

# Models of Scholar Migration from China

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## Historical Background

Following the turmoil of the Cultural Revolution, China resumed its programme of sending academically qualified students and scholars abroad to study. This became a key aspect of its educational reform, intended to provide the means of obtaining new knowledge and expertise from other parts of the world. The aim was first to compensate for the losses which occurred during the decade of the Cultural Revolution and second to import into China useful advances in modern science, technology and management. The incorporation of these would, it was hoped, enable China to modernise to the level of other advanced nations rapidly. With this as its main aim, the Chinese government has continued to send many scholars abroad in spite of the lack of national wealth and adequate educational funds.

Prior to 1949 China's education was already very backward compared to the western world. From the mid-1960's to the mid-1970's, China experienced the Cultural Revolution, in which Chinese education was upheld as a model of indigenous educational development through which Chinese intellectuals were prevented from suffering 'cultural alienation' and would therefore serve the needs of China's internally generated economic development. The economic mismanagement and political despotism of the period lead to a severely damaged education system and cultural impoverishment.

### *The Beginning of the Difficulties*

In 1978 the Third Plenary Session of the 11th Central Committee of the Chinese Community Party made foreign study a focal point of its strategy for developing a world-wide economy and for realising its goal of modernising four priority areas, namely those of industry, agriculture, national defence, and science and technology. It was decided that China must accelerate its development of a large number of specialised and sophisticated academics while also strengthening its capacity to develop such high-level talent within China. Amongst the reforms initiated by Deng Xiaoping was the reform of China's educational system. While inspecting Qinghua University in Beijing in June 1978 he stated that it was the intention of China to send 300 scholars abroad each year although in reality ten times that number have been sent in each year since. Deng Xiaoping also identified the academic areas that needed input from foreign study but made it clear that the first priority should be the natural sciences and engineering technology. At all times emphasis would be given to those areas in which China was currently weak or which it needed to explore further.

The implementation of the policy was supported by the development of cultural and scientific co-operation agreements between China and foreign governments. For example Sino-American foreign study programmes were carried out, following the normalisation of Sino-American diplomatic relations, within the terms of the 'Agreement on Co-operation in Science and Technology', signed by Deng Xiaoping and former President Carter in 1979 (Clough

1981). Sino-Canadian foreign study programmes occurred within the terms of a memorandum on educational cooperation, signed in June 1979 (Hayhoe 1984). Sino-Japanese foreign study programmes were made possible by the normalisation of diplomatic relations between the two countries in 1972, but only occurred after the Chinese government signed a specific order in July 1978<sup>1</sup>. Sino-British relations were organised within the terms of the 'Agreement on Cooperation in the Field of Education and Culture' signed in November 1979. This general agreement included specific agreements between the Royal Society and the Chinese Academy of Sciences, the British Academy and the Chinese Academy of Social Science, and the Confederation of British Industry and the State Economic Commission. Sino-German foreign study programmes were carried out within the terms of a national agreement on cultural cooperation signed in 1977 and Sino-French relationships were based on the terms of an agreement for cultural and scientific co-operation signed by representatives of the two governments in 1979 (Hayhoe 1984).

As a result of this policy China has, during the past 18 years, sent 250,000 students and scholars abroad to study in more than 100 countries but by the end of 1995 few had returned. Of the 250,000 scholars approximately 120,000 were sponsored by the Chinese government and institutions and 80,000 of these had returned. As very few of the privately sponsored scholars have returned there are about 170,000 remaining abroad, of whom 110,000 are believed to be in the US, 16,000 in Japan, 10,000 in Canada, 10,000 in Germany, 8,000 in the UK, 4,000 in France and 8,000 in Australia and New Zealand. The remainder are distributed throughout the rest of the world (Chao 1995).

### *Approach to the Problem*

This failure of scholars to return promptly represents a loss or slowing of potential development in China. The work described here was undertaken to suggest ways of improving the situation, particularly where the scholars were supported by the Chinese government or universities. While China is actively encouraging study abroad, emphasizing its availability to all, it is essential to find ways of promoting return otherwise the anticipated benefits will not be obtained. The literature suggested that such control was difficult and others who have tried to exercise such control have based it on establishing either penalties for not-return or additional personal benefits for prompt return. Such measures are already being employed to a limited extent in China but they are particularly difficult to implement in this country due to its social and economic structure. It is difficult to make penalties or benefits sufficiently severe or attractive as, in general, there is insufficient personal wealth or advantage to be distributed or withdrawn.

