The authors recorded all the journal articles written by our scholars,[28] including the title of the article, the year of publication, and the journal title. Based on the impact factor of the journal in 2013, the authors calculated the AAIF of each returnee.[29] While such a measure may ignore the overall scientific, commercial and social contribution, this is empirically the easiest variable the authors can measure that can be used to compare each individual uniformly.[30]

[25]When a parttime returnee keeps their position overseas, the authors used the current position.
[26]Some TTP awardees were working in China when they received the award.
[27]Jorge E. Hirsch, 'An index to quantify an individual's scientific research output', *Proceedings of the National Academy of Sciences of the United States of America* 102(46), (2005), pp. 16,569–72.
[28]If they had more than 100 papers, the authors used the last 100 papers.
[29]First, the authors summed all impact factors one researcher accumulated and then divided it by the length of their career (if their publication list is not up to date, the denominator will be equal to the difference between the year they receive their doctorate and the year of latest publication).
[30]Eugene Garfield, 'Citation analysis as a tool in journal evaluation', *Science* 178, (1972), pp. 471–9. The Talent Group of the Beijing CCP Organization Department uses more criteria to evaluate returnees, including 'economic benefit' (*jingji xiaoyi* 经济效益). But after a presentation by Zweig in October 2015, they agreed that the AAIF did reflect the real situation.

The descriptive statistics of this article's overseas scholar sample are in Table 3. The average age of the returnees is 43, which is consistent with the requirements of the three programs. Female returnees account for only five percent of the returnees. Part time returnees comprise 46.3 percent of our sample.

Comparing Part-time versus Full-time Awardees

The authors' first hypothesis is that the scholarly impact of part-time returnees is greater than full-time returnees. Initially, CAS' Hundred Talents Plan (HTP) offered a part-time scheme, but after a great deal of criticism, that program was stopped. So here the authors compare only CJSP and TTP awardees, with the authors' baseline model being CJSP full-time participants (Table 4). The authors used an OLS regression and controlled for some confounding factors including gender, age and field of research. The results show that the full-time TTP participants are not better than the full-time CJSP participants, but the part timers under both the CJSP and the TTP are better than the full-time CJSP participants.

This finding has several important implications. It confirms the criticism that these policies have both failed to attract the best Mainland Chinese talent overseas and, in fact, reward lower quality scientists and scholars who may not be that much better than China's own homegrown talent. On the positive side, however, a rich literature argues that developing states that cannot attract their

Table 3. Descriptive statistics for returnees used in data analysis

Variable	No. of Observations[31]	Mean	Standard Deviation	Minimum	Maximum
Age_plan	1,209[1]	42.7	6.62	27	71
Male	1,209	.947	.225	0	1
Years working before joining the program	1,209	13.5	6.57	0	37
Part-time returnees	1,209	.463	.499	0	1
AAIF	1,209	13.8	22.68[2]	.15	137.1
Number of papers per year	1,209	3.59	5.30	1	16.7
h-index	1,209	23.4	17.8	1	170

Note: (1) The number of observations is reduced because the authors dropped social scientists and for some returnees the authors could not determine their age or career length.
(2) The large standard deviation arises because the impact factors in science and engineering are quite different.

Table 4. Comparing Changjiang Scholars with 1000 Talent Plan Awardees

VARIABLES	(1) h-index	(2) AAIF	(3) No. Papers/yr.
Changjiang part-time	0.593***	0.555**	0.673***
	(0.147)	(0.256)	(0.188)
1000 Talents full-time	−0.172	0.040	−0.096
	(0.199)	(0.265)	(0.212)
1000 Talents part-time	0.581***	0.760***	0.524***
	(0.165)	(0.255)	(0.200)
Year joined Plan	0.015	0.040	0.043*
	(0.020)	(0.031)	(0.025)
Female	−0.050	−0.047	−0.047
	(0.205)	(0.226)	(0.188)
Age_plan	−0.059	−0.140**	−0.087*
	(0.040)	(0.059)	(0.049)
Age_plan^2	0.001	0.001*	0.001
	(0.000)	(0.001)	(0.000)
Fields of Research	YES	YES	YES
Constant	−26.320	−75.437	−83.739*
	(39.792)	(61.741)	(49.942)
Observations	833	833	833
R-squared	0.117	0.154	0.079

Note: *p < 0.1; **p < 0.05; ***p < 0.01. Baseline group are full-time Changjiang Scholars.

