

The Chinese Policy of Highly-Qualified Human Capital: A Strategic Factor for Global Competition in Innovation

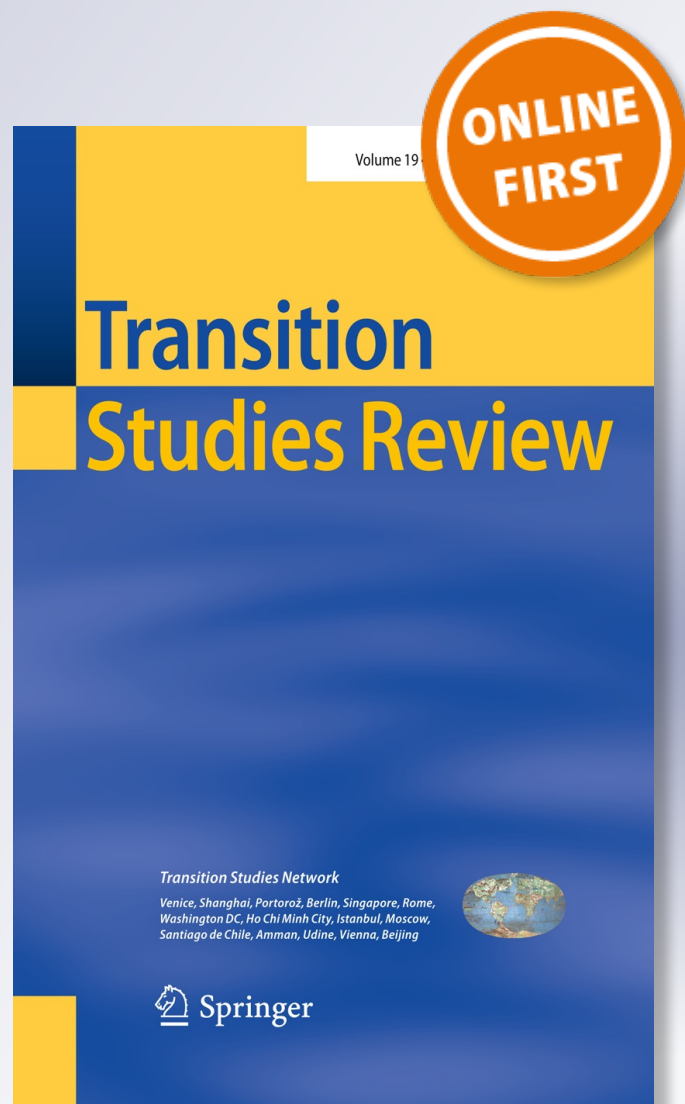
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Transition Studies Review

ISSN 1614-4007

Transit Stud Rev

DOI 10.1007/s11300-012-0246-2



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The Chinese Policy of Highly-Qualified Human Capital: A Strategic Factor for Global Competition in Innovation

Alfonso Giordano · Antonietta Pagano

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Abstract International migration is a historical phenomenon, which only recently has gained increasing importance, representing a focal point on the political agenda in most countries. One of the reasons is the deep transformation occurring in last decades, both at global and local level, of the role played by its protagonists that are turning to be transnational agents. This is especially true for the skilled professionals, who migrate internationally. As a matter of fact, international human capital mobility is now regarded as “brain circulation” rather than “brain drain”: this new concept concerns individuals who maintain frequent and continued social, economic and political ties with their country of origin, exceeding thereby the territorial and cultural boundaries. In this scenario, China is one of the main sending countries of highly-skilled migrants, through which it can built economic and academic relations with other economic and technological advanced countries. Recently, Chinese policy makers have started to consider the brain drain phenomenon as an opportunity for the transmission of business and technological know-how, as well as tacit knowledge that is hard to find through official channels. This article intends to contribute to the scientific debate on the subject, highlighting the international relevance of the so-called Overseas Chinese Professionals (OCPs), investigating their spatial distribution and features. Besides, the paper will examine the emerging

Although this article is the result of the authors' shared ideas, the following paragraph is attributable to Alfonso Giordano: “The Chinese attraction capability: a new talents global competitor?”, while the paragraph “Spatial distribution and evolution of the skilled Chinese human capital mobility” is attributable to Antonietta Pagano. Introduction and conclusions can be considered the work of both authors.