An alternative approach to improving the return rate might be a more careful or purposeful initial selection of scholars if it proved possible to predict the likelihood of their return at the time of departure. This possibility originates from experience working in the International Exchange Office of Huazhong University of Science and Technology, Wuhan. Since 1978 there had been several policy changes related to the selection of scholars and informal observation of the effects of these suggested that some characteristics such as age might be reliable predictors. The primary aim of this study was to establish whether such prediction is possible. A secondary aim was to identify what if anything, might serve as a penalty or bonus in the management of China's foreign study programme. This would be based on an understanding of scholar aspirations and motivations while abroad.

The search for possible predictors of return rate was helped by variations in policy and its implementation which served to ensure a considerable variety in the nature and type of scholar foreign study. For example between 1978 and 1981, a small number of undergraduates was

sent to continue their studies to Master degree level together with some more experienced scholars, aged about 40. Most went to the US and Canada in disciplines related to pure science and languages. Later, in 1982, the Chinese government stressed the need for making a general plan which took into account all the factors needed for political and economic reform. These were to be used when selecting scholars and new, higher, targets for the number to be sent were set. Thus between 1982 and 1986 the number of scholars sent was the highest it had ever been, and included scholars of all ages and extended to those studying for post-graduate degrees. There was a shift in the disciplines involved towards the applied sciences, especially engineering and production related. Later in the period up to 1989 there was a further shift in disciplines towards those of particular practical use to China's advanced scientific technological development and less emphasis was placed on numbers. This period also saw a decline in government sponsorship of PhD study which was offset somewhat by an increase in sponsorship by China's universities or joint ventures with foreign institutions. As a result a large number of PhD students and visiting scholars continued to be sent to the US, Canada, Japan, the UK, Germany, France, Belgium and Australia. Engineering, production-related science and management were the main disciplines involved.

Since 1990 the general policy has been to support foreign study and increased international mobility but also to encourage prompt return to China. As this policy encouraged privately sponsored foreign visits the government reduced the support for PhD study but increased its sponsorship of short visits lasting six months or less. The majority of these sponsored scholars were sent to Europe and Japan, while the majority of privately sponsored students chose the US, Canada, Australia, Japan and the UK. The disciplines sponsored officially were advanced and sophisticated science and technology with increased attention to economics, law and management.

As the choice of destination for the scholars influences the financial costs the possibility of ranking destinations according to the likelihood of a prompt return is attractive. For example, the majority of Chinese scholars and students in Britain are financed by China involving heavy financial outlay due to the high fees for overseas students in Britain. Similarly the majority of Chinese scholars and students in France are financed by China but many of them benefit from the absence of tuition fees in French higher education. The American government does not provide any financial support to Chinese scholars and students, but many American institutions provide full or partial financial support. Germany provides the greatest level of financial support for Chinese scholars and students (Hayhoe, 1984).

### *Design of the Inquiry*

In the light of this experience it was supposed that several easily identifiable factors might be associated with return rate. These were age, programme length, type of sponsorship and location of the study. Age was chosen on the basis that younger scholars had weaker links with China and might be willing to invest in significant foreign study. It was thought that longer study periods enabled scholars to identify suitable positions that enabled them to extend their leave although short study periods were difficult to use profitably if there was an initial difficulty with language or the cultural environment of the study institution. As the influence of an employing sponsor might have the same effect as family ties it was expected that sponsorship by an employing institution would give better return rates than simple funding arrangements. Location was of concern for reasons of cost as indicated above and also because it seemed easier to arrange extended stays in some countries due to their legislative frameworks. It was decided to search for such relationships in historical data and to complement that analysis with an initial inquiry into their explanation. This would take the form of a questionnaire sent to scholars on study leave in the UK.

## Historical Analysis

The records of 2271 scholars covering the period 1979-1994 were examined to test for the existence of an association between the promptness of their return and the factors listed above. The sample was made up of records from several Chinese universities although the identity of the scholars was not known. The records consisted of the month and year of birth, the month and year of departure, programme type (i.e. whether study for postgraduate degree, visiting scholar and senior visiting scholar), location of study, the sponsoring body (whether central government or university), programme length, and month and year of return (an empty item in many records).