[31]The authors only show the number of observations that are finally used, not information on all observations, including some of which have missing values.

best overseas talent may still benefit from what is called 'the diaspora option'.[32] China introduced that policy in 2000, setting aside decades of argumentation that those who did not return were unwilling to engage in the development of their 'motherland'.[33] However, the authors' findings confirm that these two key programs have pulled in top talent that otherwise would have been lost had China demanded an 'all or nothing' engagement with the country.

Institutional Culture: why the Best are Not Returning

Theories about the resistance to reverse migration should focus on the power and the ability of those in entrenched positions of authority within the key social institutions to undermine the reverse flow of talent. According to Kapur, relocating people, values, talent, and knowledge back to the home country alters the distribution of power, ideas, status and resources within it.[34] For Cerase, returnees' ability to bring about change is limited 'because of the resilience of strong power relations and vested interests which prevent innovators from undertaking any initiatives that could jeopardize the established situation and the traditional power structure'.[35] A survey in 2002 and 2003 in the Chinese Academy of Sciences found 'institutional bias' against returnees,[36] while according to Solingen, 'firewalls' in the home country limit external influences, undermining the changes people overseas want to see before they will return.[37] And if they still return, the dominant domestic norms may differ strongly from norms they learned abroad, forcing assimilation, failure, or 'exit'.[38] In the end, the ability of local power holders to resist such changes decreases the probability that they will face threats from more talented overseas scholars.

The efforts of many states to reform their educational and research environment have met sharp local resistance. Germany's reform effort to encourage competition among universities faced strong pressure from senior professors who resented curbs on their powers and greater incentives for junior faculty.[39] Resistance from systematic and institutional barriers made it very difficult for academic returnees to Turkey to change the curriculum or the research environment.[40]

The Case of China

Chinese talent programs emphasize material incentives, such as salary and research funding, the 'hard environment',[41] as well as social benefits, such as housing, children's education, jobs for spouses, and the academic rank which the returnee is awarded.[42] However, for many years, Chinese officials may have overestimated the role of material rewards and underestimated the impact of concerns about the

[32]Jean-Baptiste Meyer et. al., 'Turning brain drain into brain gain: The Colombian experience of the diaspora option', *Science, Technology and Society*, 2(2), (1997).
[33]David Zweig, Chung Siu-Fung and Han Donglin, 'Redefining the "Brain Drain": China's Diaspora Option', *Science, Technology and Society* 13(1), (2008), pp. 1–33.
[34]Devesh Kapur, *Diaspora, development, and democracy: the domestic impact of international migration from India*, (Princeton, N.J.: Princeton University Press, 2010).
[35]Cerase, 'Expectations and reality'.
[36]Zweig, 'Returning to the Chinese Academy of Sciences'.
[37]Etel Solingen, 'Of Dominoes and Firewalls: The Domestic, Regional, and Global Politics of International Diffusion', *International Studies Quarterly* 56(4), (2012), pp. 631–44.
[38]David Zweig and Feng Yang, 'Overseas Students, Returnees and the Diffusion of International Norms into Post-Mao China', *International Studies Review* 16(2), (2014), pp. 252–63.
[39]Marco Jäger and Quirin Schiermeier, 'Professors facing power cuts in German university reforms', Nature 411(6), (2001), p. 6.
[40]Interview by one of the authors in Istanbul, Turkey, April 2015. See also Servet Çelik, 'The Role of Foreign-Educated Scholars in Turkey's Higher Education System: A Narrative Study of Two English Language Teacher Educators', *Turkish Online Journal of Qualitative Inquiry* 3(3), (2012), pp. 56–70.
[41]Dennis Normile, 'New Incentives Lure Chinese Talent Back Home', *Science* 287(5452), (2000), pp. 417–18.; Quirin Schiermeier, 'China: at a crossroads', *Nature* 507(7490), (2014), pp. 129–31.
[42]Florin Vadean and Piracha Matloob, 'Circular migration or permanent return: What determines different forms of migration?' IZA Discussion Paper, (2009), accessed 25 March 2012, https://papers.ssrn.com/sol3/papers.cfm?abstract_id=1434621: Jorgen Carling and Silje Vatne Pettersen, 'Return migration intentions in the integration–transnationalism matrix', *International Migration* 52(6), (2014), pp. 13–30.

