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Higher education finance in China: current constraints and strategies for the 1990s

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Abstract. The problems facing Chinese higher education are analysed and it is argued that these are caused by underfunding, high inflation and low internal efficiency. Possible strategies for addressing these problems are discussed: these include: (i) improving internal efficiency; (ii) developing systems of cost-sharing and cost-recovery; (iii) income generation by individual universities; and (iv) increasing national expenditure on higher education as soon as the state of the economy allows.

Higher education in China developed rapidly in the 1980s. In the late 1970s, the Chinese Government started to implement the policies of modernization, reform and opening up to the outside world, aimed at speeding up economic development. Education was considered the strategic foundation for economic success, because there was a growing recognition of the importance of the availability of well-educated manpower, especially high level specialized personnel. Thus, high priority was given to higher education. The enrollment of regular higher education institutions in China rose from 1.02 million in 1979 to 2.07 million in 1988. The number of college students per 10,000 population increased from 11.5 in 1980 to 18.5 in 1988 (State Education Commission 1988).

However, the rapid expansion of the higher education system took place without the state paying sufficient attention to the issues of economies of scale and cost-effectiveness. Many very small universities and colleges were established, which meant that a relatively high cost system evolved. This mode of rapid expansion had a profound impact on the financing of the Chinese higher education system, especially during the period of economic austerity and financial retrenchment starting in the late 1980s. This paper focuses on the current financial constraints of the Chinese higher education system and outlines the strategies for cost-saving and mobilization of additional resources for universities and colleges within the overall framework of higher education finance in China. The paper is divided into three sections. Section one provides a brief description of the overall framework of higher education finance in China. Section two analyzes the current financial constraints faced by the Chinese higher education system. Section three discusses the strategies for improving the financial situation of the universities and colleges in the 1990s.

I. Outline of higher education finance in China

The Chinese higher education system consists of 1,075 universities and colleges

among which only 49 are comprehensive universities; others are specialized colleges including 281 engineering schools, 59 agriculture colleges, 11 forestry colleges, 119 medical colleges, 262 normal colleges, 14 language institutes, 80 colleges of finance and economics, 25 colleges of political science and law, 16 physical education academies, 30 art colleges, 119 short cycle vocational universities and 10 special colleges for ethnic minorities. These universities and colleges are administered and financed by either the central government or the provincial government (a few of them are administered and financed by local governments under the supervision of the provincial government, but their number is very small).

Table 1 shows that 36 universities are directly administered and financed by the State Education Commission, which is also responsible for the overall guidance of the higher education system of the country through formulating policies, degrees and plans of the state. 316 universities and colleges are administered and financed by the ministries of central government, such as the Ministry of Agriculture, the Ministry of Metallurgical Industry, the Ministry of Machinery and Electronic Industry and the Ministry of Public Health. Each of these ministries has a department of education in charge of managing their own education institutions. 723 local universities and colleges are administered and financed by Provincial Education Commissions including a few of them by local government with provincial supervision. None of the 1,075 universities and colleges in Table 1 is private. They are all state-run institutions. It should be mentioned that in recent years there emerged a few Minban (non-state) colleges which were established by some individuals, associations and communities, but they are so small and so unstable that they are excluded from the analysis, though they have a potential to grow in the future.

There are two sources of funding for higher education institutions: (1) state appropriation, which has been the major source for financing Chinese higher education, accounting for more than 90% of the expenditure; (2) revenues generated by higher education institutions themselves through research contracts, consultation and other services to industries and communities, private donations and student tuition fees. In recent years, universities and colleges have increased the proportion of funds generated by themselves since they were given more autonomy to do so in 1985 as shown in Table 2. There was no tuition charge to students before

Table 1. Number of higher education institutions by affiliation in China, 1988

Affiliation	# of inst.	Enrollment	Average size	# of teachers	Student teacher ratio
State education commission	36	254,926	7,081	52,946	4.81
Other central ministries	316	662,923	2,098	144,052	4.60
Provinces	723	1,148,074	1,588	196,187	5.85
Total	1,075	2,065,923	1,922	393,185	5.25

Source: Department of Planning, State Education Commission, 1988.

