Preliminary

Higher Education in China

HAIZHENG LI
School of Economics
Georgia Institute of Technology
Atlanta, GA 30332-0615
Tel: 404-894-3542
Fax: 404-894-1890
Haizheng.li@econ.gatech.edu

September 25, 2008

I am grateful to Sumei Guo, Fei He, Chongyu Lu, Yang Peng, Hua Wang, Ying Wang, Luping Yang, Xiaobei Zhang, Xiaojun Zhang for data collection, and especially to Lan Ding and Yanni Xu for assistance. I would like to thank Charles Clotfelter for comments.

Higher Education in China

Abstract

Since the start of economic reform in 1978, the higher education in China has expanded dramatically. Enrollment at both undergraduate and graduate level has increased rapidly. In the mean time, the number of Chinese students studying abroad, especially in the US and western European countries is growing fast. Now China is investing heavily in its elite universities in order to foster world class schools, including recruiting western trained researchers and scholars back to help build top academic programs. Therefore, it becomes an interesting and important question on whether Chinese universities will continue to serve as a complement to US universities by sending their best students to the US or will gradually become competitors to US universities. This paper studies higher education in China, focusing on its connections with US universities. Based on published and surveyed data, we analyze the trend of student enrollment in China, the dynamics of Chinese students studying in the US, Chinese government policies in building world class universities, and the recruitment of Chinese universities in the US academic market.

I. Introduction

In 2006, a total of 134,000 Chinese students went to various countries to further their study, an increase of approximately 13% compared to 2005. This number is almost equal to the total new international students (142,923) coming to the United States in that year.[1] Among all foreign students studying in the US, 67,725 students were from China in 2006, accounting for 11.6% of the total international students in the US. The size of students from China ranked No. 2 in the US, only second to India. While in other recent years, the number of Chinese students studying in the US was on the top.

As a major destination for international students, the United States has been receiving an increasing number of Chinese students since 1978, when China started to open to the outside world. In 2005, the share of overseas Chinese students in the United States was 23% (Fazackerley and Worthington 2007), the largest among all countries. In all major universities, especially Research I universities, Chinese students enroll in graduate programs in almost every field to study for master or doctoral degree.

In addition to the increasing number of Chinese students in American universities, there have been a few new trends in recent years. First, Chinese graduate students traditionally mostly studied in the fields of science, such as physics and mathematics, but now they are in many other fields, including business, economics, law, and medical areas. Second, contrary to their early cohorts, the reliance of Chinese students on financial aid (fellowship or assistantship) from the hosting schools has been reduced significantly in recent years. More Chinese students come to the US with funding from their families.

[1] Institute of International Education (IIE) Network, http://opendoors.iienetwork.org/page/92270/.

As the Chinese economy and family income grows, the Chinese currency appreciates, and college tuition in China increases, it is expected that studying abroad will become more affordable. In the meantime, however, the rapid expansion of higher education in China may keep more Chinese students to stay home for higher education. Moreover, with the increasing job and career opportunities, more and more overseas trained scholars/students return to work in China as faculty. They may help to build world-class education and research programs, and thus improve the quality of higher education in China.

Therefore, the dynamics in the higher education in China and in its interactions with the United States and other countries raise many interesting questions. How will it affect the higher education and universities in the United States? Will those American trained Chinese students help American universities to become more competitive in the global market? Will they help China to build world-class universities? Will Chinese universities eventually become competitors of American universities or continue to serve as complements to prepare high quality students for universities in the US?

Those questions have important implications for both American and Chinese universities. In this study, we attempt to address those questions from the prospect of the higher education in China with a focus on its influences on American universities. In addition to the use publicly available data, we also collect our own data for the analysis. Additionally, we conducted a small survey to get detailed information on the hiring of economics faculty members by Chinese universities in the US academic job market.

There are many studies on China's higher education system and its impact on universities in other countries. An Agora report edited by Fazackerley and Worthington

(2007), "British Universities in China: The Reality Beyond the Rhetoric" presents a comprehensive review of the relationship between British universities and Chinese universities. The article by Xin and Normile (2008) published in Newsfocus section in *Science* discussed issues related to Chinese universities in their efforts to become world-class institutions. Ma (2007) reviewed top universities in China and their role in economic transition. Liu (2008) provided an overview on research universities in China. In this study, we discuss China's higher education and focus on a different angle, i.e., focusing on its relationship with outside world, especially the United States.

The rest of the paper is organized as follows. In next section, we briefly describe the history of higher education in China. Section III discusses the rapid growth of higher education since the economic reform started in 1978. In section IV, we presented major policies adopted by the Chinese government for fostering world-class universities in China. The trend and pattern of Chinese students studying abroad are discussed in Section V. In Section VI, we discussed the situation of Chinese students and scholars in the United States. Section VII analyzes the trend and policies related to overseas Chinese students returning to work in China. Section VIII discusses the challenges in the higher education in China and concludes.

II. A Brief History of Higher Education in China

In the imperial era, Chinese education focused on the Confucius doctrines. There was no institution that could be called university. One element of Chinese ancient higher education was in the form of Taixue and Guozijian, which taught mostly Confucianism

and Chinese literature for high level civil services. The imperial examination system (Keju) was the major mechanism by which the central government identifies and recruits elites all over the country.

Followed the defeat of the Chinese Empire in the Opium Wars in 1840, the modern western education was introduced to China. Western style professional schools began to establish and some later became earliest universities in China. In 1912, China had one university and 94 professional training colleges; and by 1923, there were 35 university-level institutions of higher education and 68 provincial training colleges (Yang 2005 and references therein). Moreover, this period also marks the beginning of Chinese students going abroad to study. Starting from 1872, the government of Qing Dynasty selected 120 children aged 12-14 years old and sent them to study in the United States, 30 per year for four years.

Therefore, from the very beginning, the modern Chinese higher education was greatly influenced by foreign countries. The country's higher education first followed Japanese system and then American model. Western missionaries played a significant role in the early stage (Yang 2005). Chinese scholars returned from Japan and western countries contributed greatly to the development of the modern institutions of China's higher education.

The war with Japan and the following civil wars hindered the growth and development of higher education in China. By 1949 when the new People's Republic of China was established, there were 205 colleges and universities with a total enrollment of 116,504 students (Table 1). The number of professors was 4,785 and the number of graduate students was merely 629 (Table 2).

From 1949 to 1965 before the Cultural Revolution, the higher education in China completely switched to the Soviet model. Overall, higher education grew in a much faster pace than before. As can be seen from Table 1, the total enrollment reached 674,436 by1965, almost 6 times of that in 1949. The total enrollment reached almost 1 million during its peak year in 1960. The number of students graduated was around 200,000 per year. The total enrollment of graduate students was 4,546, more than 7 times higher compared to that in 1949. The rapid growth in graduate student body shows an increasing weight put on research.

The number of schools fluctuated dramatically during this period, from 181 to 1,289. This is mainly caused by the changes in government policies regarding the administration of higher education system and by mergers and combinations of schools requested by the government. Before the Cultural Revolution in 1965, the number of colleges and universities became 407, and the new enrollment also decreased significantly compared to the peak year of 1960. The scale of studying abroad was quite high during the period of 1954-56, but dropped quickly in the years followed.

The Cultural Revolution of 1966-76 had a devastating impact on China's higher education. Colleges and universities were closed or stopped functioning. National entrance examinations for higher education were abandoned. From 1966 to 1969, there was no admission of new students to higher education. Graduate student admission was suspended even longer, for 12 years from 1966 to 1977. Although statistics in tables 1 and 2 still show new enrollment since 1970, those students were mostly admitted into college based on their family background and political considerations. Such admission was only allowed for a few universities, not at the national level. There was no academic

standard either for admission or for graduation. During this period, the curricula, classes, and grading system were all distorted, not following the traditional academic standard of higher education.

In 1977, in the eve of the unprecedented reforms, the restoration of higher education system already started. In the end of this year, China held its first national entrance examinations for higher education since the beginning of the Cultural Revolution in 1966. There were 5.7 million people who took part in the exams, but only 273,000 were admitted to colleges and universities, an admission rate of 4.8%.[2]

III. The Growth and Trend of Higher Education

Since the beginning of the economic reforms in 1978, the Chinese higher education has been developing and expending rapidly. As shown in Table 3, from 1978 to 2006, the number of institutes of higher education increased from 598 to 1,867, more than tripled. The number of students enrolled increased from 0.86 million to 17.4 million, an average annual increase of 69%. In 2006, there were 5.5 million new students admitted into colleges and universities, more than 6 times of the total enrollment in 1978 and equivalent to the total enrollment in 2000. In 2006, the number of undergraduate students graduated was 3.8 million, which almost equals to the total number of undergraduate students graduated in twelve years from 1978 to 1989.

As can be seen in Figure 1, the accelerated growth of higher education started in 1999 due to the government policy for expanding higher education. In that year alone,

[2] Those admitted in 1977 started their higher education in spring 1978. From 1978 on, the National Higher Education Entrance Exams have been set in summer time, and students admitted start school in fall of that year.

the new enrollment increased 47%. For the five-year period from 1999 to 2003, the average annual growth in new enrollment was 29%, much higher than economic growth. The growth of annual new enrollment declined since then, and became 8.3% in 2006.

As expected, the expansion also raised the probability to get into college for those who took the National Entrance Examination. Before 1981, the rate of admission was below 10%. In other words, only top 10% of students could be admitted into college. From 1981 to 1998, the admission rate was in the range of 10-40%. In 1999, it jumped to 48%, and in 2004, to 62%. Since the expansion of higher education in 1999, more than half of those participated in the entrance exams have been admitted in to college.[3] In addition, as a result, the number of graduates increased accordingly since 2003. In 2003, when the first cohort of enrollment expansion hits the market, the number of graduates increased 40%. For 2004 and 2005, the growth rate of graduates is still high, at 27% and 28%, respectively.

Joining the fast growth of enrollment in undergraduate education, graduate education expanded even faster, given the increasing focus on research in China's higher education (See Figure 2). In 1978, there were merely 10,934 graduate students in total. However, by 2006, the number became 1.1 million, as shown in Table 4. This represents an increase of 100 times, an average annual increase of 345% for this period. The trend for annual new admission of graduate students was quite sporadic before 1999, with an annual growth as high as 159% in 1981 and -55% in 1980. It shows a quick increase from 1981-85 and then quick decline for 1986-89. Graduate admission also joined the quick expansion of higher education in 1999, when the admission of graduate students increased by 27%. The largest increase happened in 2000 when the new admission of

[3] Admission rates are from http://www.neea.edu.cn/.

graduate students increased 39%. Since then, the scale of graduate programs increased very fast as well, with an annual average growth of 30% from 1999 to 2003. In 2006, the number of graduate students graduated was 255,900 in one year, equivalent to the fifteen-year total, from 1978 to 1992. As a result, the number of graduated master and Ph.D. students grew in an average annual rate of 33% from 2003 to 2006. As the National Entrance Examinations for college, there is a National Entrances Examination for master programs as well. The admission rate for master students is much lower than that for undergraduate students. In 1997, the admission rate was 22%. With the expansion of graduate programs, the admission rate for master students has been above 25% since 2000, and reached 30% in 2004.