'softer' research environment.[43] In 2002, mainland expatriates favoured a 'systematic reform of China's environment on human talent' over special privileges,[44] while a 2004 web survey of 3,000 respondents found that the strongest force stopping people from returning was 'the complicated nature of human relations' in Chinese society.[45] Thus while the research climate, including outdated academic standards, poorly-trained scientific workers, a paucity of cutting-edge information and talented collaborators and a vibrant academic community, as well as the lack of international recognition, were important,[46] managing relationships and maintaining research enthusiasm in the face of excessive administrative interference, were the most difficult problems returnees faced.[47]

This reference to 'relationships' reflects the dilemmas observed in the early days of the transition from socialism in Eastern Europe. In those states, the early winner of reform, including individuals, social groups or organizations, having moved into new administrative posts or benefited from the changes in the allocations of resources, fought against further changes deemed necessary for the transition to succeed.[48]

The authors find a similar phenomenon in the case of science and education in China. Administrators who went abroad in the early days of reform and took up positions of authority in the science and education system resist further reforms, such as greater transparency in the competition for funding and research posts, that undermine the personalistic system they have established in the organizations they administer.

Academic networks in China place newly returned scholars at a disadvantage, compared to locals or earlier returnees, limiting their access to research funding.[49] According to one CAS researcher who was a TTP awardee in 2011.

> *Recent returnees will always have more trouble getting grants. It takes at least three years for people to know and trust you. There are two aspects to evaluating an application. First, the project plan, with 60-70 percent of the evaluation based on that … . But 30-40 percent of the evaluation is based on relationships, it can't be avoided in Chinese society especially since everyone can guess who wrote the application. Also, although much of the money goes directly to the applicants, the directors of research institutes can decide who can apply for the grants.*[50]

Qiu Chengtong, a Chinese mathematician at Harvard, told a journalist that whether or not he would return permanently 'depends on the research environment'. The president of Wuhan University agreed.[51]

Leaders within the CCP have known this problem for a long time. Li Yuanchao, who founded the TTP in 2008 after he became head of the CCP's Organization Department, advocated transforming China's research culture.[52] A survey carried out on behalf of the Organization Department in 2011 on high-end returnees under the TTP confirmed these concerns, lamenting that research funding is based on 'guanxi' not quality, returnees must share money from the awards with locals in the same unit, administrative intervention is too common and may determine who can apply for grants, and that applications are too complex. The research culture was thus the major problem.

The source of resistance to the TTP became clear to two of the authors in June 2012. At a small meeting in Shenzhen with Li Yuanchao, then Director of the Organization Department and creator of

[43]Jinian Lai, 'Liuxue huiguo renyuan dui keyan huanjing de renshi diaocha ji jianyi' [Research and opinions on the views of returnees from overseas towards the conditions of scientific research], *Zhongguo keji luntan* [Forum on Chinese Science and Technology], 11, (2011), pp. 119–26.
[44]Zweig and Wang, 'Can China bring back the best?'.
[45]Michael G. Finn, 'Stay Rates of Foreign Doctorate Recipients from U.S. Universities, 2011 , Oak Ridge Institute for Science and Education, US Department of Energy, National Center for Science and Engineering Statistics of the National Science Foundation (2014), accessed 29 November 2019, https://orise.orau.gov/files/sep/stay-rates-foreign-doctorate-recipients-2011.pdf.
[46]Yigong Shi and Yi Rao, 'China's Research Culture', *Science* 329(5996), (2010), p. 1128.
[47]Lai, 'Liuxue huiguo renyuan dui keyan huanjing de renshi diaocha ji jianyi'.
[48]Hellman, 'Winners Take All'.
[49]Lai, 'Liuxue huiguo renyuan dui keyan huanjing de renshi diaocha ji jianyi'.
[50]Interview by one of the authors in Guangzhou, November 2011.
[51]Ding Jia, 'Shenhua keji tizhi gaige' [Deepen the reform of the S&T system], *Zhongguo kexue bao* [*China Science Daily*], 14 December 2012, p. 1.
[52]Zweig and Wang, 'Can China bring back the best?'.

