

“Brain Drain” of Chinese Academics: What and Why

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Talent is the bottleneck to China's innovation push

- China's Medium to Long-Term Plan for the Development of Science and Technology (2006-2020) calls for turning China into "an innovation-oriented nation" by 2020.
- The toughest challenge is the dearth of talent at the high-end who possess the creativity and innovative ability to lead China's scientific and educational enterprises and economic growth.
- "Brain drain" is to blame for the lack of talent in China.

The number of the “non-returned” is insignificant

- Between 1978 and the end of 2005, more than 933,400 Chinese went abroad for study and research, of whom only 232,900 had returned.
- Compared with the graduates from Chinese universities during this period – more than 10 million – the number of the “non-returned” is insignificant.

... and there has been “Brain gain” and “brain circulation”

- There has been an increasing return of seasoned entrepreneurs and professionals who take advantage of the opportunity of economic growth in China.
- There also has been an increasing collaboration between Chinese-born academics working overseas and academics in China. For example, some 70% of the U.S.-China coauthored S&T papers involved a Chinese-origin scientist residing in the U.S.

Some data

Table 1: Programs targeting high-end academics

Programs	Total #	% Foreign experience	% Foreign PhDs
NSFC Distinguished Scholars (1994-2004)	1,176	98.5	32.8
MOE Cheung Kong Scholars (1999-2004)	537	90	37.2
CAS One Hundred Talent (1999-2004)	899	86.5	43.6

Tentative conclusion

- If such highly-profiled programs with enormous resources, prestige, and incentives attached have failed to attract more high-quality academic returnees, one could hardly claim the country's effort to turn around the "brain drain" successful.

Chinese with American PhDs overwhelmingly remain in the U.S.

Table 2: Stay rates of foreign PhDs awarded by American universities (%)

	1987/88 PhDs in 1992	1990/91 PhDs in 1995	1992/93 PhDs in 1997	1994/95 PhDs in 1999	1996 PhDs in 2001
China (S&E PhDs)	65 (480)	88 (1,791)	92 (2,240)	91 (2,781)	96 (3,022)
India	72	79	83	87	86
Taiwan	47	42	36	42	40
Korea	17	11	9	15	21
All countries and regions average	41	47	53	51	56

Chinese PhDs go overseas for post-doctoral training

- Between 1985 and 2004, China awarded more than 100,000 doctorates in science and engineering.
- The number of those who have done post-doctoral fellowship in China during the same period is 33,000.
- A significant number of Chinese doctorates have gone abroad for such training.

The U.S. employs more Indians with S&E degrees, but more Chinese PhDs

Table 3: Foreign-born U.S. residents with S&E degrees (2003)

Degree level	Place of birth	Residents	Degree from outside the U.S. (%)
All degree	India	448,700	56.9
	China	294,800	28.1
	South Korea	110,200	31.1
Doctoral	China	62,500	23.9
	India	41,300	34.0
	South Korea	8,800	12.1

Chinese PhDs come from all of the world

Table 4: Chinese-born S&E PhDs in American workforce (2003)

	Number	Note
PhDs earned in the U.S. (1983-2003)	35,000	Total number of PhDs awarded to Chinese is about 37,000
PhDs earned in the U.S. by Chinese-origin naturalized citizens	1,000-2,000	
PhDs earned prior to 1983	~ 10,000	Mostly from the U.S. but also from other countries
PhDs earned in Japan, Canada, Australia, or Europe	~ 6,000	1,000-2,000 for each
PhDs earned in China	~ 10,000	
TOTAL	62,500	

Reasons (1)

- There are few good Chinese PhDs.

Table 5: Distribution of PhDs awarded by field and program quality (1994-2003)

	n_j/n	$n(\text{top5})_j/n(\text{top5})$	$n(\text{top5})_j/n_j$	$n(\text{low})_j/n_j$
	% of PhDs awarded to Chinese	% of PhDs awarded to Chinese from top-5 institutions	% of PhDs awarded to Chinese that were from top-5 institutions	% of PhDs awarded to Chinese that were from unranked or ranked-below institutions
Physics	12.4	8.3	7.0	51.3
Chemistry	15.5	5.3	2.7	58.6
Economics	6.0	3.8	8.4	37.8
Biochemistry	16.6	6.3	2.5	63.2

Reasons (2)

- Comparatively, salary for academics in China is low.
- There are the family issues to deal with.
- From the perspective of career development
 - They would experience the most difficult time adapting to the quickly changing environment in China because the rules of the game are different.
 - They may not have social network and “invisible college.”
 - Research culture not conducive to doing the first-rate work.

Reasons (3)

- From the perspective of China's research environment
 - Political ritual is there to stay.



His *Cell* paper is “a gift of an ordinary Party member to the Party on its birthday.”

Reasons (4)

- From the perspective of China's research environment
 - Although the political and scientific leadership knows that China lacks first-rate talent, institutional leaders may not necessarily welcome them.
 - Talent-seeking programs have been abused.
 - Rampant corruption has turned talent away.



“Why do I want to be their company?”

Conclusion

- Most of the Chinese-origin academics – many being the best and brightest – remain overseas.
- The opportunity cost for them to work in China is just too high.
- They are critical to China's indigenous innovation push.
- China needs to significantly improve its research environment so as to attract high-quality talent.