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returning flow and the challenge that the country will have to cope with in the next future to impose itself as a innovative leading economy.

Keywords Brain circulation · Brain return · Human capital · Knowledge-based economy · Migration policies · Skilled migrations

JEL Classification J24 · F22

Introduction

Globalization and its consequences have brought to light the political relevance of international migration that can be considered the result of complex geopolitical and economic dynamics. Indeed, while originally the formation and perpetuation of this movement has developed among countries that had already established relations, such as colonial; nowadays, these connections are mostly due to a labour market increasingly globalized (Lucas 2008), the dropping of transport costs, a more and more faster media and the rise of the knowledge-based economy. Besides, the increasing success of production systems more and more dependent on scientific and technological innovation has highlighted the importance of human capital. The global competition is, therefore, focused on a new field, that of talents, leading many countries to adopt more flexible immigration policies, designed to attract specialists and highly qualified professionals. As a result, the immigration shape and features have changed, turning to give more importance to its intellectual aspect, better known as the phenomenon of brain drain. It should be recalled that the term was used for the first time in the 60s by the British Royal Society to describe the emigration of a growing number of scientists and technicians from the post-war Europe to the USA and Canada (Cervantes and Guellec 2002).

If there is no doubt that this phenomenon has assumed global proportions, it is also true that China has certainly distinguished itself by being one of the largest “exporter of brains”.

Spatial Distribution and Evolution of the Skilled Chinese Human Capital Mobility

The mobility of human capital in China is a very old phenomenon, which can be traced back to the Qing Dynasty, 221 B.C. (Young and Shih 2003); however, the opening of China to foreign culture and knowledge is due to Rong Hong, known for being the first Chinese who studied abroad. The main builder of the intellectual relations consolidation between China and the West world is, however, Deng Xiaoping, to whom we owe one of the most important reforms of modern China.

The purpose of the Deng's reforms was summarized in its program the four modernizations: agriculture, industry, science and technology, military system. In particular, the modernization of science required a connection to foreign academic world, especially the advanced Western countries. The 1978, when the Xiaoping's

mandate begins, is, therefore, a decisive year for the development of international mobility of Chinese human capital. Since then, as calculated by the Ministry of Education of China, the country has suffered an outflow of 1.62 million students and scholars (Wang 2012), commonly known as Overseas Chinese Professionals (OCPs).

The expression OCPs stands for the overseas Chinese community of talents and professionals. In details, it refers to Chinese residing abroad, in possession of a university degree or a high qualified certification and employed in highly skilled sectors. It consists of students, scholars, researchers and professionals working in universities, research labs, private companies, foreign government agencies and NGOs. Are included in this category also freelancers, entrepreneurs and specialists in the field of technology (Wescott 2005).

From a comparative analysis of the available information it is possible to draw a general picture of the main features of the Chinese intellectual community overseas. The data indicate that the average age of OCPs is 34.59 years, with a peak of 62 years and a minimum of 22.

From the academic achievement point of view, the analysis conducted by Xiang (2005) shows that the 78.2 % of the students completed a PhD; while the 16.4 % a Master. The same survey also indicates that students who have obtained a Bachelor's degree represented 5.5 % of OCPs.

With regard to the fields of specialization, engineering and science are the main areas of study, compared to very low enrolment rates in humanistic, accounting for 4 % (Fig. 1).