Doctoral programs in China re-started in 1982, when there were only a few hundreds doctoral students throughout the country. From 1988 on, the number of doctoral students enrollment reached the number of 10,000. Since then, it took 15 years for the total enrollment to reach 100,000 in 2002. However, it took merely 5 years to increase the enrollment by another 100,000 doctoral students. In 2006, there were 55,955 new doctoral students admitted in China, and the total enrollment of doctoral students reached 208,038. In that year, 36,247 students were awarded a doctoral degree. In comparison, in the United States in 2006, there were 45,596 doctoral degrees awarded. And the number of doctoral degrees awarded in China is around 79% of that in the US. However, ten years ago in 1996, this ratio was merely 13%.

Doctoral programs have expanded quickly since 1990, as can be seen in Table 4. For 1990-2003, the annual growth the new enrollment of graduate students was above 20% for most years. The expansion of higher education also affects doctoral programs.

In 1999, the new admission of doctoral students increased 33%, and for 1999-2003, the average annual growth of enrollment was 27%. The growth of doctoral admission slowed down considerably since 2004, and the growth in 2005 and 2006 is merely 3% and 2%, respectively. Interestingly, the admission rate for doctoral program is very high. For 1998-99, it is as high as 56%, double that for master programs. The rate dropped to below 46% since 2001, and at 41% in 2005.

Interestingly, the faculty size does not seem to increase as fast as enrollment. In 1999, when undergraduate admission rose by approximately 50% and graduate admission rose by about 30%, the total number of faculty members merely increased by 5%. Although the faculty size grew in a faster pace in the years after 1999, it is still far below the speed of enrollment. In particular, the average annual increase of faculty size from 1999 to 2003 is 12%, far below the growth of admission. The implication is that since 1999, China educates more college students with fewer faculty members. More specifically, the student/faculty ratio was 8.8 in 1998 before the expansion, and became 10.3 in 1999. The ratio continues to rise to 16.2 in 2003, and 17.2 for 2006, which almost doubled the number before the start of recent expansion. This ratio is considerably higher than that in the US. In particular, in the US, the average ratio of students to faculty for 4-year private school is 12.2, and for 4-year public school is 14.8.[4] Given the huge economic gap between the two countries, it is unclear whether the ratio in China is too high and thus may compromise education quality.

As Figure 3 and 4 shows, the average student-faculty ratio was below 10, and the average number of students was below 4,000 before the expansion took place in 1999. From then on, both figures go up quickly. The average number of students reached 9,905

[4] National Center for Education Statistics, http://nces.ed.gov/programs/digest/d07/tables/dt07_237.asp.

in 2006 from 3,530 in 1998, an increase of 180.6%. Thus, from 1998 to 2006, the average annual growth of the number of students per school was 23%. It appears that the expansion of higher education in China has been mainly in the increase of students.[5] It is unclear whether such a quick enrollment expansion compromises the quality, especially given the quick rise of student-faculty ratio.

IV. Major Reforms and Government Policies for Fostering "World-Class Universities"

Since the economic reforms started in 1978, the Chinese government implemented a number of market oriented reforms in higher education institution. Major reforms include: first, abandon the traditional mandatory planning system from the government regard admission and placement, and give schools flexibility in their enrollment; and more importantly, abandon the job assigning system and let graduates to find jobs in the labor market. Second, change from traditional free higher education to tuition based system. Third, open higher education institutes to outside world and encourage collaborations and exchanges with universities worldwide.

In addition to changes in the institution and system, Chinese government also launched a number of specific programs with special funding in order to help universities to become world-class schools. The major initiatives include "211 Project" and "985 Project" as well as some related projects like "863 Project" and "973 Project."

The "211 Project" aimed at providing special support to the top 100 universities to help improve their teaching, research, and infrastructure. It includes: i) improve faculty,

[5] One reason for the dramatic increase of students per school is the merge of universities, mostly driven by the Chinese government. On the other hand, since many existing universities build satellite campus, it is unclear how facility per student changes.

labs, and infrastructure for those universities; ii) support some selected programs to help them become leading programs in the fields; iii) improve information technology including Internet and library.

The total fund for the "211 Project" for 5-year period from 1995 to 2000 was 18.37 billion Yuan RMB. In this project, the amount of 6.39 billion Yuan was for supporting the selected priority programs. The fund supported a total of 107 universities and 602 priority programs. Among the programs supported, 42% are on engineering and new technology, 20% on social science and humanity, 15% on basic research, 11% on medical and health, and the remaining 12% on environmental and agriculture.[6]

The "985 Project" is aimed at helping the top 38 universities to become world-class universities. It includes: i) reform and improve operation mechanism within a university; ii) recruit leading scholars inside China or from overseas to establish strong research teams; iii) establish Science and Technology Innovation Platform and Social Science Research Base in those selected universities, iv) improve university infrastructure and support international collaborations.[7] The "985" project provides special financial support to those universities, ranging from 300 million Yuan to 1.8 billion Yuan per school. The funding comes from the Ministry of Education and local provincial government. Compared to the "211 Project," the "985 Project" is weighted more heavily on research. Table 6 listed all 38 universities supported by the 985 fund and their funding amount. As shown in the table, the list includes all top major research universities in China.

---

[6] The figures are from the official website of Ministry of Education, China, http://www.moe.edu.cn/edoas/website18/level3.jsp?tablename=724&infoid=5607, and http://www.moe.edu.cn/edoas/website18/level3.jsp?tablename=724&infoid=3568.

[7] Official website of Ministry of Education, China. http://www.moe.edu.cn/edoas/website18/level3.jsp?tablename=684&infoid=5120.

The "863 Project" focuses on research and development of high level technology while the "973 Project" is to support basic research. Both projects represent a large investment in science and technology. Universities in China have received a large amount of funding from those two projects for their research. For example, by 2002, there were 49 universities that received funding in the amount of 10 million Yuan or more from the "863 Project."[8]

In addition, every year, the National Natural Science Foundation and Social Science Foundation in China provide a large amount of financial support to faculty members in universities to support their research projects.

V. Chinese Students Studying Abroad

It has been a long tradition for Chinese students to go abroad to study, beginning from as early as 1872, as discussed in the history of higher education in China. Since the founding of the People's Republic of China, till the Cultural Revolution, most students going abroad were sponsored by the government. From 1950 to 1966, the Chinese government sent a total of 10,678 students to study in approximately 25 countries, mostly in Soviet Union, Eastern Europe, and other socialist countries. The policy of studying abroad was mostly abandoned during the Cultural Revolution, as well as other policies on international exchanges in education. For the ten-year period from 1966 to 1976, merely 1,629 students were sent to other countries, mostly for studying foreign language.[9]

[8] See China Education Online, October 28, 2005, http://www.51paihang.cn/html/edu/716.html.
[9] Data are from China Education Statistical Yearbook 1949-1981.

Following the start of economic reform in 1978, the government resumed the policy of sending students and scholars to study abroad. In 1979, a total of 1,750 people were dispatched to other countries to study. Most of them (74%) were visiting scholars. Among those going abroad, 82.6% for studying natural science, 16.1% for studying language, and only 1.3% for studying social science. This natural science-oriented pattern continued for a number of years.

Individuals going abroad to study can be classified as visiting scholars/students, who generally will not get a foreign educational degree; and formal students, who are to pursue degrees in foreign countries. Most visiting scholars/students were sponsored by the government or their employers, while most degree students going abroad were sponsored by the hosting schools in the form of fellowship and/or assistantship. In 1981, the Educational Testing Service (ETS) from the United States entered China to offer TOEFL, GRE and GMAT for Chinese students. Those tests make it possible for Chinese students to apply for formal graduate degree programs and to apply for financial aid from the schools they applied. Before 2000, due to the relative low level of family income, financial aids are almost the only financial resource for Chinese students to study abroad for a graduate degree.

Since 1978, the number of Chinese students going abroad has been continuously increasing except for the period of 1988-91 due to the Tian-An-Men Square demonstration.[10] Figure 5 show the total number of Chinese students and scholars study abroad. As can be seen, the number increased from 860 in 1978 to 134,000 in 2006. In this period, there were more than 900,000 Chinese students and scholars studied abroad.

[10] 1n 1989 and 1990, the number of students going abroad funded by the government dropped 21% and 25%, respectively, compared to the previous year.

Based on Institute of International Education (2007), China is the overall largest supplier of international students to countries around the world over the past decade. In 1992, because the famous south trip of the leader Deng Xiaoping, the country re-started economic reforms. Since then, especially after 1998, the total number of Chinese students going abroad to study has accelerated. In that year, the total number of students going abroad increased from 2,900 in 1991 to 6,540, an increase of 126 percent in one year. The second fastest increase happened in 2001 with an annual growth rate of 115%.

As can be seen in the graph, before 1992, almost all students and scholars studying abroad were funded by the Chinese government. The number of students without government funding has increased rapidly after that. Before 2000, it is almost impossible for Chinese students to get a US entry visa if he/she does not get some sort of scholarship from the hosting institute. Thus, most of those non-government sponsored students were funded by financial aids from the hosting institutes in the foreign country. Since 2000, due to the rapid increase in family income in China, it has been much easier for a Chinese student to get a US entry visa with self-funding.

Table 7 shows the number of Chinese students based on funding categories from 1996 to 2006.[11] For the ten-year period from 1996 to 2006, the average annual growth rate of students studying abroad was 25.7%. The largest increase is the group of self-funded students, with an annual growth rate of 31.7%, although with large fluctuation from year to year. Obviously, the increase has been mostly driven by self-funded students, given the annual average growth of 12.3% and 5.3% for 1996-2006 for government funded and employer funded students, respectively. The proportion of self-

[11] Data before 1996 were either missing or non-comparable. For example, the official statistics before 1991 does not include self-funded students.

funded students was about 65% in 1996, but increased to 90% or above since 2001.[12] The total number of self-sponsored students and scholars going abroad to study in 2006 was 120,878, which is 90.2% of those going abroad that year. As the income level continuous to grow, we can expect that more Chinese families can afford to study abroad with their own financial resources.