the TTP,[53] the president of Dalian Polytechnic University, which is funded under the '985 world-class university program', criticized the program's large salaries and bonuses, and the unfair privileges these 'high flying' returnees received which, he claimed, harmed the enthusiasm of locally trained scholars in his university. When pressed by Li, he admitted that one-third of his faculty had degrees from his own university—reflecting the academic inbreeding rampant in China, which helps older professors build their networks in the university. The fact that this opponent of reform, as well as the director of a CAS institute who also criticized the program at that meeting, had been visiting scholars in the US years before and did not have foreign PhDs, led to hypotheses 2 and 3.

Resistance to Reform in the Chinese Academy of Sciences

For many years, the Chinese Academy of Sciences (CAS), as well as its HTP, had resisted deeper reforms. CAS' president is equal in rank to a minister, and is always a member of the CCP's Central Committee, so if demands for reform must overcome his resistance, they must come from on high.[54] Senior researchers in CAS, known as Principle Investigators (PI), select the new PIs, abetting the creation of an internal and potentially competitive networks, while new projects that compete for CAS' internal research funding must be recommended by at least two senior CAS Fellows, increasing the power CAS Fellows have over their academic field.[55] CAS' promotion system lacks rigour, allowing senior fellows to promote their junior allies. According to a university scientist, 'CAS hires too many young scientists who then go through little or no review, and essentially receive tenure without having to prove themselves'.[56] Fourth, directors of CAS institutes often have limited international experience, particularly the rigorous training one undergoes through a Western PhD program. Thus, between 2002 and 2013, the percent of CAS institute directors who had gone overseas as Visiting Scholars, rather than as PhD students, rose from 41.9 percent to 45.5 percent, while another 27.7 percent of directors had no overseas experience at all. As of 2013, overseas PhDs composed only 26.8 percent of institute directors, though that was an increase over the 18.9 percent in 2002. Yet while many leaders in CAS returned in the 1990s, or even late-1980s, they determine the research direction of each institute, leaving little room for new research teams.[57] Finally, in the late-1990s, CAS institutes became independent research groups, limiting the influence of CAS' president, who unlike a university president, cannot easily introduce reforms.[58] Also, more than half of CAS' funding comes directly from the Ministry of Finance to the institutes, not from competitive grants, allowing institute directors to allocate funds to members of their own network.[59]

Similar to the criticism of the CAS institute director who attended the meeting with Li Yuanchao, CAS' Vice President, Shi Erwei, worried that the high salary and special privileges given to returnees would create conflict inside CAS;[60] so, none of the newly hired directors of the five new CAS institutes established in 2010 came from overseas. According to Shi, CAS' management style differs from the Western norms recommended by returnees. For example, CAS vets candidates for its HTP internally,

[53]Two of the authors were meeting with Li Yuanchao and other officials concerning national policies on returnees when this confrontation occurred. One of them had been invited to present his findings on resistance to the program.

[54]The reinvigoration of reform, which began in 2013, was in response to criticism from Xi Jinping, who the year before had taken over the leadership of the CCP.

[55]Mingfei Jin, 'Moluo de PI zhidu' [The decline of the PI system], *Wo xin zhong de Zhongguo Kexueyuan zhengwen huodong* [A collection of articles on 'The Chinese Academy of Science in my heart'], 30 June 2011, accessed 12 June 2015, http://www.cas.cn/zhengwen/jsgj/201106/t20110629_78971.shtml.