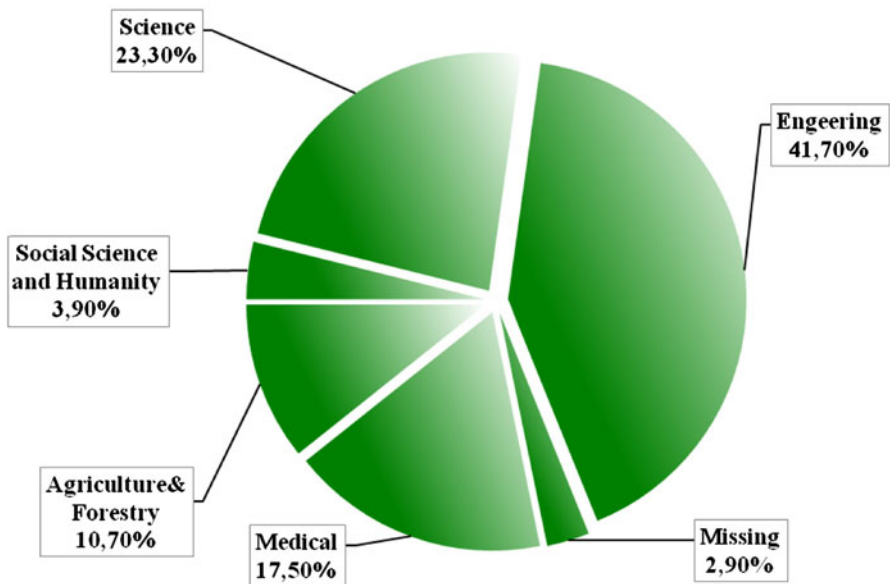


Fig. 1 OCPs' fields of specialization. Source: Xiang Biao

Main destinations are Western European countries, the United States, Australia, Canada and Japan. 60 % of legal migrants after 1978, including skilled and unskilled migrants, were mainly students and their families; moreover, according to data reported by UNESCO, in 2005 students of Chinese origin who settled in Western countries¹ and Japan were about 344,700. This is a significant figure, considering that in 2003 the Chinese student flow directed towards those countries was 257,191, or 37 % of the total number of students who have emigrated abroad (equal to 700,200 young Chinese).

The United States represents the main destination, but recently have increased the skilled migration flow to countries like Japan, France, Germany, United Kingdom and Australia.

In particular, for what concerns the United States, skilled migration flows from China have qualified for a long time the Middle Kingdom as the main “exporting country” of students, with 54,466 young people enrolled in 2000 (Giordano and Pagano 2010); this leadership lasted until 2002, when the inflow of Indian students has been greater than any other country.

The variability of Chinese immigration to the United States is mainly due to migration policies and the demands of the American labour market, which over the years have profoundly influenced the extent of inflows. Since 2001, American universities and education centres have suffered a decrease in the number of Chinese students, and more generally of foreign students, because of the new immigration laws came into force after the events of September 11th. The terrorist attacks and the need for greater national security have led to a much severer and restrictive immigration laws. There have been adopted, indeed, new legislations concerning the eligibility requirements for the visas issuance and on the measures on mobility to and within the country. Therefore, given the greater difficulty of obtaining a residence permit and the increase of visas denial by the US authorities, many students, including those in China, have been discouraged from applying and have opted for new solutions, for example, decided to enrol at universities in other countries.

The inflow of foreign students, including the Chinese community, is therefore strongly decreased, enrolling a smaller number than in previous years, such as in 2002, the year in which the decline was 9.7 % (Institute of International Education Network (IIE) 2012). However, 2007 can be considered the year of a renewed Chinese student migration, as in this year the number of students amounted to 67,723, representing an increase of 8, 2 % compared to 2006 (Fig. 2).

Generally, most of the Chinese students goes to the United States to attend university courses or master, a good percentage is present as a researcher or student, few are Chinese migrants who choose other training options. For example, in the academic year 2008/2009, students of Chinese nationality enrolled at US universities were 26,645, representing 23.5 % of the total foreign students, while only 3,747 Chinese students have attended intensive language courses (Institute of

¹ In particular they have been taken into account Australia, Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom and the United States.