The significance of studying abroad in China's higher education, especially in graduate education, can be seen in Figure 6. It shows the ratio of studying-abroad students to graduating undergraduates and to new graduate admission in China. In general, most of those students studying abroad are to pursue graduate degrees in the hosting countries. With this assumption, we can see that, since 1978, those going abroad to study accounts for an increasing proportion of graduating college students. The percentage reached more than 9% in 2002. In other words, about 10% of graduating Chinese college students went to other countries for study. The ratio started to decline to around 3.5% in 2006. One reason for the declining proportion is that the enrollment hike since 1999 reached graduating time in 2002-03.

On the other hand, the ratio of students going abroad to domestic new graduate admission is much higher, and it shows a stronger rising trend. In particular, in 1995, the ratio was 40%, meaning that those going abroad for graduate education are almost 40% of those who stay home for graduate education. The ratio declined since then to about 24% in 1998. However, since 1998, the ratio rose rapidly to 62% in 2002, and then declined to 34% in 2006. For most of the years since 1994, the size of Chinese students going abroad for graduate study is approximately one third of those joining domestic graduate programs. Therefore, studying abroad weighted quite high in the graduate

[12] Self-funded students include those who received financial aids from hosting schools in a foreign country.

education for Chinese students. Even with the rapid increase in domestic graduation, studying abroad is still an important component for Chinese students after finishing undergraduate degree.

It is interesting to note that the enrollment boom started in 1999 does not seem to have a big impact on the flow of studying abroad. As those students started to graduate in 2003, the growth of study abroad, however, shows a different pattern, decreasing in both 2003 and 2004, and increasing only slightly in 2005. From 2003 to 2006, the average annual growth rate of graduation for undergraduate and graduate students was 30% and 33%, respectively. Yet, the annual average growth for studying abroad for the same period was merely 2%. Therefore, it appears that the proportion of students going abroad to further their study declined.

It is unclear though whether the decline is caused by diminishing propensity to study abroad or by other social and economic factors. In general, the candidate pool for study abroad is graduating seniors plus graduate students. We calculate a proxy for study abroad propensity by dividing the number of studying abroad students to the candidate pool. Figure 7 shows the trend of studying abroad propensity. The trend is generally up till approximately 7% in 2002, and then declined continuously to around 3% in 2006. It seems that, for the expanded college admission started in 1999, less proportion of them studied abroad.

With the increase of government revenue and foreign currency reserves, Chinese government expanded the scope and scale in sponsoring graduate students to study in developed countries. In 2007, Chinese government started a new program called Graduate Students Joint Training Program (GSJT). This program sponsors first or

second year doctoral students currently studying in universities in China to do course work and dissertation work in a number of designated universities in developed countries, for a period of one to two years. The program also provides financial support to the students who have been admitted into a formal graduate program to study for a graduate degree, mostly for doctoral degree, for up to four years. The fund comes from the China Scholarship Council (CSC), with monthly stipend in the amount of approximately $1,000 plus a round-trip international airline ticket.

Those GSJT students do not need to get admission into the graduate program in the hosting schools. The only requirement is that a faculty member at the hosting school agrees to host and co-advise the students. In this case, those students do not need to undertake the arduous tasks such as taking TOEFL and GRE, and thus the program makes it much easier for them to go abroad to study and do research. The biggest advantage of sponsoring graduate students abroad, compared to traditionally sponsoring of more senior visiting scholars, is that graduate students have much better English skills and can seriously take courses and work on their dissertations in a foreign university under advising of a co-advisor in the hosting school. Therefore, those graduate students can be expected to gain a lot more in learning and research experience. Such a program may also help to improve the quality of doctoral programs in China.

Based on the current government plan, from 2007 to 2011, China is going to support 5,000 graduate students each year for obtaining a graduate degree or for joint training abroad. To get an idea about the magnitude of this program, in 2006, the total new enrollment of doctoral students was about 58,000.[13] Thus, the scale of the GSJT

[13] The Statistic Communiqué of Education Development 2007, Ministry of Education, April, 2008.

program plans to support almost one tenth of new doctoral students admitted in domestic programs to developed countries for research and study.

VI. Chinese Students and Scholars in the United States

The total number of Chinese students in the US in 2006 is 67,723, increased from merely 753 in 1978. The proportion of Chinese students among all international students increased steadily, from below 1% before 1981 to 1-10% in 1981-91. Since 1998, Chinese students have always accounted for more than 10% of the total international students in the US.

The total number of Chinese students in the US is shown in Figure 8. Note that the total number is the stock of Chinese students and is affected by the number of newcomers, those who returned to China, and those who graduated. As can be seen in the graph, the total number of Chinese students dropped from 1992 to 1994, and again from 2002 to 2003. In 1994, the decline was 11% and in 2003 the drop is 5%. It is unclear what caused such changes. The "September 11" event in 2001 might contribute to the decline in 2003 as well as the almost flat growth in the two years followed.

Figure 9 shows the total number of Chinese graduate students and undergraduate students in the US. The number of undergraduate students appears to be quite stable. Clearly, majority of Chinese students are in the US for graduate studies. In early years such as 1985 and 1986, undergraduate students were about 33% and 24% of graduate students, respectively. After that time, the percentage has been always below 20%, mostly in the rage of 15-18%. In early years, it is generally difficult for Chinese families

to afford tuitions for their children to go to US college. Those undergraduate students might come to the US with their family due to immigration. At that time, the total number of graduate students was small, and thus undergraduate students accounted for a high proportion. Because graduate students can receive financial aids from the hosting institutes, applying for graduate program and financial aid became a main channel for Chinese students to come to the US. In 1987 and 1988, the number of graduate students increased by 32% each year.

Similar to the case for all Chinese students going abroad to study, the number of those who came to the US did not seem to follow the increasing trend in enrollment and graduation in China as well. As can be seen in Figure 8, the growth of Chinese students in the US followed closely the pattern of other non-Chinese international students from 2001 to 2005. In 2006, however, the growth of Chinese students (8.2%) was much faster than other groups of international students (2.6%). The pick up of growth of Chinese students in the US in 2006 is consistent with the pattern of all Chinese students studying abroad for that year, when the number grew 13.1% compared to 2005.

The differing trend of fast enrollment increasing in higher education in China and the slow path of those students/graduates going abroad to study raised some interesting questions. One possible explanation is that only those top students in China go abroad to study. If so, the expanded enrollment did not have much impact on this group. Another possible explanation is that the rapid expansion of graduate programs in China offers Chinese students more chances to go to graduate schools in China, and thus they do not need to go abroad to further their studies. Additionally, it is also possible that, with growing opportunities in China, students become less interested in going abroad than

previous groups. Other explanations include the restrictions placed on the number of Chinese students from some overseas schools and/or the economic condition in destination countries.

However, the rapid raise in family income (partly due to the appreciation of the Chinese currency), the greater openness of the country and higher degree of connections with universities all over the world, and the increasing ease of getting an entry visa for Chinese students to other countries, should promote more Chinese students to study abroad. It is unclear whether the outflow of Chinese students to study abroad would speed up in the near future.

The above observations raise an interesting research question: what determines the decision of Chinese students going abroad to study? Given the data limitation, especially the lack of micro-level data, it is difficult to investigate the impact of economic and social factors on the trend of study abroad. However, we were able to obtain the detailed data on Chinese students coming to the United States, sponsored by the government Graduate Students Joint Training Program (GSJT) in 2007. The data include the study fields of those students, the destination schools, etc. This data set provides some information to investigate the factors that influence Chinese students' coming to study in the US.

Based on the data, in 2007, the inauguration year of the GSJT Program, a total of 3,952 students sponsored by the program were able to find their hosting institutes. Among them, 1,977 students came to the United States. Not surprisingly, the US took more than half of those students. Table 8 show the list of top ten schools with most GSJT

students from China. Those schools are mostly ranked within the top 100 universities in the US. Table 9 shows top 10 origin universities in China for those GSJT students.

Figure 10 shows the field distribution of the GSJT students in the US. Interestingly, life science became the top field of study, accounting for 31% of all students supported by the program. Engineering and physical science ranked No. 2 and 3, respectively. Differing from the natural science oriented focus for Chinese students studying abroad in early years, now students studying in social science, management, humanity, and other fields are catching up, almost equal to the number of those in physical science.

An empirical analysis (see Ding and Li 2008 for details) shows some interesting aspects of Chinese students coming to the US. More specifically, it appears that social network places an important role for an American institute to host Chinese students. The social network is measured by the number of the Chinese faculty in the hosting institute. The results show that if the number of Chinese faculty members increases by 100, the number of Chinese students hosted is expected to increase by 5-7, keeping other things constant. Among others, state universities are more likely to accept Chinese students than private universities.

Given the large number of Chinese students studying in the Unites States, it is clear that American universities play a significant role in providing higher education to Chinese students, especially in graduate education. On the other hand, many Chinese students stay in the US to work after graduation, contributing to the US economy. Moreover, overseas Chinese students also make contribution to global higher education as many of them became faculty members in universities all over the world including the

United States, after receiving a doctoral degree. Chinese doctoral students are becoming an important component in the global academic market.

Table 5 shows the number of doctoral degrees awarded to Chinese students in the United States. In 2006, the number was 4,774, an increase of 25% from the previous year. It represents 30% of all doctoral degrees awarded to foreign students, and 10% of all doctoral degrees awarded in the US for that year. Both ratios have been showing a clear increasing trend. Compared to the number of doctoral degrees awarded in China, in 2006, US trained doctoral is 13% of that trained in China. However, the total number of Chinese students received doctoral degree in both countries was 41,021 in 2006, which is more than 40,822 doctoral degrees awarded to non-Chinese students in the United States.

In order to get some information on Chinese faculty members in universities in the US, we collected data among the 95 universities in the United States.[14] Most of those schools are among the top 100 schools based on the college rank. In those 95 schools, there are total 6,230 Chinese faculty members. On average, there are 66 Chinese faculty members per school, accounting for 3% of total faculty size. Among those schools, 66 are state university and 29 are private university. The average number of Chinese faculty in state universities is 67 (accounting for 3.0% of total faculty), and in private universities is 63 (accounting for 3.7% of total faculty).

In the sample, 46 schools are among the top 50 schools in the US. For those 46 schools, the average number of Chinese faculty members is 76, accounting for 3.0% of total faculty size. Among them, the average number of Chinese faculty in state universities is 79 (accounting for 2.91% of total faculty), and in private universities is 70

[14] Those schools are chosen because they hosted more than 5 Chinese graduate students sponsored by the GSJT program in 2007. Details about the sample can be found in Ding and Li (2008).