Table 2. China: investment in higher education (in billion yuan)

Year	GNP	Total government revenue	Total national budget	Total expenditure on education	Total expenditure on higher education	Revenue generated by higher edu. inst.
1952	NA	18.37	17.60	1.16	0.27	NA
1965	NA	47.33	46.63	3.59	0.74	NA
1978	358.80	112.11	111.10	7.62	1.50	0.064
1979	399.80	110.33	127.39	8.81	2.32	0.092
1980	447.60	108.52	121.27	11.32	2.81	0.074
1981	477.30	108.92	111.49	12.25	3.21	NA
1982	519.30	112.40	115.33	13.66	3.44	0.086
1983	580.90	124.90	129.25	15.29	4.30	0.099
1984	696.20	150.19	154.64	17.90	5.22	0.137
1985	856.80	186.64	184.48	22.44	6.48	0.550
1986	972.60	226.03	233.08	26.49	7.98*	NA
1987	1135.10	236.89	244.85	27.70	8.01*	0.692
1988	1401.50	258.78	266.83	32.36	NA	NA

Source: Constructed by the author according to information from the State Statistics Bureau of China (1988, 1989) and the Department of Planning, State Education Commission of China (1986, 1987, 1988).
* Estimated number.

1989. Instead, universities and colleges provided free dormitories and stipend for food and other subsidies to students. Starting in 1989, most of the universities and colleges started to charge a tuition fee of 200 Yuan (equivalent to 43 U.S. Dollars) per academic year to the newly enrolled students, which accounts for about 8.6% of the unit recurrent cost.

The state appropriation for higher education has come mainly from two different levels of government. The allocation for the 36 national universities of the State Education Commission and the 316 universities and colleges of the line Ministries comes from the budget of the Ministry of Finance of the central government. It allocates funds to the State Education Commission and other Ministries according to head count enrollment. They, in turn, allocate the funds to their universities and colleges. The 723 provincial universities receive their funds from the Department of Finance of the provinces. Columns 6 and 7 of Table 2 provide the basic statistics of expenditure on higher education and the amount of revenue generated by colleges and universities in selected years, which are aggregated national level statistics including appropriations from both central and provincial government, against the background information of the country's Gross National Product (GNP), Total Government Revenue, Total National Budget and Total Expenditure on Education.

Table 2 shows that the Chinese Government has increased its expenditure on education as whole and on higher education specifically since the late 1970s both in absolute value and relative to government revenue and GNP. It can also be seen that the annual rate of increase of expenditure on education as a whole is higher than the annual rate of increase in the total government revenue; and the annual rate of

increase of expenditure on higher eduction is higher than that on education as a whole since the implementation of the modernization program. For example, the total government revenue increased 2.31 times from 112.11 billion yuan in 1978 to 258.78 billion yuan in 1988; the total expenditure on education as whole increased 4.25 times from 7.62 billion yuan in 1978 to 32.36 billion yuan in 1988; the total expenditure on education as a whole increased 4.25 times from 7.62 billion yuan in 1978 to 32.35 billion yuan in 1988. During the same time period, the total expenditure on higher education increased 5.34 times from 1.50 billion yuan in 1978 to 8.01 billion yuan in 1987. This demonstrates that the Chinese Government has given high priority to investment in education in the country's modernization process, and has given even higher priority to investment in higher education, showing the government's growing recognition of the importance of education, especially higher education, for its economic and social development.

Table 2 provides information on total spending on higher education. Table 3 gives the structure of higher education expenditure and the unit recurrent cost of higher education in China. From Table 3 one can find that, among the total recurrent expenditure on higher education, personnel expenditure accounts for only 42%, which is lower than that in some other countries. This is due to the lower faculty and staff salaries in China on the one hand; on the other hand, the non-personnel expenditure is relatively high because it includes costs incurred in activities such as publishing and printing, running affiliated schools and hospitals for university staff and their families, housing all the students and employees, which are not considered 'higher education' in some other countries. One can also find that

Table 3. China: structure of higher education expenditure and unit cost in higher education (in billion yuan)

	Total expenditure on higher education	Recurrent expenditure		Capital expenditure	Unit recurrent cost (in yuan)
		Personnel expenditure	Non-personnel expenditure		
1952	0.27	0.07	0.07	0.13	830
1965	0.74	0.36	0.27	0.11	918
1978	1.50	0.49	0.68	0.33	1,844
1979	2.32	0.70	0.94	0.68	1,798
1980	2.81	0.82	1.09	0.90	1,752
1981	3.21	0.92	1.31	0.98	1,753
1982	3.44	0.98	1.41	1.06	1.922
1983	4.30	1.18	1.60	1.52	2,185
1984	5.22	1.26	2.01	1.95	2,229
1985	6.48	1.52	2.50	2.46	2,477
1986	7.98*	1.85*	2.84*	3.30	2,564
1987	8.01*	2.10*	2.91*	3.00	2,314
1988	NA	NA	NA	2.93	NA

Source: Constructed by the author according to information from State Statistics Bureau of China (1988, 1989) and the Department of Planning, State Education Commission of China (1986, 1987, 1988).
* Estimated number.

the unit recurrent cost of Chinese higher education is more than 2,000 yuan in recent years, which is about 200% of the GNP per capita in China. Table 3 also shows that among the total spending on higher education, capital expenditure accounts for a large proportion, showing the rapid expansion of higher education since the late 1970s, including the establishment of many new colleges and unviersities, which required a large amount of capital investment. Within this overall framework of higher education finance, the following section analyzes the current funding constraints faced by the Chinese higher education system.