[56]David Cyranoski, 'Chinese science gets mass transformation', *Nature* 513, 25 September 2014, pp. 468–9.

[57]Hongfei Wu, 'Zhongguo Kexueyuan zai zou xiapo' [CAS is on a declining path], *Sciencenet*, 8 December 2012, accessed 30 November 2019, http://blog.sciencenet.cn/blog-176-640879.html.

[58]Jia, 'Shenhua keji tizhi gaige [Deepen reform of the technological system], p. 1.

[59]Chunli Bai, 'Wu fa huibi de Zhongkeyuan gaige' [The unstoppable reform of CAS], *Huanqiu shibao* [*Global Times]*, 24 April 2014, accessed 30 November 2019, https://china.huanqiu.com/article/9CaKrnJKlrb.

[60]Erwai Shi, 'Zhongkeyuan xinjian wu suo weihe fangqi haigui'? [Why did five institutes at CAS set aside returnees?], *Science Times*, 5 January 2015, accessed 30 November 2019, http://scitech.people.com.cn/GB/10705839.html.

while a panel of global experts evaluates applicants to the other two programs, making it possible for weaker candidates, who have relationships with the leading researchers at CAS, to enter.[61]

Therefore, the authors proposed a second hypothesis, that awardees under CAS' Hundred Talent's Plan (HTP) have weaker academic standing than awardees under the TTP or the CJP. To compare the quality of people under different programs, the authors used returnees under CAS' HTP as our baseline model and found that the h-index, the AAIF, and the number of papers participants in the two other programs published each year was significantly higher than CAS' HTP awardees (Table 5, column 1, p. < .01).

Column 2 of Table 5 controls for the influence of the year they returned, as the quality of the returnees may have changed and, since some of the HTP awardees came back as early as 1995, when the program was launched, the authors need to mitigate that effect. Similarly the CJSP was launched in 1998, three years after the HTP, but 10 years before the TTP. Statistical results show, however, that after controlling for the improving quality of returnees in the national programs over time, the CJSP and the TTP awardees were still much better than returnees under the HTP, regardless of when people returned. Column 3 presents the findings after the authors control for the fact that part-time CJSP and TTP participants are stronger than full-time participants in these programs, but the findings are still statistically significant, particularly for the CJSP scholars at universities.[62] The Annual Number of Publications (ANP) and the h-index also show that CJSP and TTP awardees are stronger and have greater academic influence ($p < .01$) than the HTP participants from CAS.

This finding could be due to the fact that the HTP recruits weaker scholars. However, the responsibility for the lower quality of the scientists in CAS falls squarely on the head of CAS and its internal mechanisms, as the participants in the TTP who are recruited by CAS are also weaker than participants in the TTP who join universities (Table 6, column 1). The robustness check using annual number of publications and the AAIF again support our hypothesis that CAS recruits weaker scholars to its HTP than the other programs. On the other hand, statistical analysis also shows that people

Table 5. Comparing the quality of returnees under three national talent programs

VARIABLES	(1) h-index	(2) h-index	(3) h-index	(4)AAIF	(5) ANP
Changjiang Scholar	0.541***	0.543***	0.416***	0.834***	0.567***
	(0.080)	(0.083)	(0.083)	(0.158)	(0.120)
1000 Talents	0.818***	0.812***	0.489***	0.774***	0.429***
	(0.081)	(0.079)	(0.092)	(0.162)	(0.123)
Year joined plan		0.001	0.001	0.077***	0.043***
		(0.007)	(0.007)	(0.012)	(0.009)
Part-time			0.475***	0.519***	0.618***
			(0.065)	(0.119)	(0.093)
Female	−0.097	−0.098	−0.117	−0.317*	−0.130
	(0.096)	(0.096)	(0.097)	(0.165)	(0.127)
Age_plan	0.001	0.000	−0.007	−0.125***	−0.040
	(0.028)	(0.028)	(0.027)	(0.044)	(0.034)
Age_plan^2	0.000	0.000	0.000	0.001**	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Fields of Research	YES	YES	YES	YES	YES
Constant	2.266***	−0.366	−0.188	−149.5***	−85.3***
	(0.629)	(13.263)	(13.184)	(24.1)	(17.7)
Observations	1,209	1,209	1,209	1,209	1,209
R-squared	0.166	0.192	0.188	0.207	0.167

Notes: The baseline group is the HTP. Robust standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

[61]Because CJSP participants are sponsored by the Ministry of Education and target universities, no CJSP scholars went to work at CAS as their first stop.