(accounting for 3.00% of total faculty). It is interesting to note that the percentage is actually slightly higher in private universities.

Table 8 and 9 shows a list of top schools in terms of the size of Chinese faculty based on the sample of 95 universities. The University of Michigan has the largest number of Chinese faculty, followed by the University of Pittsburg and University of Missouri at Kansas City. In terms of percentage, Stevens Institute of Technology is on the top with 27.1% of Chinese faculty as listed in Table 12, followed by Georgia Institute of Technology and University of Missouri at Kansas City.

Due to the lack of data, it is unclear how fast the size of Chinese faculty grew in the past decade as well as its relative size compared to faculty of other nations in the United States. However, we can expect that the absolute and relative size will continue to grow given the large amount of Chinese students in the US. The path of Chinese students, mostly top college students from China, from being educated in American universities to contribute to American higher education, shows an interesting dynamics in the integration of higher education among countries. In this sense, higher education in those two countries is complementing and mutual benefiting to each other.

VII. Returning to Work in China of Overseas Trained Chinese Students

Many Chinese students who received graduate degree in the US entered the American job market, especially in early years. Before 1992, very few of them returned to China. Those Chinese students worked in academia, consulting business, industry, and even government sector. Highly educated Chinese students make contributions to various

sectors of the US economy, and also quickly entered the American middle class after their graduation.

In order to attract well-established oversea scholars to return to work in China, the Chinese government has adopted a number of preferential policies specifically aimed at oversea students. Those policies are to provide students educated outside China, especially in developed countries, attractive packages if they return to work, including relatively high compensation, generous research support, and prestigious rewards.

In 1998, The Ministry of Education and the Li Ka Shing Foundation in Hong Kong jointly established the Changjiang Scholar Fellowship program. This program would set up "Changjiang Professorship," "Changjiang Lecture Professorship," and "Changjiang Scholar Achievement Award" in Chinese universities and research institutes. Changjiang scholars are expected to play a leading role in research, in building research and graduate program, and in teaching core courses and advising young scholars and graduate students. A "Changjiang Professor" is expected to work in the awarding institute no fewer than nine months; and a "Changjiang Lecture Professor" is expected to work in the awarding institute for no fewer than two months.

Since the start of the program till 2006, there were 803 "Changjiang Professors," 304 "Changjiang Lecture Professors," and 14"Changjiang Scholar Achievement Awards" awarded in 97 Chinese universities.[15] Among those Changjiang scholars, 94% have oversea study or work experience. This figure shows that a majority of China's leading scholars have some training in other countries. Among "Changjiang Professors," 231 of them were awarded to oversea scholars in order for their returning to work in China,

[15] See http://www.cksp.edu.cn/news/16/16-20070319-136.htm.

approximately 29% of the total awardees. Moreover, all 304 "Changjiang Lecture Professorship" positions were awarded to oversea scholars, including some prominent non-Chinese scholars.

Following the Changjiang scholarship program of the central government, provincial government and universities also established similar fellowship programs to attract well-established scholars, such as the "Furong Scholar Fellowship" program in Hunan Province and "Zhujiang Scholar Fellowship" in Guangdong province. Although local fellowship is not as prestigious as the Changjiang fellowship, their funding amount is comparable. Such funding becomes one of the important channels to attract established oversea scholars into the higher education sector in China.

In addition, the Natural National Science Foundation of China (NSFC) also sets up specific funds to support oversea scholars to do research in China. For example, it established "Distinguished Young Scholar" fund for oversea scholars in 2005. The recipient of this fund should work full-time in China to do researches. The program granted RMB 9.4 million in 2005, and the figures increased to RMB 24 million and 20 million in 2006 and 2007, respectively.[16] Moreover, in order to encourage joint research, the NSFC has also established Joint Research Fund for Overseas Chinese Young Scholars to do joint research with a Chinese institute. Such research resources provide incentive for oversea Chinese scholars to collaborate with researchers in China or return to work in China permanently.

With more internationally established scholars working in Chinese universities, Chinese young scholars and especially fresh Ph.Ds in other countries also consider universities in China as their alternative job search. Taking a faculty position in a

[16] See http://www.nsfc.gov.cn/nsfc2008/index.htm.

university in China is becoming much more acceptable and sometimes a better option for many fresh Chinese doctors or even senior scholars in foreign countries, even in the United States. In the meantime, universities in China also started to actively recruit faculty oversea.

It still lacks detailed data on the recruiting efforts from universities in China. However, we are able to collect data for economics field via the Job Openings for Economists (JOE) published by American Economic Association (AEA). Every year in early January, AEA in conjunction with approximately 50 associations in related disciplines holds a large scale annual meeting in the United States, Allied Social Science Association (ASSA) annual convention. In this convention, AEA also provides job placement service. Universities and some non-academic employers submit their job opening advertisement for economists (mostly with Ph.D. in economics) to AEA, and AEA publishes job openings on regular base.

Based on the JOE, the year of 1995 is the first year that Chinese schools listed job openings there. Two schools listed job openings for this year, Peking University (its China Center for Economic Research) and Hopkins-Nanjing Center in Nanjing University. After that, from 1996 to 1999, Hopkins-Nanjing Center was the only employer listed. In 2000 and 2001, Peking University was the sole employer; and in 2002 and 2003, Tshinghua University joined the recruitment. In 2004, another university, Shanghai University of Finance and Economics started to recruit faculty in the ASSA placement market, and it listed 10 openings for that year. Since then, the number of schools and institutes recruiting in the ASSA market increased very quickly, and reached

8 and 7 in 2005 and 2006. The number doubled to 14 in 2007, plus 3 additional research institutes.

With the jump of Chinese schools recruiting in the American academic job market starting in 2005, the total number of positions also surged. The total economics faculty positions for recruiting in the ASSA job market were below 10 till 2003. However, the number increased to 108 in each of 2005 and 2006, and became 80 in 2007 (See Table 13).[17]

Given a large gap in salary between universities in China and in the US, the biggest concern for job candidates is the scale of compensation. In 2002, Tsinghua University was the first to publish salary range in the JOE advertisement, RMB 200k-600k ($25,000-75,000) plus housing subsidies and research support. Although that salary is not high in the US standard, it is 5 to 10 times of the salary earned by faculty members with the same rank in the same school, and is in the very high percentile of compensation in China. Since then, it becomes common for Chinese universities to put salary range in the JOE job advertisement. In 2007, the highest salary was from Shanghai University of Finance and Economics, RMB 300k-1.5 million.[18] Given the relative live standard and continued appreciation of Chinese currency, such a pay scale is becoming increasingly attractive, especially due to the additional housing subsidy and research support.

In order to find more detailed information about faculty hiring packages from universities in China and to assess its competitiveness, we conducted a survey for those hiring schools in China. The survey covers 7 of the 14 schools recruiting economics

[17] The number for 2005 and 2006 should be interpreted with caution because one school, Southwestern University of Finance and Economics, advertised 50 and 40 positions in the JOE for those two years, respectively.
[18] Due to the appreciation of Chinese currency from $1=RMB 8 to $1=RMB 7, this amount is approximately $43,000-214,000.

faculty in the ASSA job market in 2007. Those seven schools are major Chinese universities and have been listed for 3 or more years in JOE.[19] The survey questionnaire was filled by the Chair/Dean of those schools, and thus provides information for their related departments. Since for some schools, there are multiple departments hiring, our sample includes total 10 departments from those schools.

The survey results are reported in Table 14 and 15. As can be seen in Table 14, the faculty size varies dramatically, from 3 to 140. This is because some departments are newly established. So far, there are two hiring models to add faculty members with oversea doctoral degrees. One is to add new faculty members to the existing faculty in a department but with different pay scheme and evaluation standard; and the other one is to set up a new department for oversea faculty. The latter model is relatively easier to implement as it can reduce the potential conflicts between faculty groups caused by the huge difference in pay scale and promotion standards. Therefore, in the table, we can see that the ratio of US trained faculty is very high, 45% on average and as high as 97% in the sample.

Since senior faculty members in the US are generally difficult to recruit due to the tenure system in the States and the uncertainties in China. Most Chinese students with doctor degree in economics returned to work in China are fresh PhDs. Because of the need for the universities in China to build their programs and mentor young faculty and graduate students, senior faculty members from oversea are generally in high demand. In order to find a practical way to recruit senior faculty from the States, many universities in

[19] The sample of 7 schools included is based on authors' connection and response for the questionnaire. Those on the JOE list in 2007 but not included are mostly first time recruiter in the ASSA market, including, for example, Harbin Institute of Technology and Shandong University. Since those excluded are mostly followers of the schools in our survey, we believe that our sample is representative.

China set up some type of Special-term Professorship, which is a part-time position specifically designed for oversea senior faculty members, such as those with tenure in the US universities. The survey shows that the average number of special-term professors is about 4 in the sample, and the ratio of special-term professor with US academic appointment to full-time faculty with US Ph.D. degree is 65% on average. Therefore, the flexible special-term professorship plays an important role in oversea faculty hiring.

Moreover, for most newly established departments/programs, the head (Director, Chair or Dean) is held by a senior oversea faculty member, mostly tenured faculty member in US universities, on part-time base. In our survey, 70% of department/units have an oversea head. The obvious advantage of having oversea head or special-term professors is that it can help to quickly build the program to international standard and to attract junior faculty from oversea.

The average estimated number of faculty planned to hire from oversea for next three years is more than 13, which is 4 faculty members per year on average. This is a very quick expansion by any standard. Moreover, the ratio of planned oversea hiring to the existing US trained faculty size is 239%, indicating very high demand for oversea trained faculty in Chinese universities. Following the plan, the size of oversea faculty will be more than double in three years.

Table 15 provides information on compensation package for hiring oversea faculty members. The average starting salary for fresh Ph.D in economics is approximately $36,000 to $43,000, and can be as high as $57,000. There is housing subsidy for a limited number of years in the range of $6,600 to $7,200; and annual research support of $5,500 to $6,800 for junior faculty. Senior faculty compensation

packages are higher in all categories, except for the research support. The base salary ranges from $47,000 to $67,000 on average. It is common for Full Professor to have salary in the range of $80,000. Based on American Association of University Professors (AAUP), in 2007, for doctoral institutes, the average salary for Assistant Professor is $68,112, and for Associate Professor and Full Professor is $80,043 and $118,044, respectively.[20] Although the salary (even plus housing subsidy) is still lower than that in US research schools, it is close to the range, notwithstanding the live costs are much lower in China. Moreover, the annual research support is comparable or even higher. Additionally, the teaching load is mostly 2-3, which is lower than in most economics program in the US.