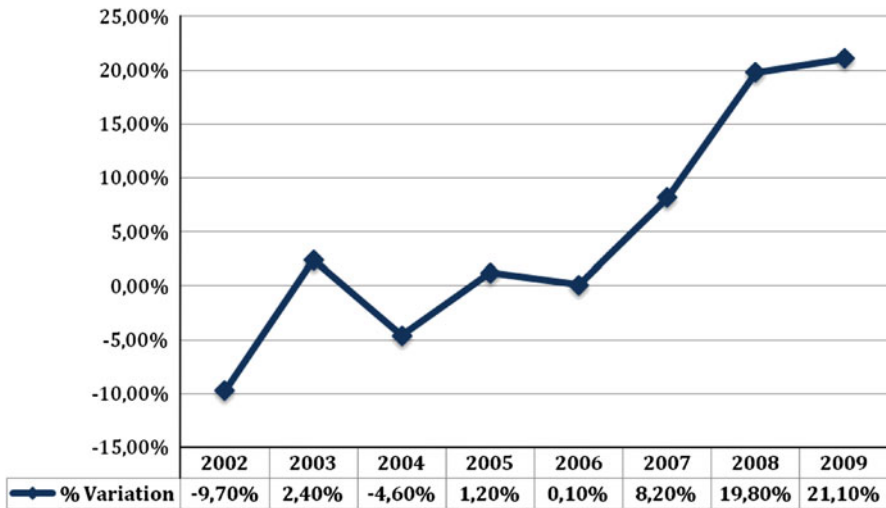


Fig. 2 Chinese students migration trend to the USA (2002–2009). Source: Institute of International Education (IIE)

International Education Network (IIE) 2012). Even the figures relating to 2006 confirm the trend to a higher qualification of OCPs, the statistics of the American National Council of Science show that of the 2.2 million obtained PhDs in science and engineering in the US, 11 % (approximately 242,000) were from China, second only to India which represented, instead, the 16 % of the total PhD students. The data which, however, is even more interesting is the rate of post-doctoral stay: as reported by the US Energy Department’s Oak Ridge Institute for Science and Engineering the percentage of highly qualified Chinese that in 2007 remained in the United States, after 5 years from achieving a PhD, was the largest in the world, with 92 % of doctorates Chinese remained, compared to the retention rates of 81 % of India, 41 % of South Korea and 33 % of Japan (Wessel 2010).

The Australia represents as well a strong pole of attraction for skilled migration, especially from China. The intellectual exchange between the two countries began in the 1980s, although with very modest trends. The factors that contributed to this migration relation are to be found in the socio-political changes that have occurred in both countries. With regard to China, the main elements were the end of the Cultural Revolution and the Reform of Deng Xiaoping. In Australia, instead, the main transformation was the new immigration policy and the introduction of a new education programs, which attracted many more Chinese than the same courses offered by the United States and Great Britain.

China has always ranked among the top ten talents exporters to Australia, although the Sino-Australian exchange programs have experienced significant variability. Comparing the figures of 2002 and those of today the result is remarkable: in 2008 the number of enrolments in Australia rose to 127,276 Chinese students, in particular, in the period considered here (2002–2008) the average annual growth was 17.7 % (Yang 2007) (Fig. 3)

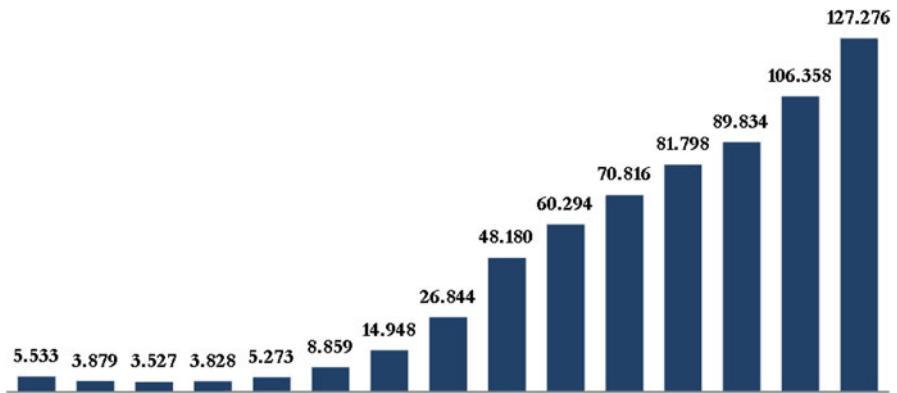


Fig. 3 Chinese skilled migration flow to Australia. Source: Australian Education International (AEI)

The university sector is the main choice of Chinese students, which in 2008 accounted for 40.5 % of the total. Furthermore, in 2008 the Chinese student community was equal to 28.2 % of total foreign students; while the Indian students were 27,701, second in terms of presence in Australia, which, however, represented 15.2 % of total foreign students (Australian Education International (AEI) 2010).