The records were separated to group together scholars that had returned promptly, those that had returned after a short delay and those that remained away for an extended period. For the purpose of this analysis a short delay was established as an extension of up to a half of the original study period. Such an extension would normally be granted on request. Delays greater than this were deemed to be significant and delays greater than about three times the original study period were defined as extended delays although such delays could not be identified in the whole sample. The sample of records was trimmed to exclude the records of scholars who were within the short delay category. Analysis of the sample showed that delays greater than within one and a half times the planned duration (4.5 years in the case of a PhD student) were generally many times the planned length. This left a total of 2035 records to be analysed, of which 1058 were of scholars who had already returned leaving 977 (48 %) still to return. Of those that had returned 610 (30 %) had returned without delay ; 338 (17 %) had returned within one and a half times the planned stay and 110 (5 %) returned after a delay greater than within one and a half the times planned stay. Of the 977 scholars still to return 241 (12 %) had not returned after ten years.

### Age

The possible association with age was the first to be analysed as other factors such as programme type and therefore programme length were expected to be associated with age. Figure 1 is a plot of the proportion of scholars grouped according to age who delayed their return significantly. It is clear that the proportion is least amongst the 35 to 55 age group. The variability in the under 20 and over 50 age groups was thought to reflect the small numbers in the sample of these groups. A chi-square test confirmed that there was a significant association between the age of a group of scholars and the proportion of that group showing significant delay in their return.



Figure 1. Relationship between the proportion of scholars that delay their return and their age

The relationship between age group and the proportion of that age group that significantly delayed their return was calculated using a logistic regression. Using ordinary least squares a best fit line of  $W(x) = -4.74 + 0.127x$  was found where the logit was calculated as :

$$W(x) = \ln[(\text{non-delayed proportion aged } x)/(\text{delayed proportion aged } x)]$$

where  $x$  is the average age of the group.

The sample was divided into groups spanning a range of five years. The regression, drawn in Figure 2, shows that the linear expression is an acceptably close fit to the data although there is some indication of a slight ‘S’ shaped relationship. In order to estimate the proportion of an age group to show delay in their return the expression  $W(x) = \ln [\exp (\alpha + \beta x)] = \alpha + \beta x$  was used to give, by a rearrangement of terms, the following estimated proportion of a group aged  $x$  to delay their return  $= 1/[1 + \exp (\alpha + \beta)]$

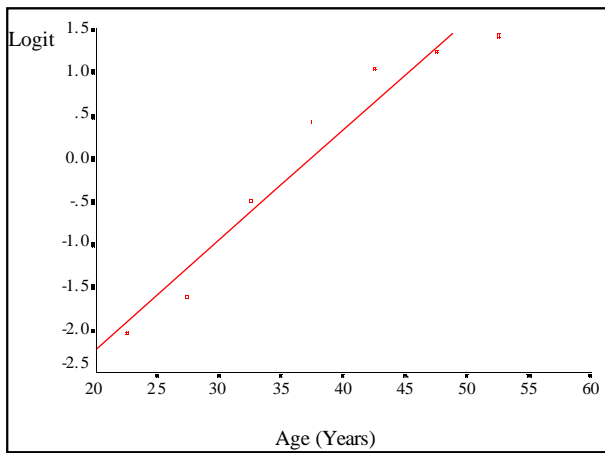


Figure 2. Regression of the logit (W(x)) for each age

Using the slope and intercept values of the regression as estimates of  $\alpha$  and  $\beta$  the relationship between delayed proportion and age was plotted as shown in Figure 3. This shows that younger scholars aged say 25 are more than twice as likely to delay their return than a scholar aged 40.

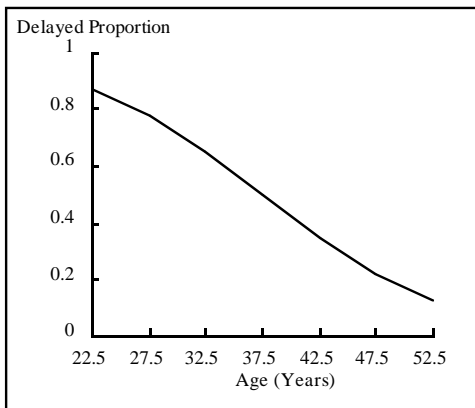


Figure 3. Estimated proportion delayed against age

### Programme Type

It was anticipated that age and programme type would be linked but the sample included a sufficient spread of ages for two programme types namely postgraduate study (typically a three year period) and visiting scholar (making no distinction on seniority). The length of study leave for visiting scholars was more variable but in general it was much shorter than three years, sometimes as short as three months.