With the hiring package described above, universities in China are getting more oversea trained faculty members. They even become competitors for US teaching schools and some research schools in hiring Chinese faculty in the US academic market. The survey asked a question "Please write down the name of two top universities in the US where your full-time faculty members received their PhD degree from." The answers include Harvard University, Princeton University, Stanford University, UC-Berkeley, etc.

With all the efforts from the Chinese government and universities, the number of those with oversea education returned to work in China has been rising steadily, and reached 42,000 in 2006, as shown in Figure 11. The increase has accelerated since 2000. In the past 5 years from 2002 to 2006, the average annual growth in returned students/scholars is 29%, which is higher than that of studying abroad.

However, every year, there are still much more students going abroad than coming back. The ratio of returned to those going abroad shows a declining trend since

[20] "The Annual Report on the Economic Status of the Profession, 2007-08," http://www.aaup.org/.

1988. In 2006, those returning to China were less than one third of those left China. The average ratio for the past 5 years (2002-06) is 23%, i.e., the returned was less than one fourth of those going abroad. However, the returning ratio has shown a steady increasing trend since 2002. Combining with the observation that the number of returned students/scholars has accelerated since 2000, it is interesting to see whether such a rising trend of returning ratio would continue.

VIII. Challenges and Conclusions

In this study, we discussed the higher education in China and study-abroad of Chinese students, focusing on those in the United States. In the era of globalization, higher education in most countries is not isolated. This is especially the case for China as a country becomes more integrated into the world. Additionally, because of the large number of Chinese students and scholars studying abroad, the development of higher education in China will also inevitably affect universities in other countries.

We show that China's higher education has been growing rapidly since the beginning of economic reforms, with the resources generated by dramatic economic growth and the engagement with universities in other countries. During this period, many Chinese students have been going abroad to receive best education in world-class universities in developed countries. Therefore, universities in other countries have been a significant part of higher education for Chinese students, especially at the graduate level. Additionally, the returned oversea trained Chinese scholars and faculty in China also help improve the quality of higher education there. In turn, many oversea Chinese students

contribute to the economy in the hosting countries through their employment there after graduation. Moreover, Chinese faculty with increasing size in the hosting countries also contributes to their higher education. Such dynamics between universities in China and in other countries may help to reinforce the mutual positive impact on higher education in both sides.

However, there are many challenges facing China's higher education. First, the rising college tuition makes higher education an increasing financial burden for Chinese families. Since 1989, China's higher education began to transform from tuition-free (with some living allowances to students) to tuition-based. By 1997, tuition had become mandatory in all colleges in China with the average tuition per student reached about 31% of per capita GDP.[21] This ratio reached 53% in 2002.

Secondly, the rapid expansion of enrollment has shown some negative impact on job placement. The large increase of supply in college students since 2003 is at least one reason for the difficulty for college graduates to find a job in recent years. Since 2003, the job placement rate for college graduates has been between 70 to 73%.[22] As the growth of college admission slowed down considerably in 2005 and 2006, the job market for college graduates may improve starting from 2009.

Third, the objective of master programs is not well defined in China, leaving students and faculty wonder whether master programs are for training researchers or other purpose. Such confusion causes problems in program and curriculum design. Moreover, doctoral programs in China generally need dramatic improvement in quality in

[21] The tuition and enrollment data only include regular institutes of higher education.
[22] The placement rate is based on the September number of that year, China Education Statistical Yearbook, various years, and http://edu.people.com.cn/GB/8216/52456/52459/106207/index.html.

order to train best researchers. Major reforms are needed for doctoral programs in the design, curriculum, etc. Unfortunately, such an effort has been hindered by the factor that a large number of government officials and business executives are getting their doctoral degree on part-time base. Such a window dressing desire from those groups of people who control administrative and financial resources compromises the improvement of doctoral education in China, and makes doctoral education effectively an EMBA type program. As a result, the best Chinese students with great research potentials still choose developed countries especially the US for their graduate training.

Finally, unlike the transition of economy toward a market system, the higher education system in China is still largely central planned in nature. Government intervention can be seen in almost every aspect of teaching and research.

For the United States, the impact of the development of China's higher education cannot be ignored, given the large number of students trained here. First of all, the high quality Chinese students and Chinese faculty should help to make American universities more competitive. Second, the increasing number of Chinese students with self-funding may also contribute to financial resources of American universities. Moreover, the collaboration between Chinese and American universities will help to expand education and research experiences for American students and faculty. Based on Institute of International Education (2007), the number of Americans studying abroad in China increased by over 500% in the past ten years, making China one of the top 10 study abroad destination countries for U.S. students, and one of the top 10 host countries for all internationally mobile students. U.S. students account for 7% of all international students

in China. China is now ranked fifth as a destination country for international students behind the U.S., the United Kingdom, France and Germany

Therefore, although the expanded and improved higher education in China may offer Chinese students better opportunities in home; however, in the foreseen future, a large portion of top Chinese students will still come to the United States to further their education. Moreover, given a big gap between China and US, many best trained Chinese students in the US will stay to work here. In this sense, the higher education in China is still a complement to American universities. On the other hand, the increasing trend of the return of established Chinese scholars in the US due to aggressive recruiting policies from Chinese universities may change such a situation gradually as those returned scholars may help to build world-class programs for Chinese students. As a result, some Chinese may choose to stay home for further education instead of going abroad and more oversea trained students/scholars may go back. The latter may cause some complications that go beyond the higher education sector itself. However, given the significant changes needed for China's higher education system as well as its economic and political system, the relative status between Chinese and American universities will remain for a long time.

Reference

Ding, Lan and Haizheng Li, 2008, "Social Network and Study Abroad: The Case of Chinese Students in the U.S.," Paper presented at the Chinese Economists Society 2008 North America Conference, University of Regina, Canada, 20-22 August 2008.

Fazackerley, Anna and Philip Worthington (2007), "British Universities in China: The Reality Beyond the Rhetoric," Agora Discussion Paper, www.agora-education.org.

Institute of International Education (2007), "Educational Exchange Between the United States and China," An IIE Briefing Paper, July 2008.

Liu, Nian Cai (2007), "Research Universities in China: Differentiation, Classification, and Future World-Class Status," in World Class Worldwide—Transforming Research Universities in Asia and Latin America, edited by Philip G. Altbach and Jorge Balan, The Johns Hopkins University Press, Baltimore, pp. 54-69.

Ma, Wanhua (2007), "The Flagship University and China's Economic Reform," in World Class Worldwide—Transforming Research Universities in Asia and Latin America, edited by Philip G. Altbach and Jorge Balan, The Johns Hopkins University Press, Baltimore, pp. 31-53.

Xin, Hao and Dennis Normile (2008), "Gunning for the Ivy League," Science, Vol. 319, January 2008, pp. 148-151.

Yang, Rui, 2005, "Higher Education in the People's Republic of China: Historical Traditions, Recent Developments and Major Issues," Paper presented to the 5th National and the 4th International "Challenges and Expectations of the University": Experiences and Dilemmas of the Reformation, Universitidad Autónoma de Tampico, Tamaulipas, Mexico, 8-10 June 2005.

Tables

Table 1 Schools and Undergraduate Students in China 1949-1977

(person)

	Number of Schools	Total Enrollment	Graduated	New Enrollment
1949	205	116,504	21,353	30,573
1950	193	137,470	17,607	58,330
1951	206	153,402	18,712	51,689
1952	201	191,147	32,002	78,865
1953	181	212,181	48,091	81,544
1954	188	252,978	47,069	92,280
1955	194	287,653	54,466	97,797
1956	227	403,176	63,214	184,632
1957	229	441,181	56,180	105,581
1958	791	659,627	72,424	265,553
1959	841	811,947	69,839	274,143
1960	1,289	961,623	136,138	323,161
1961	845	947,166	151,283	169,047
1962	610	829,699	177,255	106,777
1963	407	750,118	198,754	132,820
1964	419	685,314	204,499	147,037
1965	434	674,436	185,521	164,212
1966		533,766	140,670	0
1967		408,930	124,836	0
1968		258,736	150,194	0
1969		108,617	150,119	0
1970		47,815	102,672	41,870
1971	328	83,400	5,945	42,420
1972	331	193,719	16,961	133,553
1973	345	313,645	30,057	149,960
1974	378	429,981	43,282	165,084
1975	387	500,993	118,955	190,779
1976	392	564,715	149,154	217,048
1977	404	625,319	194,426	272,971

Note:

*Data Source: China Education Yearbook 1949-1981

*There is no new enrollment during 1966-1969.

*Because of the Cultural Revolution, the statistical work is interrupted and some data for 1966-1977 are missing.

*Numbers of students graduated for 1966-1971 are estimated based on the data for 1965.

Table 2 Statistics on graduate students and Professors in China 1949-1977

(person)

	All Enrollment	Graduated	New Enrollment	Number of Professors
1949	629	107	242	4,785
1950	1,261	159	874	5,154
1951	2,168	166	1,273	5,549
1952	2,763	627	1,785	5,223
1953	4,249	1,177	2,887	4,792
1954	4,753	660	1,155	4,746
1955	4,822	1,730	1,751	4,522
1956	4,841	2,349	2,235	4,558
1957	3,178	1,723	334	4,615
1958	1,635	1,113	275	4,315
1959	2,171	727	1,345	3,936
1960	3,635	589	2,275	3,674
1961	6,009	179	2,198	3,871
1962	6,130	1,019	1,287	3,815
1963	4,938	1,512	781	3,713
1964	4,881	895	1,240	3,653
1965	4,546	1,665	1,456	3,506
1966	3,409	1,137	0	
1967	2,557	852	0	
1968	1,317	1,240	0	
1969		1,317	0	
1970			0	
1971			0	
1972			0	
1973			0	
1974			0	
1975			0	
1976			0	
1977	226		0	2,288

Note:

*Data Source: China Education Yearbook 1949-1981

*Data for 1961 and before only include graduate students at universities; for 1962 and after, data also include graduates from Chinese Academy of Science and research institutes

*Because of the Cultural Revolution, the statistical work is interrupted and some data for 1966-1977 are missing. The number of professor of 1977 does not include Tibet and some universities in Hunan.