This proves the predilection of Chinese students for highly qualified education in Australia. A success due to the geographical proximity, the simultaneous presence of highly educational institutions and the opportunity for a further improvement of their language skills, being Australia an English-speaking country.

Canada represents another example of a country characterized by a major presence of Asian origin students, particularly from China, showing increasing migration flow from 1990s until 2002. In this period, indeed, the total inflow of Chinese students in Canada was marked by a growing increase. The years in which there was a strong presence of China were, in particular, 1999, when occurred an increase of 84.4 % in the total number of Chinese students enrolled in Canada, and in 2001, in which the increase was equal to 84.7 % (Citizenship and Immigration Canada (CIC) 2012). One of the reasons that caused this sudden surge can be traced back to the establishment, in 1997, of the first office of the Canadian Education Centre Network (CEC) in Beijing, aiming at providing additional information concerning the highly qualifying educational programs in Canada. The results were immediate, given that within 2 years the number of participants has doubled, as a matter of fact in 2001 were enrolled 20,415 Chinese students, about 215 % more than 1999 (Fig. 4)

Despite the lower inflows in recent years, it is still possible to find the great relevance of the Chinese presence in the international student community; in fact, Chinese students has the largest percentage of foreign students studying in Canadian institutions (in 2008, the Chinese community accounted for 23.7 % of foreign students enrolled in Canada). This record is due to the consolidation of relations in the educational field between Canada and China, and to decreasing number of students from different countries, given the increased international competitiveness of education systems.

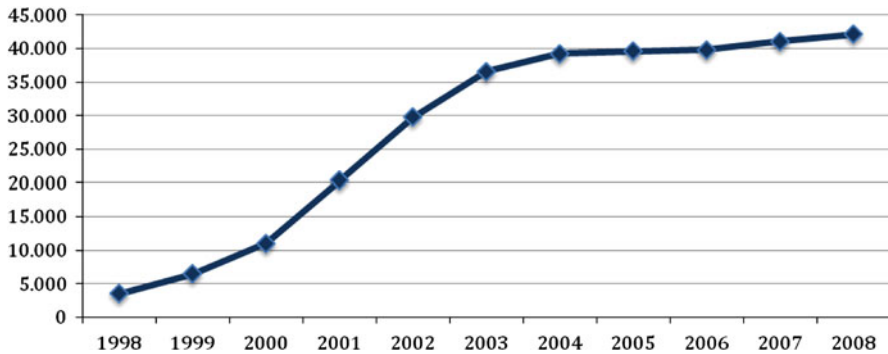


Fig. 4 Chinese students in Canada (1998–2008). Source: Citizenship and Immigration Canada (CIC)

Finally, analysing the Chinese students migration flow in the European area, it must be highlighted that this migration relation has already been established in the first half of the eighteenth century, when the first Chinese migrants flowed into the old continent, and more specifically in Germany and the United Kingdom (Shen 2008), an intellectual relationship that continued until 1950² (Table 1).

As demonstrated by the information obtained for the period 2004–2007, the main countries of destination of the qualified Chinese migration are the UK, Germany and France. These countries are characterized by important university cities, such as Oxford and Cambridge with regards to the United Kingdom, Heidelberg in the case of Germany; as a result, they are able to attract a high number of international students. Moreover, the opportunity to live in capital cities such as London and Paris, that represents the political, economic, financial and cultural centres of their countries, encourages more and more skilled migrant to settle in such cities. The same reasoning can't be done to the German case, although it is the second European country with the highest number of Chinese students. The federal structure of Germany has not given rise to the formation of cities with the same characteristics as London or Paris, therefore, for example, the political capital is Berlin, the financial centre is Frankfurt and the commercial one is Hamburg.