The sample was thus divided into two and the logistic analysis repeated for each part. A clear relationship with age was found in both cases. The logistic regressions and the graphs of estimated proportion of scholars to delay their return are shown in Figures 4 to 7.

This analysis shows that scholars on a postgraduate programme are very likely to delay their return, remaining well above half for the over forties. Visiting scholars are less likely to delay their return, only the youngest showing rates as high as the lowest of the postgraduate students. The older scholars can almost be relied upon to return prom.

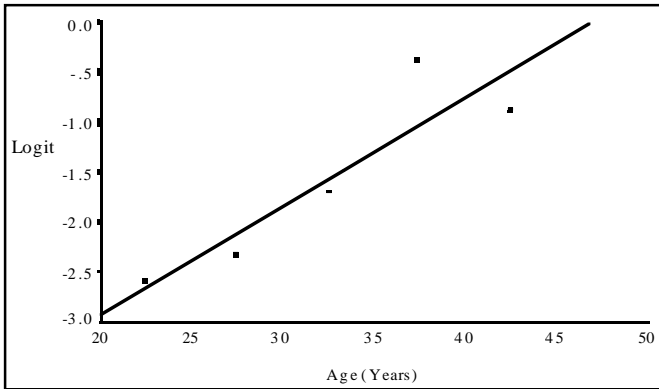


Figure 4. Regression of the logit (W(x)) against age of PG scholars

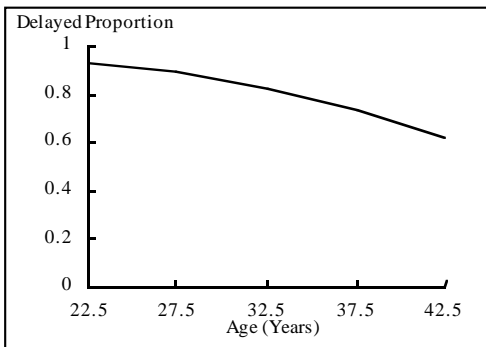


Figure 5. Estimated proportion of PG scholars delayed for each age

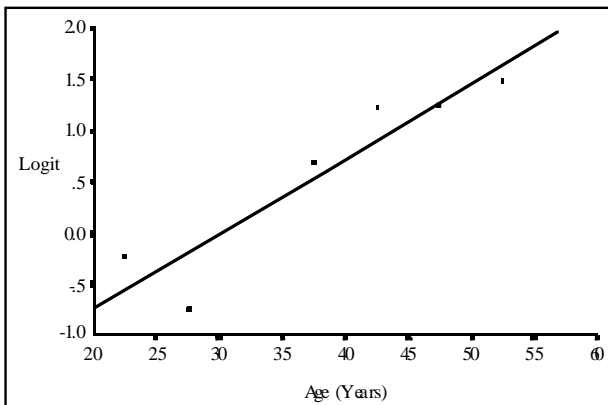


Figure 6. Regression of the logit (W(x)) against age of visiting scholars

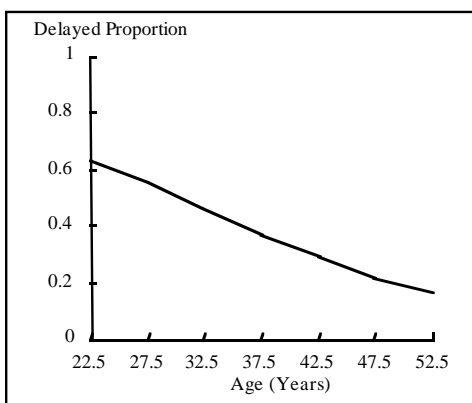


Figure 7. Estimated proportion of visiting scholars delayed for each age

## *Programme Length*

An attempt was made to establish if a direct link with programme length could be established by selecting a sub-sample of scholars within a narrow age range (28 to 32) shown in Table 1. Programme lengths were separated into five categories to represent programmes of up to 0.5 year in length, 1 year, 1.5 years, 2 years, over 2 years in length. PhD. students would fall into the over 2 year category ; Masters students into the 2 year category and visiting scholars may fall into either of the 1, 1.5 or 2 year categories. Senior visiting scholars, who would be associated professor or full professor in China typically fell into the 0.5 year category.