Table 3 Schools and Undergraduate Students in China 1978-2006

year	Number of IHEs (unit)	Number of Undergraduates(thousands)		
		Total Enrollment	New Enrollment	Graduated
1978	598	856	402	165
1979	633	1020	275	85
1980	675	1144	281	147
1981	704	1279	279	140
1982	715	1154	315	457
1983	805	1207	391	335
1984	902	1396	475	287
1985	1,016	1703	619	316
1986	1,054	1880	572	393
1987	1,063	1959	617	532
1988	1,075	2066	670	553
1989	1,075	2082	597	576
1990	1,075	2063	609	614
1991	1,075	2044	620	614
1992	1,053	2184	754	604
1993	1,065	2536	924	571
1994	1,080	2799	900	637
1995	1,054	2906	926	805
1996	1,032	3021	966	839
1997	1,020	3174	1000	829
1998	1,022	3409	1084	830
1999	1,071	4134	1597	848
2000	1,041	5561	2206	950
2001	1,225	7191	2683	1036
2002	1,396	9034	3205	1337
2003	1,552	11086	3822	1877
2004	1,731	13335	4473	2391
2005	1,792	15618	5045	3068
2006	1,867	17388.4	5465	3774.7

Sources: Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

Table 4 Statistics on Graduate Students and Professors in China 1978-2006

Year	Number of Faculty Members (thousands)	Number of Professors (person)	Number of Associate Professors(person)	Number of Graduate Students (person)		
				Total Enrollment	New Enrollment	Graduated
1978	206	2,709	5,467	10,934	10,708	9
1979	237	3,114	8,509	18,830	8,110	140
1980	247	3,620	12,971	21,604	3,616	476
1981	250	4,231	19,680	18,848	9,363	11,669
1982	287	4,458	22,461	25,847	11,080	4,058
1983	303	4,552	28,217	37,166	15,642	4,497
1984	315	4,427	29,058	57,566	23,181	2,756
1985	344	4,674	28,606	87,331	46,871	17,004
1986	372	7,727	38,989	110,371	41,310	16,950
1987	385	12,507	64,466	120,191	39,017	27,603
1988	393	14,778	78,777	112,776	35,645	40,838
1989	397	15,318	82,899	101,339	28,569	37,232
1990	395	15,052	84,150	93,018	29,649	35,440
1991	391	15,706	83,788	88,128	29,679	32,537
1992	388	18,559	85,548	94,164	33,439	25,692
1993	388	24,385	95,360	106,771	42,145	28,214
1994	396	28,300	102,100	127,935	50,864	28,047
1995	401	31,100	106,500	145,443	51,053	31,877
1996	403	33,300	110,600	163,322	59,398	39,652
1997	405	35,900	114,300	176,353	63,749	46,539
1998	407	36,700	115,900	198,885	72,508	47,077
1999	426	39,359	125,900	233,513	92,225	54,670
2000	463	43,674	138,820	301,239	128,484	58,767
2001	532	50,678	161,333	393,256	165,197	67,809
2002	618			500,980	202,611	80,841
2003	725			651,260	268,925	111,091
2004	858			819,896	326,286	150,777
2005	966			978,610	364,831	189,728
2006	1,076			1,104,700	397,900	255,900

Sources: Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

Table 5 Doctoral Students in China

Year	Number of Doctoral Students(person)		
	Total Enrollment	New Enrollment	Graduated
1978			
1979			
1980			
1981			
1982	536	302	0
1983	737	172	4
1984	1,243	492	39
1985	3,639	2,633	287
1986	5,654	2,248	284
1987	8,969	3,615	464
1988	10,525	3,262	1,583
1989	10,998	2,776	2,046
1990	11,345	3,337	2,457
1991	12,331	4,172	2,610
1992	14,558	5,036	2,528
1993	17,570	6,150	2,940
1994	22,660	9,038	3,723
1995	28,752	11,056	4,641
1996	35,203	12,562	5,430
1997	39,927	12,917	
1998	45,246	14,962	8,957
1999	54,038	19,915	10,320
2000	67,293	25,142	11,004
2001	85,885	32,093	12,867
2002	108,737	38,342	14,638
2003	137,000	48,740	18,806
2004	165,610	53,284	23,446
2005	191,317	54,794	27,677
2006	208,038	55,955	36,247

Table 6 Top 40 Universities in China in the Government 985-Program

Beihang University
Beijing Institute of Technology
Beijing Normal University
Central South University
China Agricultural University
China University of Mining and Technology
Chongqing University
Dalian University of Technology
East China Normal University
Fudan University
Harbin Institute of Technology
Huazhong University of Science and Technology
Hunan University
Jilin University
Lanzhou University
Nanjing University
Nankai Univeristy
National University of Defense Technology
Northestern University
Northwest A&F Technology
Northwestern Polytechnical University
Ocean University of China
Peking University
Renmin University of China
Shandong University
Shanghai Jiaotong University
Sichuan University
South China University of Technology
Southeast University
Sun Yat-Sen University
The Central University for Nationalities
Tianjin University
Tongji University
Tsinghua University
University of Electronic Science and Technology of China
University of Science and Technology of China
Wuhan University

Xiamen University
Xi'an Jiaotong University
Zhejiang University

Note:
China University of Mining and Technology and East China Normal University joined in the 985 Program in 2007.

Table 7 Number of students studying abroad 1996-2006 (person)					
Year	Total number	Government funded	Employer-funded	Self-funded	Self-funded/ Total number (%)
1996	20905	1905	5400	13600	65.1
1997	22410	2110	5580	14720	65.7
1998	17622	2639	3540	11443	64.9
1999	23749	2661	3204	17884	75.3
2000	38989	2808	3888	32293	82.8
2001	83973	3495	4426	76052	90.6
2002	125179	3500	4500	117000	93.5
2003	117307	3003	5150	109154	93.0
2004	114682	3555	6881	104246	90.9
2005	118515	3979	8078	106458	89.8
2006	134000	5580	7542	120878	90.2
Average annual growth rate(%)	25.7	12.3	5.3	31.7	

Sources: China Statistic Yearbook (2006)
China Education Yearbook (1997-2007)

Table 8 Top 10 U.S. Universities in Hosting GSJT Students from China

(Unit: Persons, %)

University	Number of GSJT Students	Chinese faculty	International openness
University of Michigan, Ann Arbor	59	139	27.08%
University of Illinois, Urbana-Champaign	51	94	40.24%
University of California, Los Angeles	49	129	17.73%
Pennsylvania State University, University Park	43	98	42.73%
Harvard University	42	64	33.68%
University of Maryland, College Park	41	110	33.17%
Columbia University in the City of New York	38	81	33.32%
University of Southern California	37	92	33.35%
University of Wisconsin, Madison	36	80	27.07%
Georgia Institute of Technology	31	69	47.87%
The University of Texas, Austin	31	67	29.00%
University of California, Berkeley	31	34	20.02%
University of California, Davis	31	83	21.97%

Source: China Scholarship Council.

Table 9 Top 10 Mainland China Universities in sending CSC awardees

(Unit: Persons)

University	Number of CSC awardees
Peking University	282
Tsinghua University	167
Wuhan University	163
Zhejiang University	145
Nanjing University	138
Nankai University	126
Beihang University*	126
Shandong University	125
Northwest A&F University	122
Jilin University	118

Source: China Scholarship Council.

Note: Beihang University* was formerly called Beijing University of Aeronautics and Astronautics.

Table 10 Awarded Doctoral Degrees in the US

year	To Chinese Students	To foreign students	U.S. citizens	Total Awarded
1983			24,393	31,280
1984			24,045	31334
1985			23,388	31,295
1986			23,097	31,897
1987			22,984	32,365
1988			23,290	33,497
1989			23,402	34,325
1990			24,913	36,065
1991			25,583	37,530
1992			26,009	38,886
1993			26,449	39,800
1994			27,150	41,033
1995			27,740	41,747
1996			27,777	42,437
1997	2,408	11,390	28,160	42,539
1998	2,571	42,683	28,456	42,637
1999	2,400	11,368	27,986	41,097
2000	2,594	11,597	27,986	41,365
2001	2,670	11,602	26,907	40,737
2002	2,644	11,353	25,936	40,025
2003	2,784	12,063	26,413	40,757
2004	3,209	13,000	26,431	42,123
2005	3,827	14,225	26,312	43,385
2006	4,774	15,916	26,917	45,596

SOURCE: NSF/NIH/USED/NEH/USDA/NASA, Survey of Earned Doctorates.

Table 11 Top 10 of Chinese faculty

Institute	Chinese faculty	Chinese faculty to total faculty ratio
University of Michigan, Ann Arbor	139	2.59%
University of Pittsburgh, Pittsburgh	133	3.07%
University of Missouri, Kansas City	131	7.04%
University of California, Los Angeles	129	3.64%
Cornell University	127	6.21%
Purdue University, West Lafayette	124	4.49%
Ohio State University, Columbus	122	2.85%
Vanderbilt University	120	3.82%
Yale University	119	3.60%
University of Florida	111	2.26%

Table 12 Top 10 of Proportion of Chinese faculty

Institute	**Chinese faculty to total faculty ratio**	**Chinese faculty**
Stevens Institute of Technology	27.05%	56
Georgia Institute of Technology	7.57%	69
University of Missouri, Kansas City	7.04%	131
University of Missouri, Rolla	6.78%	32
Cornell University	6.21%	127
Case Western Reserve University	5.51%	87
Baylor College of Medicine	5.50%	105
Rensselaer Polytechnic Institute	5.47%	27
University of California, Riverside	5.18%	43
The University of Texas, Arlington	5.09%	57

Table 13 Economics Faculty Recruiting in the United States by Chinese Universities 1995-2007

Year	# of School employers	# of other employers	# of faculty openings	# of other openings
1995	2	0	5	0
1996	1	0	2	0
1997	1	0	2	0
1998	1	0	2	0
1999	1	0	2	0
2000	1	0	3	0
2001	1	0	3	0
2002	2	0	6	0
2003	2	0	9	0
2004	3	0	12	0
2005	8	0	108	0
2006	7	0	108	0
2007	14	3	80	14

Data Source: www.aeaweb.org/joe/.

Note:

1. Other employers are research institutes, such as Samsung Economic Research Institute China.
2. Southwestern University of Finance and Economics listed 50 openings in 2005 and 40 openings in 2006.
3. For the number of openings, we assume "several" equals to 3.