The analysis of the Chinese students geographical distribution is helpful to understand how the growing international competition, resulting from an economic system increasingly based on knowledge, has led to a greater number of countries to attract and encourage the migration of students, researchers, technicians and highly qualified professionals. However, the increased attention paid to the role of skilled migrants as agents of economic growth and development for the countries of origin, induced the latter to adopt policies and programs to encourage the return, even if on temporary basis, of their talents.

² Until 1950, many Chinese students have completed their studies in Japan, USA and Western Europe, but then this flow decreased dramatically after the birth of the Republic of China. Policies for education suffered, in fact, a sudden turn in favor of closer intellectual ties with the Soviet Union and other socialist countries.

Table 1 Chinese students in Europe

	2004	2005	2006	2007	2004/2005 (%)	2005/2006 (%)	2006/2007 (%)
United Kingdom	48,494	53,941	52,175	54,066	11.2	-3.3	3.6
Germany	25,284	27,129	27,390	27,117	7.3	1.0	-1.0
France	11,514	14,316	17,132	18,836	24.3	19.7	9.9
Netherlands	1,957	3,877	3,835	3,584	98.1	-1.1	-6.5
Belgium	1,566	1,562	1,302	1,149	-0.3	-16.6	-11.8
Finland	1,308	1,382	1,444	1,677	5.7	4.5	16.1
Sweden	1,141	1,133	1,267	1,755	-0.7	11.8	38.5
Denmark	1,139	1,613	2,066	2,037	41.6	28.1	-1.4
Switzerland	741	798	824	818	7.7	3.3	-0.7
Austria	732	1,078	1,320	1,391	47.3	22.4	5.4
Norway	468	517	630	725	10.5	21.9	15.1
Spain	390	454	587	867	16.4	29.3	47.7
Italy	276	423	960	1,678	53.3	127.0	74.8
Hungary	88	111	138	201	26.1	24.3	45.7
Portugal	60	75	80	76	25.0	6.7	-5.0
Poland	51	169	306	422	231.4	81.1	37.9
Czech Republic	16	30	71	40	87.5	136.7	-43.7
Greece	11	18	39	34	63.6	116.7	-12.8
Slovakia	1	(m)0	4	22			450.0
Luxemburg	(m)0	(m)0	15	(m)0			
Ireland	(m)0	(m)0	(m)0	(m)0			

Source: Organisation for Economic Co-operation and Development (OECD) (2012)

The data on Slovakia, Luxembourg and Ireland indicated by (m) are not currently available

The Chinese Attraction Capability: A New Talents Global Competitor?

The economic progress achieved by China in recent years, have made this country especially attractive with regard to the creation of new markets, from the scientific and intellectual points of view. Besides, the central authorities have made efforts to rebalance the “intellectual hemorrhage” that has characterized China in this last century.

Currently, the Chinese political debate focuses not only on the strategies and useful policies to face intellectual migration, but also on the options that might allow to benefit from the expatriate Chinese communities, just like is doing the Indian government with its intellectual diaspora (Giordano and Terranova 2012). This policy is based on a new approach to brain drain, understood today as a means of dissemination and circulation of skills and knowledge. It has been used the term brain circulation rather than loss of talents; nowadays the OCPs are considered the tool for an easier access to the advanced technology of other countries.

In order to let this knowledge and know-how circulate, it is important that the Chinese human capital continues to work abroad and periodically return home, for example, as a Visiting Professor, in this way it will be established a circuit of technological and scientific diffusion necessary for the development of its economic system (Giordano and Pagano 2009). In this context was created the Torch Program: launched in 1988, it aimed to develop scientific research and emphasize its use in the commercial sector, in order to promote the creation of high-tech production sectors, especially in fields such as biotechnology, information technology and sustainable energy. The program adopts high-tech cluster models and the interaction between actors at territorial level (Shaffer 2004). The final goal is to attract both OCPs and international investors through the creation of infrastructure, tax incentives and collaboration with research institutes and the local scientific community.