[62]The findings for the TTP are significant at the 0.1 level because some of participants work in laboratories of companies whose interests lie in creating patents, not in academic publications.

Table 6. Quality of Returnees in CAS versus China's Universities

VARIABLES	(1) h-index	(2) h-index	(3) AAIF	(4) ANP
CAS	−0.387***	−0.277**	−0.358**	−0.386**
	(0.069)	(0.123)	(0.166)	(0.160)
Year joined plan	0.007	−0.016	−0.028	0.023
	(0.006)	(0.028)	(0.045)	(0.041)
Part-time	0.505***	0.399***	0.689***	0.582***
	(0.060)	(0.077)	(0.121)	(0.108)
Female	−0.150	0.159	0.136	−0.060
	(0.098)	(0.120)	(0.220)	(0.217)
Age_plan	0.003	−0.007	−0.153**	−0.106**
	(0.026)	(0.044)	(0.063)	(0.052)
Age_plan^2	−0.000	0.000	0.001**	0.001*
	(0.000)	(0.000)	(0.001)	(0.001)
Fields of Research	YES	YES	YES	YES
Constant	−12.375	34.707	62.857	−43.502
	(11.799)	(55.085)	(91.174)	(82.053)
Observations	1209	625	625	625
R-squared	0.100	0.228	0.162	0.069

Notes: * p <0.1 ** p <0.05 *** p <0.01. Robust standard error is in parentheses.

who join CAS through the TTP plan, rather than through the HTP, publish more high ranked articles, suggesting that the recruitment process could be important, as CAS senior fellows worry more about personal relations than research quality in picking the new PIs, while the TTP panels, composed of international evaluators, play a role in admitting better scholars into CAS. Similarly, when the authors compare the h-index, AAIF, and ANP of the publications of TTP recipients working in CAS and in universities, the latter are significantly stronger on all three measures (Table 6), suggesting that it is CAS' culture that generates less influential publications.

Some observers have challenged our position. Zheng Yongnian argued that CAS researchers were less concerned with scholarly publications and more engaged with nationally sponsored research, such as space travel, high speed rail, environmental protection, etc., making publications less important for career development.[63] They may also care more about patents than publications. However, two returnees at the Beijing's High Energy Physics Institute interviewed by Zweig in spring 2017 saw publications as the major criterion for evaluation and promotion and argued that scientists at CAS saw publications as the major way to gain scientific recognition.

Second, one reviewer suggested that CAS' lower performance could be attributed to its lower reputation. When returnees are asked whether they wanted to work in CAS or the universities, they generally prefer the latter. But CAS is the number one research institute in Nature Index, even higher than Harvard or the Max Planck Institute. Funding is relatively easier to get as the Ministry of Finance gives CAS funds directly. Therefore, it would be hard to say that discrimination against CAS would undermine the quality of its researchers rather than its internal research culture.

University Presidents as a Source of Resistance and Reform

Based on the encounter in Shenzhen, where a university president with no overseas PhD strongly opposed the TTP, the authors hypothesized that the source of resistance to programs that privilege high quality returnees was influenced by certain characteristics of university presidents. These qualities include their educational background, their opportunities for further promotion, the level of institutional reform in the university and the pattern of upward mobility of the university president, all of which affect the academic culture of the school and the willingness or ability of the university to attract the very best overseas scholars.

[63]Comments by Zheng Yongnian at a seminar by Zweig in 2016 at the East Asian Institute in Singapore.