The age range was chosen to give the best representative sample of the programmes within a narrow age range but the sample was uneven in the numbers in each category, However the conditions for making a chi-square test were satisfied and indicated that there was a significant relationship with programme length. The sample shows increasing tendency to a delayed return as programme length increases except for an unexpected low value for the two year programme length. There is no clear explanation for this at present.

Table 1. Numbers delayed for each programme length category for scholars aged between 28 and 32

<b>Length</b>	<b>0.5 Year</b>	<b>1 Year</b>	<b>1.5 Years</b>	<b>2 Years</b>	<b>2+ Years</b>
<b>Total Numbers Programme</b>	19	141	15	47	140
<b>Numbers Delayed</b>	10	86	10	21	121
<b>%</b>	53	61	67	45	86

## *Sponsoring Body and Host Country*

The sample of scholars contained 1248 sponsored by central government and 787 sponsored by universities. The proportion who delayed their return was 49 % in the case of government sponsored scholars and 60 % of those sponsored by a university. This difference was in part due to the different types of scholar in each group. Attempts to find a statistical significant difference when these differences were allowed for were unsuccessful.

Host country or geographical region was classified in the four categories for the purpose of this analysis. They were the US-Canada-Australia, Europe, Japan, and elsewhere. This grouping was determined first on the existence of similar immigration legislation governing the ability of a scholar to extend their stay and second on the need to have suitable group sizes for the statistical analysis. The return rates for these four regions were 42 %, 47 %, 62 % and 61 % but the variation was such that no clear statistical differences could be identified.

## *Questionnaire To Find Explanations*

The analysis of historical data was complemented by a short questionnaire designed to clarify or explain the results obtained. The questionnaire was in three main parts : the first asked for some personal details such as sex, present age and family status while the second asked for details of the programme of study including details of length of stay, sponsoring body, some details of their position prior to taking study leave. The third part sought to establish the scholar's intention with regard to their return home and to identify some of the considerations that influenced their choice. The questionnaire was distributed to 185 Chinese scholars studying in the UK and responses were obtained from 134 of them. While this response rate was very good

the types of scholars replying were very similar and some comparisons between this sample and the first analysis were impractical. However it provided some useful information as a pilot of a more substantial study that might be undertaken in the future.

### Questionnaire and Historical Analysis Compared

When asked, 22 % of the respondents said that they planned to return home promptly, 32 % said that they expected to extend their stay by a short amount, 38 % hoped to extend their stay considerably and the remainder (8 %) were looking for a very long or indefinite stay. These figures are broadly similar to those reported from the earlier analysis but suggest a slightly higher delay rate that was found there. For comparison the earlier analysis found that 30 % had returned without delay, 17 % returned within one and a half times the planned stay and 5 % returned after a delay greater than within one and a half times the planned stay.

This difference may be inherent in the particular sample, reflecting the current nature of the scholar programme and the aspirations relevant to a single host country. However there is also the possibility that there is a tendency for studies to need extensions (in the eyes of scholars at least) and there might also be a desire to stay which is reduced by the practical opportunities. There is no discernible difference between the male and female responses.

The relationship between reported intentions and age of the respondents was also in broad agreement with the historical analysis. Scholars were asked to indicate their age by marking one of six age ranges. The sample included 2 (1.5 %) under 26 years ; 15 (11 %) were between 26 and 30 years, 70 (52 %) between 31 and 35 years, 39 (29 %) between 36 and 40 years, 4 (3 %) between 41 and 45 years and 4 (3 %) were over 46 years. The majority of respondents (81 %) were therefore aged between 30 and 40 years leaving many other age groups poorly represented. Some age groups have therefore been combined in Figure 8 which summarises the responses. The relationships between age, programme type, length of study and the respondents' intentions are summarised in Figures 9 and 10.