At the same time, it is essential to guarantee the right of free movement to and from China. To this end, the central authorities have adopted a multiple-entry visa valid for 5 years. Moreover, in 2004 a permanent residence permit was granted, it is addressed specifically to skilled workers, investors, teachers and their families of Chinese origin with foreign citizenship. The parameters to be met are very restrictive: in particular, an investor must have invested in the Chinese market for at least 3 years; a professional must have lived in China for the same period earning a good salary; the spouse must have been married for at least 5 years and have stayed in China more than 9 months (Le Bail and Shen 2008). Through these two legislative measures the Chinese government wants to ensure greater freedom of movement and, at the same time, a faster diffusion of their knowledge and expertise.

The first signs of success of the return policies were warned at the start of the 1990s, presumably as a result of the incentives introduced in 1988: significant is the increase in 1992, when the percentage change in the number of returns was equal to 74.5 % (Fig. 5)

The most reflecting increases occurred from 2000 to 2005, considering that the number of returns has almost tripled, allowing China to take back in 2005 about 35,000 students (Fatiguso 2007). Although with a slower pace, the flow of returns is still growing, giving the recent 25 % increase.

Currently, the central authorities must, therefore, face two contradictory phenomena: on the one hand, the growing number of direct foreign students, just in 2008 there were six millions of Chinese who have decided to emigrate going to increase the number of OCPs; on the other hand, the increasing flow of returns, always in 2008 the rate of return was 28 %, a 2.4 % points increase compared to 2007 (Wang 2012).

The problem, however, is that the inflow of talent is not enough to compensate the loss of human capital, since, as published by the Ministry of Education, at the end of 2011 the intellectual migration regarded 2,244,100 Chinese students going abroad, while returned only the 36 %, this means a difference of 818,400 Chinese professionals (Ministry of Education of the People's Republic of China 2012). Despite the growing economic development in China, countries like the United States and Europe continue to hold a large number of OCPs, this lack of attractiveness is explained in part by the excessive national authorities concentration

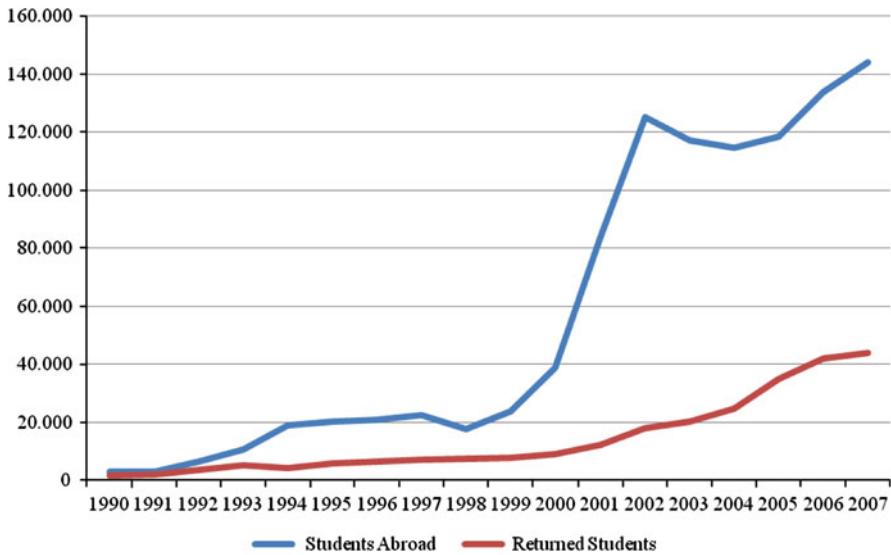


Fig. 5 Skilled Emigration and Return Flow of Chinese students (1990–2007). Source: National Bureau of Statistics of China (2012)

of short-term return policies, ignoring policies to encourage the permanent residence of OCPs and, at the same time, attract a greater number of skilled migrants from abroad. For example, in 2009 the number of qualified foreigners entered China amounted to 480,000 person/time³; meanwhile, always at the end of 2009 the number of permanent work permits granted to foreigners were 223,000 (Wang 2012).