Why do the authors see these factors as important? First, universities with presidents who are themselves returned PhDs should be less worried about the competition from the top overseas talent. Second, if the president has a chance to be promoted into the higher echelons of the educational bureaucracy (measured by having an age below 58),[64] he or she may be more likely to see new talent as beneficial to the university's national and global status. Third, presidents of universities who were promoted to the post of president from outside the university (particularly if they are a returned PhD) are more likely to bring in more overseas talent than presidents who have risen to the post of president from within the ranks of the university, as the latter are more likely to have developed a network of home-grown academics whom they wish to protect from newly returning 'high-flyers.' Finally, over the past 15 years, some universities have instituted new policies on job search and hiring, promotion, letting faculty control their own research grants, the hiring of 'part-time deans' who maintain their overseas positions, even as they reform the Chinese educational institutions to which they are appointed, as well as other changes to the university's institutional culture.

To test the hypothesis that a university administrator's conservatism and the institutional culture they foster undermine the recruitment of top overseas talent, the authors constructed a panel data set (Table 7) that includes: (1) the number of scholars recruited to each university in that year from the national programs; (2) the university president's age; (3) the overseas educational experience of the president—PhD, visiting scholar (or post-doc), or no overseas experience; (4) whether the president was promoted from within the host university; and (5) whether the university introduced any major reforms.[65] The data covered 27 universities and 61 university presidents from 1999 to 2012 and is outlined in table 7.[66]

Table 8 reports the results of a fixed effects OLS model combining all university presidents. Results confirm the hypothesis that universities with presidents who could still be promoted, who possessed an overseas PhD, or who were brought into the post of president from outside, brought in more overseas professors through the TTP or the CJSP. Model 1, our baseline model, which compares presidents who have a chance to be promoted and those who do not, finds that presidents who have the opportunity to be promoted bring in 1.52 more high quality returnees ($p. < .01$) than those who no longer can be promoted. Model 2 compares universities based on whether their presidents were internally or externally promoted and finds that universities whose president was promoted from within the university hierarchy recruited 1.58 fewer high-quality returnees than universities whose president had been brought in from the outside ($p. < .01$). Model 3 shows that universities with presidents who hold an overseas PhD recruit 1.79 more high level talent, as compared to universities whose presidents have no overseas experience ($p. < .05$),[67] an increase of over 50 percent, as the

Table 7. Summary Statistics of Variables for Analysis of Universities

	Mean	Standard deviation	Minimum	Maximum
No. of Returnees to the university each year	3.04	3.03	0	17
Internal Promotion	.609	.489	0	1
Current President was a Visiting Scholar	.346	.476	0	1
Current President holds an overseas PhD	.383	.487	0	1
No. of years in post	5.09	2.91	1	17

Note: N = 376, the total number of observations in 27 universities over 12 years. The authors lost two observations because one university was not established until 2000. The number of presidents was 61.

[64]Cadres in China cannot become deputy ministers after they reach age 58. Chien-wen Kou and Wen-Hsuan Tsai, "Sprinting with Small Steps' Towards Promotion: Solutions for the Age Dilemma in the CCP Cadre Appointment System', *China Journal* 71, (2014), pp. 153–71.

[65]The authors cannot use actual reforms instituted by the university as a new dependent variable because reform is a one-off event, supplying too few cases for analysis.

[66]These 27 universities are all under the supervision of the MOE. There are in total 75 universities under direct control of the MoE. Some of them are highly discipline-oriented, so the number of returnees is very small.

[67]In this case, the authors control for the age of the president or his/her chance of promotion, showing that having an overseas PhD has a huge impact on the willingness to recruit more overseas talent.

Table 8. University Presidents and Recruitment of Returnees from National Programs

	Model 1	Model 2	Model 3	Model 4	Model 5
opportunity_promote	0.421***	0.416**	0.412**	0.446**	0.368**
	(0.159)	(0.153)	(0.152)	(0.211)	(0.147)
Overseas_PhD			0.578**	0.590**	0.594**
			(0.259)	(0.242)	(0.278)
Visiting_Scholar			0.152	0.149	0.302
			(0.211)	(0.212)	(0.239)
Internally_promoted		−0.458***	−0.384***	−0.392**	−0.313**
		(0.141)	(0.137)	(0.135)	(0.132)
No. of years in post				0.010	
				(0.025)	
Some internal reform					0.476**
					(0.183)
Year Fixed Effect	Controlled	Controlled	Controlled	Controlled	Controlled
University Fixed Effect	Controlled	Controlled	Controlled	Controlled	Controlled
Constant	−0.563**	−0.205	−0.424	−0.383	−0.536
	(0.214)	(0.241)	(0.258)	(0.285)	(0.246)
Observations	376	376	376	376	376
R-squared	0.105	0.120	0.150	0.150	0.239