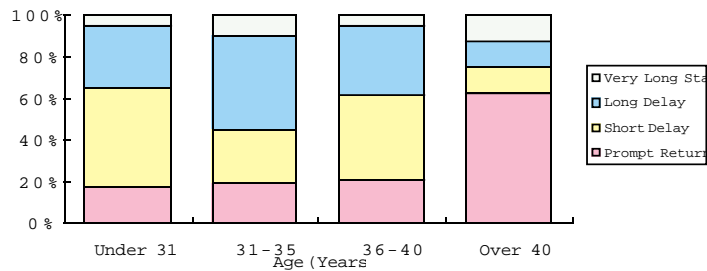


Figure 8 Intended behaviour of scholars grouped by age

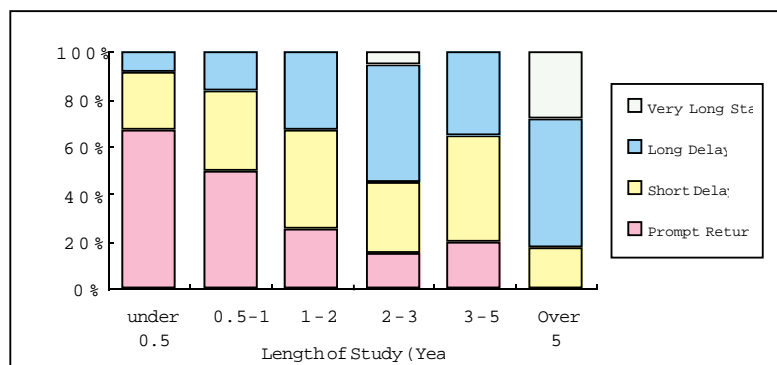


Figure 9 Intended behaviour of scholars grouped by length of study



The responses were much as was anticipated. Those on short visits intended to return promptly and the proportion declined as the study length increased. PhD students were the most likely to be seeking an extension to their stay while senior visiting scholars were the least likely.

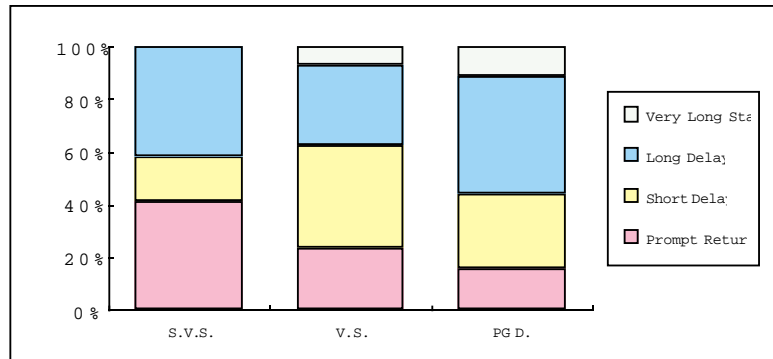


Figure 10. Intended behaviour of senior visiting scholars (S. V. S), visiting scholars (V.S) and scholars studying for Postgraduate Degrees (PG D)

### Motivation of Scholars

The final section of the questionnaire asked the scholars to identify the things that they took into account when reaching their decision about returning home. Their replies are summarised in tables 2 to 5 which list those things seen as advantages and disadvantages. The lists are in order of the number of scholars selecting each item, the advantages being at the top and the disadvantages being at the bottom. Thus making changes to items at the top or bottom would be expected to have a greater effect, positive or negative, than those in the middle.

The original intention of the questionnaire was to identify motivational differences in the scholars that had made different decisions about the timing of their return. The results suggest that the differences are either personal or accidental in the sense that the particular circumstances of an individual enable them to balance future possibilities differently. The most striking feature is the general similarity across all categories of scholar.

The general conclusion is clearly that considerations of work opportunities, the availability of the necessary means of undertaking research is the topic that is a principle concern of all scholars. This concern is expressed in both positive and negative terms either as advantages in remaining or as difficulties to be overcome on return. There is a suggestion from the most frequently given negatives that the organisation and context of research opportunities in China is widely viewed as being in need of substantial improvement. In the eyes of many this is linked with concern for the general political situation and general living standards.