Table 14 The hiring of oversea faculty members in Chinese universities

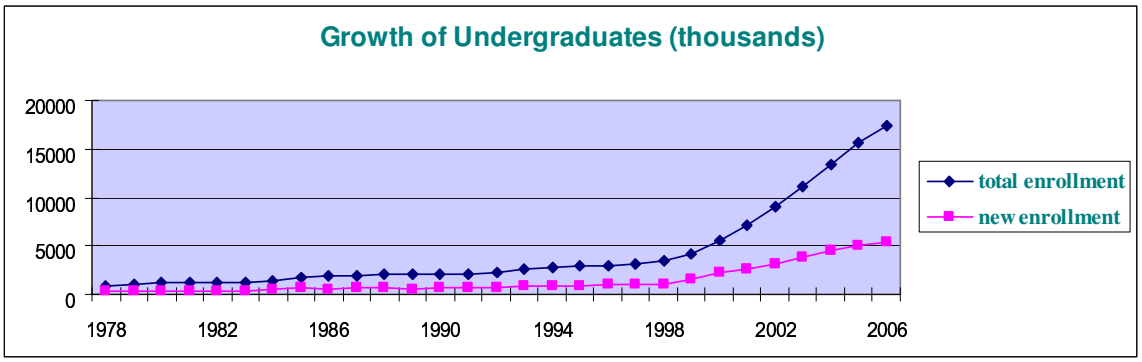
	Average	Min.	Max.	# of Obs.
Faculty size	45.6	3	140	9
Faculty with doctoral degree from US	9.3	2	29	9
Part-time US faculty	3.4	1	7	10
Planned oversea hiring	13.1	5	20	9
Oversea head	0.7	0	1	9
US full-time / all faculty	0.45	0.04	0.97	9
US part-time / full-time faculty	0.65	0.03	2.00	9
Planned hiring / US full-time faculty	2.39	0.34	7.50	9

Table 15 Information on Offer Packages for US Trained Faculty in Economics (in RMB)

	Average		Min.	Max.	Num. of the Obs.
	From	To			
Junior starting salary	253,000	304,000	200,000	400,000	10
Senior starting salary	330,000	470,000	300,000	550,000	5
Junior annual housing subsidy	46,125	50,708	24,000	67,000	8
Junior housing subsidy years	4		3	6	8
Junior annual research support	38,400	47,400	20,000	100,000	10
Senior annual housing subsidy	59,667	83,667	48,000	183,333	5
Senior housing subsidy years	5.6		3	10	5
Senior annual research support	35,667	42,333	20,000	80,000	6

Figures

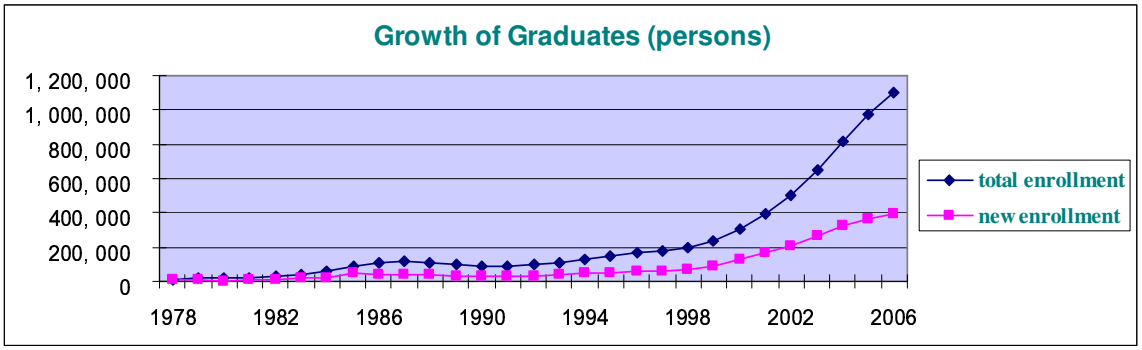
Figure 1 Enrollment of Undergraduate Students (1978-2006)



Sources:

Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

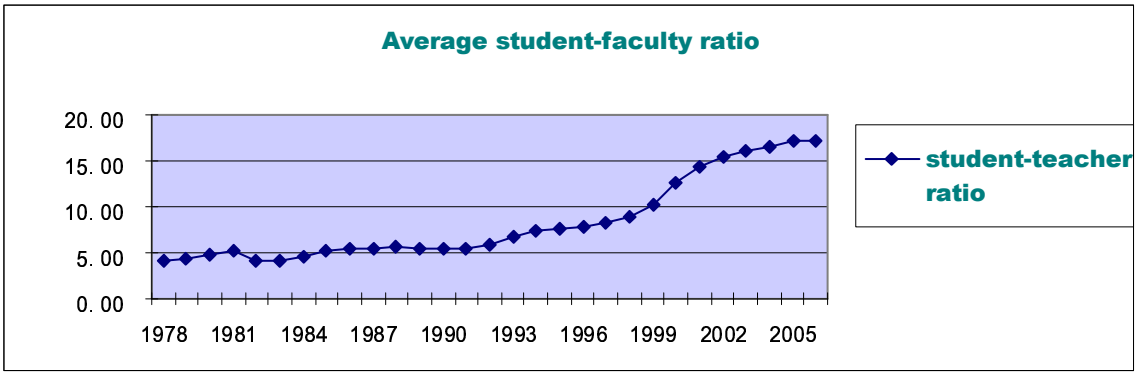
Figure 2 Enrollment of Graduate Students (1978-2006)



Sources:

Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

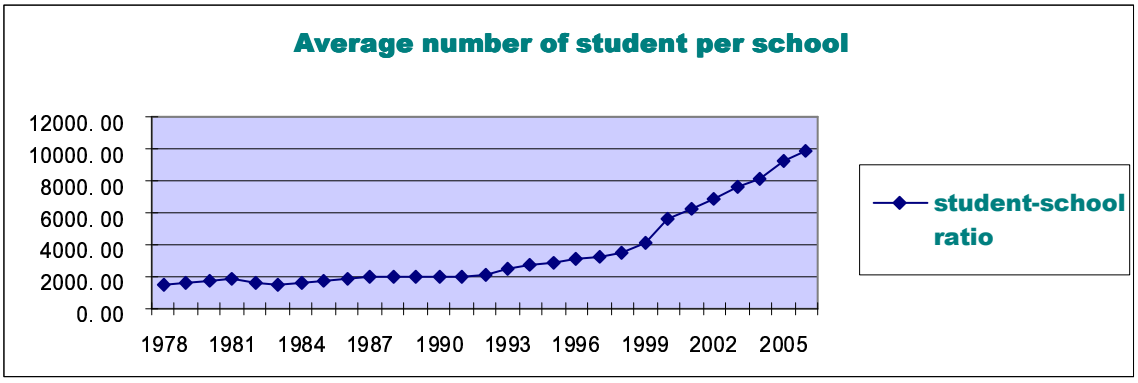
Figure 3 Average Student-Faculty Ratio



Sources:

Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

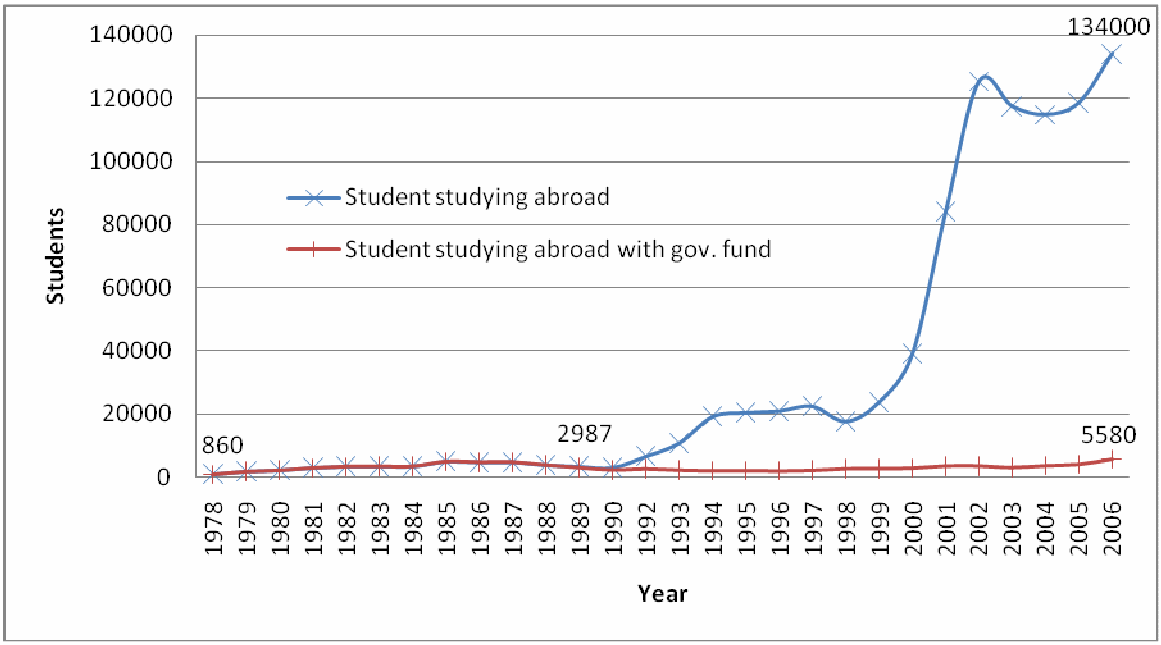
Figure 4 Average number of students per school



Sources:

Comprehensive Statistical Data and Materials on 55 Years of New China
China Statistic Yearbook (2003-2006)
The Statistic Communiqué of Education Development in 2006

Figure 5 Chinese students studying abroad (1978-2006)



Source: China Statistical Yearbook 2006, China Education Yearbook (various years)
Note: Year 1991 is excluded for lack of data

Figure 6
The Ratio of Studying-abroad Students to
Graduating Undergraduates and New Graduate Admission in China