The analysis of both the skilled and returned migrations leads to discouraging observations: first, the set of the two flows is today inadequate to meet the quantitative and qualitative necessities of the Chinese economic and research system; secondly, the greater number of temporary skilled immigrants confirms the tendency of the central authorities to promote the short-term recruitment. This policy choice, although supports a rapid know-how and expertise diffusion in all the economic and productive fields, does not promote the formation of a scientific and entrepreneurial class that vast and competent to be highly competitive and innovative on the global scene.

It must be notice, however, that some measures have been taken to facilitate the inflow of foreign talents, such as the “Thousand Talents Program”, which aims at attracting 2,000 highly skilled foreign talents in the next 5–10 years (Zhang 2012) and the promulgation in 2004 of the green card as a tool to attract and retain highly skilled workers. In August 2011, more than 1,500 people have migrated to China, mostly thanks to the first program, giving priority to leading scientists and entrepreneurs to enhance the economic system in the development of key

³ The term person/time has been chosen to underline the temporary basis of the foreign skilled migrants' staying in China.

technologies. We must, however, point out that 70 % of these talented immigrants were foreign nationals (Wang 2012). China, therefore, even if is able to attract a greater number of skilled migrants from abroad, is not yet capable to exercise with success its centripetal force towards foreign qualified talents.

The greatest risk, hence, is that China may not be able to achieve the “Great Leap Forward” by turning from a productive to an innovative economy.

Conclusion

The remarkable economic performance of China has produced a high attraction towards foreign capital. It is estimated that at the end of 2011, China's foreign exchange reserves exceeded \$3 trillion (Bloombergs News 2012). At the same time, however, China fails to exercise the same kind of force against domestic and foreign talents.

The strategy pursued in order to recruit highly skilled professionals was mainly based on policies addressed to the return of OCPs and on the highly competitive qualification of home-grown talents. China, however, has an increasing need for highly qualified personnel that can't be satisfied only by the local formation of human capital and the return of expatriated talents, for at least two reasons.

First, the net rate of skilled migrations is still too unbalanced, which means that the flow of skilled labour (Chinese and foreign) of short and long term can't compensate, both in numbers and competencies, the outflow of human capital from China. Based on available data concerning the period 2009–2011, China would need of nearly 700,000 highly qualified professionals in order to balance the inflow and outflows of human capital. Secondly, the Chinese demographic window risks to end in a short time. In other words, the Chinese population is rapidly aging, a phenomenon caused by both the increased life expectancy and the implementation of the one-child policy. In 2010, for example, the portion of population over 60 years has risen from 7.3 million in 2008 to 161.1 millions, corresponding to 12.5 % of the population. In the next 10–30 years, China could see its demographic dividend vanish (Wang 2012).

To this regard, it must be added that recently Chinese authorities are considering the possibility of abolishing the one-child policy in favour, instead, of the implementation of a two children per family program by 2015 (Olesen 2012). The adoption of such policy would ensure the sustainable demographic replacement rate essential to maintain in China a balanced population pyramid and, therefore, ensure the presence of skilled and unskilled workers, indispensable to support the economic development of the country. At the moment, it is only possible to make assumptions and nothing can be said about a real success of this new program, much less on the time needed to achieve it. Hence, China should emphasis on increasing the inflow of professionals, particularly skilled, that not only could support the balance of the Chinese demographic structure, but it would represent an important strategic tool to develop creativity and innovation in the research and production systems.

China represents a leading country in the contemporary economic system that was able to achieve significant progress in the high-tech sector, especially for what

concerns the computer and military industries. However, these are products based on existing technologies, created in other leading economies. Thus, central authorities should focus on the implementation of initiatives to promote the national scientific and technological research, through, for example, the formulation of medium and long term policies aiming at the formation and attraction of highly skilled professionals in order to compensate the skilled migration net rate imbalance and to promote, at the same time, the development of a national economy based on knowledge and innovation, which currently appear to be the strategic factors essential to succeed in today's global system.

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