Note: Our dependent variable is the log of the number of national talent program returnees to the university in each year. The baseline group is universities whose president has no overseas experience. Robust standard errors in parentheses are clustered at the university level.

*** p. <.01, **p. <.05, *p. <.1.

average number of returnees to these universities was 3.04. On the other hand, if the president had only been a Visiting Scholar, which implies a less transformative intellectual experience than getting an overseas PhD, the authors found no statistically significant effect on the number of top returnees recruited, relative to those with no overseas experience at all. Thus, the experience of being a visiting scholar makes a president no more likely to recruit top talent than not having gone abroad at all. In column 4, the authors run a robustness check to see whether the length of time the university president was in office affected the number of returnees recruited from national programs; the result turns out to be insignificant.

Finally, to check if a change in the university's research environment affected the recruitment of high quality returnees, the authors designed a variable called *reform*, whose value is equal to 1 if the university, at least one year previously, has carried out any of three reforms: a 'dual track system' of personnel reform; a 'part-time dean' strategy; or introduced a 'special academic zone'. Universities which did not introduce any reforms in that year were scored as 0.

Results shows that the number of high quality returnees increased after reforms were implemented ($p. < 0.05$), adding an additional 1.61 returnees, again an increase of more than 50 percent. Thus, internal environments in universities that were more meritocratic, more openly competitive, and that ceded power to talented returnees (protecting them from bureaucratic intervention) attracted more highly talented people to the university.

Conclusion

The findings lead to several conclusions. While many people assume that 'the best are not returning' and posit reasons as to why this may occur, this article uses useful metrics to demonstrate empirically that full-time returnees are not as good as part-time participants in key national programs. Given that these programs, especially the 1000 Talents Plan, sought to bring back China's best overseas talent on a full-time basis, some observers assert that these programs have failed and should be stopped.[68]

[68]The U.S. government's attack on the TTP as a mechanism for intellectual property theft and spying has led China to impose a public moratorium on the discussion of the TTP.

In terms of theory, the authors can argue that national economic development and positive incentives for overseas talent can reverse the most deleterious aspects of the dreaded brain drain that often saps the strength of science and technology in developing societies. However, even in societies where top leaders are reform-oriented, and they spend large amounts of money on R&D and various programs to attract overseas talent, winners of the first efforts at reform may successfully maintain many personalistic, inward looking norms that help these initial victors of reform resist further changes that could undermine their power.

This 'partial reform equilibrium' may be sustainable because institutional culture matters, and, if not reformed, undermines national scientific development. Thus, although CAS' leader professed disinterest in adopting Western norms pushed by returnees, if CAS wants to maintain a leading role in China's scientific, R&D and innovation system, it must deepen the transformation of its research environment. By employing a recruitment process that seems flawed, particularly relative to the TTP, CAS' scientists were falling behind researchers at universities, prompting some voices to call for an end to this relic of the Soviet system.

Similarly, if returnees outperform locally trained PhDs, universities should recruit more talented, overseas PhDs to join their faculty. And while this process is underway, our data show that giving overseas trained academics authority in the academic system, as Li Yuanchao suggested, will attract more top talent, further strengthening China's research.

Finally, some glad tidings. Despite China's inability to convince the best to return 'full-time', the country has persuaded very talented, overseas Mainland scholars to participate in China's national development. And despite the US assault on the TTP, China's adoption of the 'diaspora option' in 2000, which encouraged scientists remaining abroad to transfer technology, ideas and information back to China, can only enhance China's scientific project and justified the decision to allow its very best brains to go abroad.

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