Table 2. Advantages and disadvantages given by the 29 scholars opting for a prompt return

Advantages	Number	(%)
Better professional opportunities in China	22	75.9
Raising my professional title	9	31
Stable job position and better quality of life	9	31
Higher social standing and respect	8	27.6
I have offers of funds for further research	6	20.7
Better opportunities for using ability to the full	5	17.2
I have offers of good accommodation in China	3	10.4
<i>Disadvantages</i>		
Difficult to transfer to a degree course	2	6.9
Honour agreement with my sponsor	4	13.8
End of financial support	5	17.2
Difficulty of finding suitable opportunity	7	24.1
Separation from my family and friends	11	37.9
Loss of job seniority in China	12	41.4
Education of my children	14	48.3

Other substantial issues are more practical concerning worries about family, children and the competition for advancement and opportunity. These are mostly seen in a negative light. Finally there may be some concern over more basic competencies such as language fluency.

Table 3. Advantages and disadvantages given by the 43 scholars opting for a short delay

Advantages	Number	(%)
More practical experience	31	72.1
More opportunities for earnings abroad	19	44.2
Waiting for my spouse to finish her/his degree	6	14
Other personal advantages	5	11.6
<i>Disadvantages</i>		
Other personal disadvantages	5	11.6
Lack of fluency in English	7	16.3
Lack of academic experience	12	27.9
Difficulty obtaining promotion	16	37.2
Difficulty obtaining funds for research	18	41.9

Table 4. Advantages and disadvantages given by the 51 scholars opting for a long delay

Advantages	Number	(%)
Increased academic experience	35	68.6
Good research conditions in the UK	28	54.9
A British degree is better than a Chinese degree	11	21.6
Higher earnings	11	21.6
Opportunity for spouse to obtain a British degree	10	19.6
Have won an award for PhD study in the UK	9	17.7
Other personal advantages	3	5.9
<i>Disadvantages</i>		
Other personal difficulties	3	5.9
Poor public infrastructure	4	7.8
Difficult for children to adjust to Chinese education on return	5	9.8
Competitiveness of securing research funding	9	17.7
Unable to find suitable work in China	11	21.6
No confidence in the present economic situation.	12	23.5
Lack of favourable political situation	15	29.4
Lower living standards	15	29.4
Poor research work conditions	19	37.3
Complex social relationships	22	43.1
Poor salary	25	49

Table 5. Reasons given by the 11 scholars opting for an extended stay in the UK

Reasons	Number	(%)
Better academic prospect	9	81.8
My child will have secondary or higher education in UK	1	9.1
Other personal reason	1	9.1

## Conclusions

The analysis of the historical data suggest that it is possible to identify some simple criteria that would enable government and universities to exert influence over the return rate of scholars from foreign study leave. Age, length of study leave and the type of programme were apparently good predictors of likely return rate. The variety of policy changes in the recent past was instrumental in providing, within a manageable number of individuals, a wide variety of scholar and study leave for the analysis. However this variety also means that the situation being sampled was in a constant state of flux. It would be wise to confirm these results by further study before making crucial decisions based on them.

However this analysis may be used to guide foreign study policy. Without taking further control measures it may be possible to improve scholar return rates by limiting the age range chosen for sponsorship. An appropriate age range may be calculated on the basis of the expected value of a period of study leave. The results of some illustrative calculations are shown in Figure 11.

### Calculating the Expected Value of Foreign Study

It is assumed that study leave of three years might be a suitable average to plan for as it represents a good balance between the time taken to settle and depart and the time available for productive study. The basic value to China of such study leave is assumed to be proportional to the number of years worked subsequently in China. Without delays it would be best to send young scholars as they have a longer working life ahead of them. In practice of course allowance must be made for the proportion of working life lost through delayed return. This is a simple calculation using the proportion delayed and age relationship established earlier (Figure 3).

The expected value to China is calculated as :

$$(\text{retirement age} - (\text{age at departure} + \text{study duration})) * (1 - \text{proportion delayed}).$$

Retirement age is assumed to be 65, age at departure is a variable and the study duration is chosen to be the suggested three years plus the 50 % extension which would normally be given to complete a study. The proportion delayed varies with the age of departure and is obtained from the graphs shown earlier (Figure 3 for all kinds of study programme). The result of these calculations for ages of departure between 20 and 60 is shown in Figure 11. The Figure also shows the calculation allowing for a more generous extension to the basic study leave. In each case the implication is clear ; there is a range of ages between say 32 and 48 that will provide China with the greatest expected benefit.