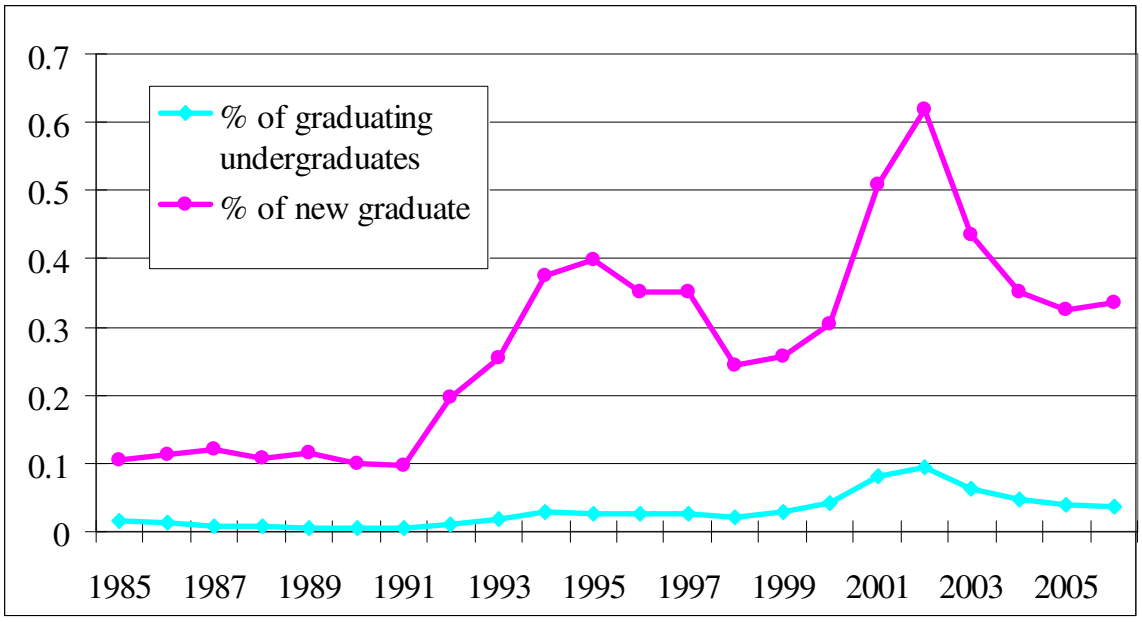
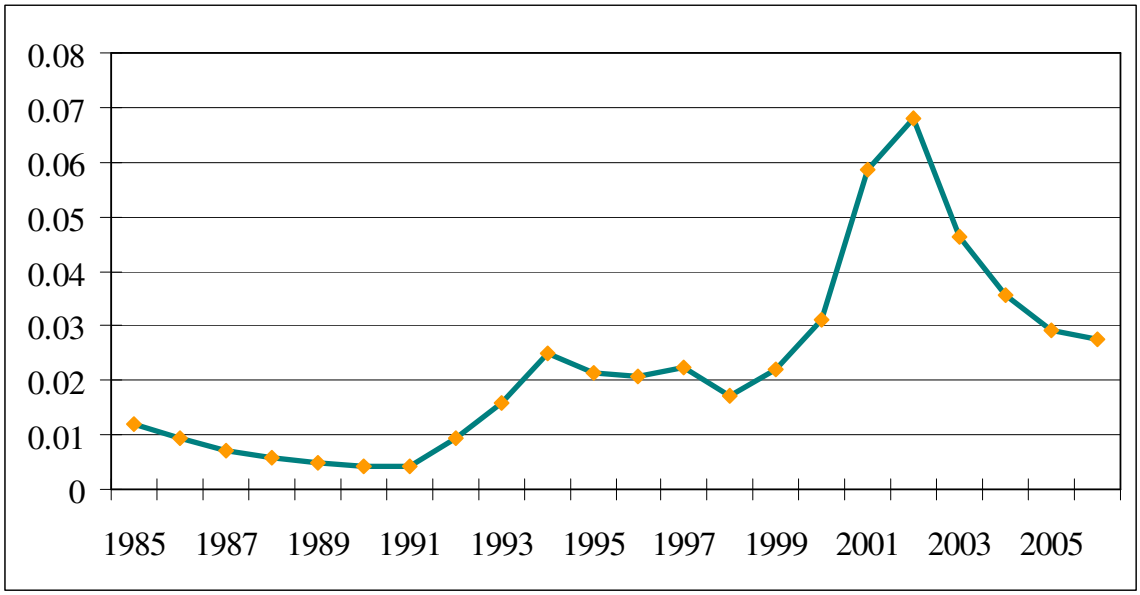


Figure 7 Study aboard propensity (1985-2006)



Note: the propensity is defined as the percentage of those studying abroad to total graduating undergraduates and total graduate students in China.

Figure 8 Chinese Students in the US

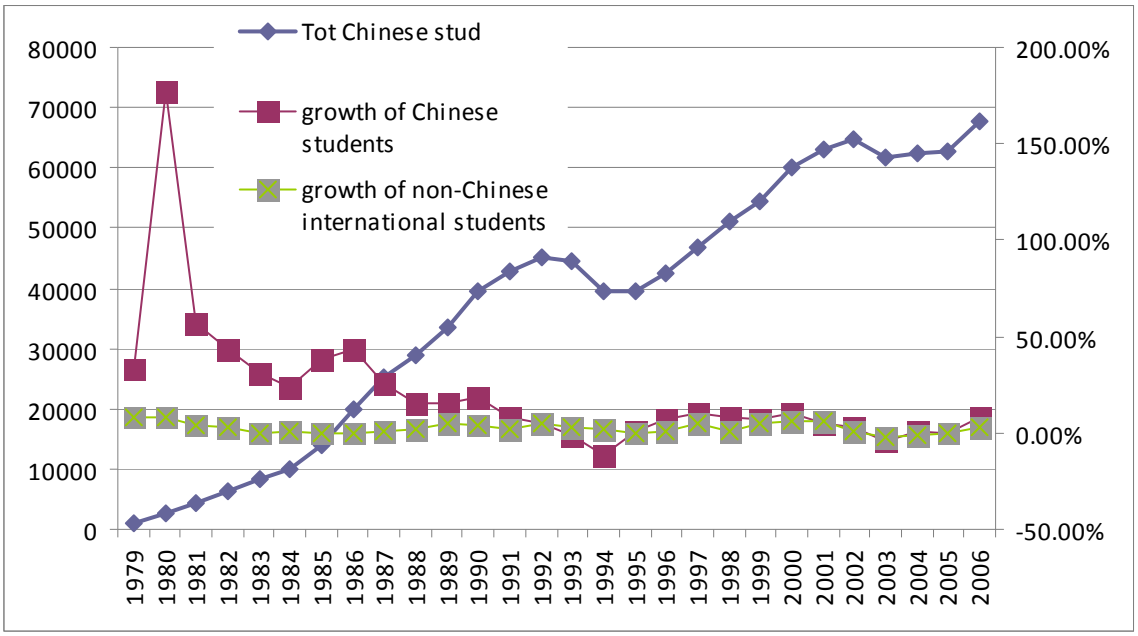


Figure 9 Chinese Graduate Students vs. Undergraduate Students in the US

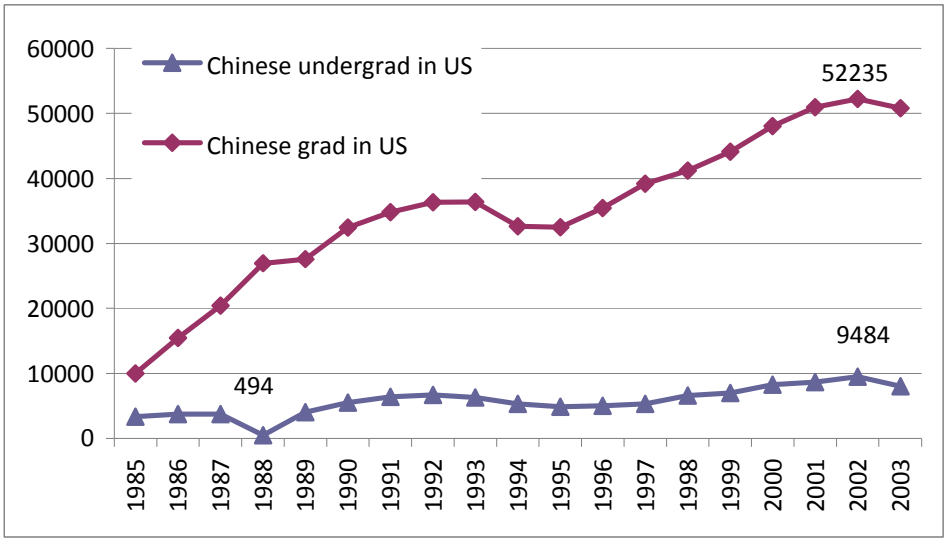
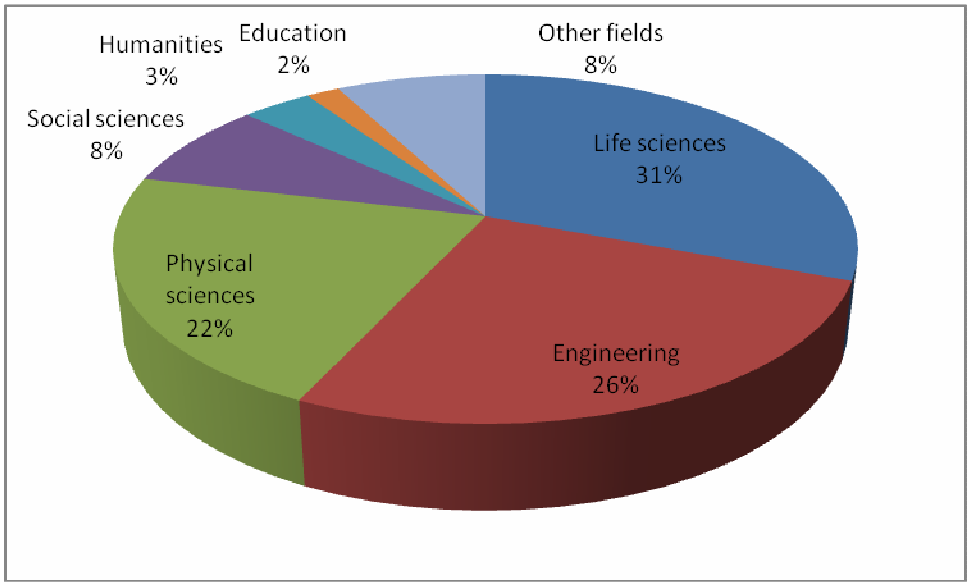


Figure 10

The distribution of Chinese students in the US supported by the Graduate Student Joint Training Program by academic disciplines



Source: China Scholarship Council.

Note: This classification refers to NSF/NIH/USED/NEH/USDA/NASA, 2006 Survey of Earned Doctorates, which is shown as follow.

Life sciences include Agricultural sciences/natural resources, Biological/biomedical sciences, Health sciences;

Physical sciences include Chemistry, Computer & information sciences, Earth, atmospheric, & marine sciences, Mathematics, Physics & astronomy;

Social sciences include Anthropology, Economics, Political science/international relations, Psychology, Sociology, Other social sciences;

Engineering includes Aerospace/aeronautical engineering, Chemical & related engineering, Civil & related engineering, Electrical & related engineering, Industrial engineering, Materials/metallurgical engineering, Mechanical & related engineering, Other engineering;

Education includes Education administration, Education research, Teacher education, Teaching fields, Other education;

Humanities include American literature, English language & literature, Foreign language & literature, History, Other humanities; and

Other fields include Business & management, Communications, Fields not elsewhere classified.

Figure 11 Number and ratio of returned students