### Focusing Control Measures

This tentative result opens the way for setting targets for other more direct measure that might be taken to improve return rates. Figure 11 suggests a general approach to providing benefits or penalties as a means of encouraging return might be unnecessary. Measures taken to improve the return rate of the younger scholars would offer the best return for the effort involved. The results of model calculations that explore the sensitivity of the expected value of foreign study leave are

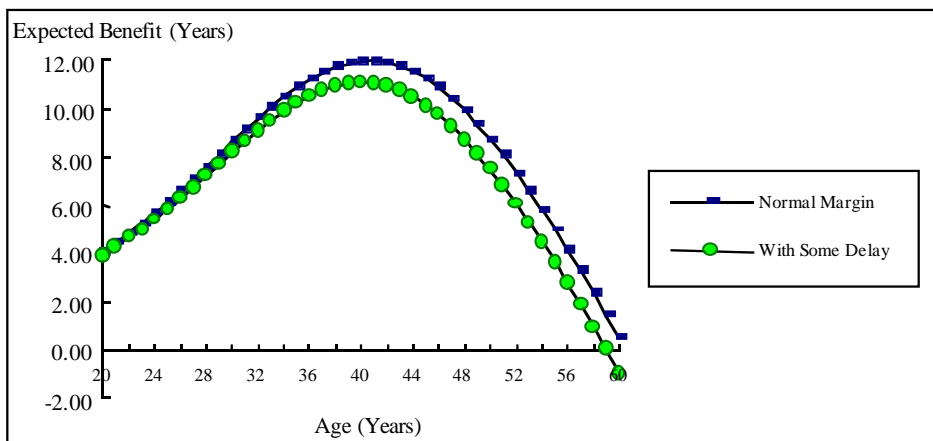


Figure 11. Calculated expected benefit of foreign study plotted against age of scholar

shown in Figure 12 An improvement of the return rate of 20 year old scholars of 10 % would double their expected value to China. While an improvement of 40 % may be ambitious there are clearly considerable benefits to be obtained by focusing the use of resources and administrative effort. There may be other advantages in focusing on the younger scholars, for example the cost of providing benefits on return are likely to be less for them than for more mature scholars.

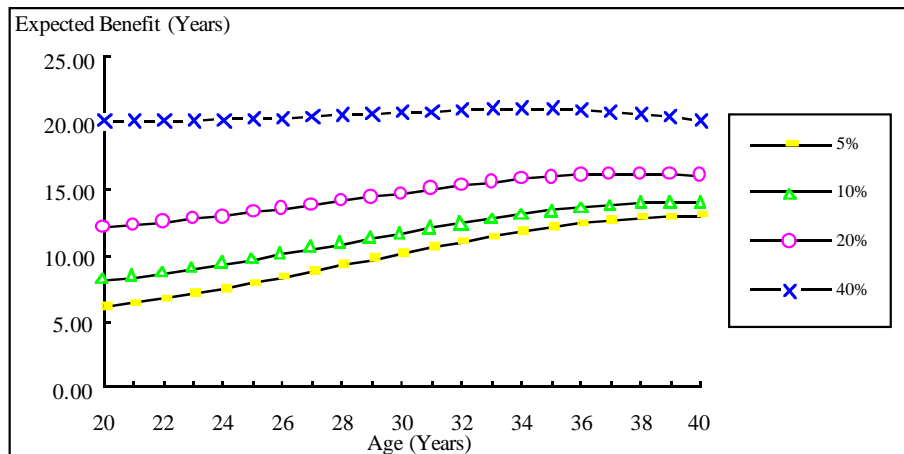


Figure 12. Calculated expected benefit for younger scholars assuming return rate improvements of 5, 10, 20 and 40%

### Remaining Difficulties

However the difficulty of such change should not be underestimated. China's present social institutions are weak and in particular there is no strong legal system supporting management. As a result many laws and agreements are not adequately enforced. For instance, the agreement that enables foreign study was formulated by policy makers as early as 1987, including the terms of sponsorship. It explicitly states that sponsored students and scholars have an obligation to return promptly after completing their study and they must then serve for at least five years in their previous work unit. If they fail to do this their guarantors should refund all expenses to the sponsoring body. In practice this formal requirement, even though notarised by judicial authority, has not been enforceable. Chinese citizens do not have valuable private property so there is no significant action that could be taken by the legal system. This may change as the prosperity hoped for as a result of the foreign study programme comes into being but until then control of return rates will remain a considerable challenge.

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<sup>1</sup> This information was published in Xinhua News Agency on November 22, 1983, p. 7.