II. The current financial constraints of the Chinese higher education system

Although the total expenditure on higher education in China has increased at a rate higher than the increase of the government revenue, the Chinese higher education system has faced increasing financial constraints, which has created straitened circumstance for universities and colleges in the country. This situation is demonstrated in two aspects: first, there are serious shortages of both non-personnel instructional funds and of the necessary facilities and equipment for higher education institutions, especially at some provincial universities. The personnel cost has accounted for an increasing share of the total expenditure, as a result of high rates of inflation in China in the past few years. Though the reported personnel costs account for about 42% of the recurrent expenditure in 1987 at national level, a survey of 114 higher education institutions in three provinces conducted by the World Bank in cooperation with the Institute of Higher Education of Peking University in 1989 showed that the personnel costs for provincial universities account for about 58% of the current expenditure in 1988. This led to a dramatic decrease of funds for non-personnel instructional purposes and exacerbated the problems of equipment shortages and has resulted in understocked laboratories and libraries. Many higher education institutions had to cut their subscriptions to periodicals they had taken for many years. Even national universities are short of both equipment in quantity and funds for upgrading their large proportion of obsolete facilities and equipment. Furthermore, there are more than three million square meters of dangerous buildings in higher education institutions across the country, which need funds for repairs (Department of Planning, State Education Commission 1988).

The second aspect is that faculty salaries are relatively low. According to the State Council of China, the salary range for an assistant instructor at university and college is 70-97 yuan, for a lecturer 97-150 yuan, for an associate professor 122-230 yuan, for a full professor 160-355 yuan. The basic salary goes up gradually with teaching experience and is supplemented with other employment benefits (State Council 1985). Even though the basic salaries of university faculty members are comparable to those of other professions with similar educational qualifications, total remuneration is lower for the teaching profession because of the much larger bonuses given to employees in industries. According to the National Statistics Bureau of China, the average income for teachers and employees in the educational

and cultural sectors ranked number eleven among twelve major occupations in 1987 (Jiao 1988). In 1988 the average annual income from salary and subsidies for the 12 major occupations in China is 1,853 yuan, the monthly average is 154.4 yuan. However, according to a survey of 2,368 university faculty members (Luo 1990), in 1988, the basic salary plus subsidies for a university lecturer is 104.5 yuan, for an associate professor 129.5 and for a full professor 182.5 yuan, showing that the income from salaries of associate professor and lecturer are respectively 17% and 33% lower than the average of the 12 major occupations in the country, while that of a full professor is only 18% higher than the average. The government responded to faculty complaints about low salaries with some pay increases, but the increases were offset by very high inflation rates in the past two years. This situation has resulted in an unstable teaching force. Many faculty members have left the teaching profession or intend to leave (Jiao 1988; Luo 1990).

The current financial difficulties of Chinese higher education system are caused by the following factors:

First, the higher education system expanded too fast and the increase of state appropriation for higher education could not keep up with the growth of the cost. The total enrollment of the regular higher education institutions increased from 1.02 million in 1979 to 2.06 million in 1988. Many new higher education institutions were established during this period. For example, in the three years from 1983 to 1985, more than 300 new universities and colleges were set up. The total expenditure on higher education increased at a rate higher than the increase of the total government revenue in the early and mid-1980s. When the government faced economic austerity and financial retrenchment in the late 1980s and early 1990s, the rate of increase in the allocation to higher education was slowed down, as shown in Tables 2 and 3. This tendency was more obvious for 1989 and 1990, though there have been no official statistics published yet. This slow-down, together with the growing costs, has put the higher education system into straitened circumstances.

Second, the financial situation of education has been exacerbated by inflation. Even in early 1980s, when the inflation rate was relatively low in China, (in 1983, the officially announced retail price index was 101.5% and the cost of living index was 102.0%, and in 1984 102.8% and 102.7% respectively) the cost of instructional materials went up quite rapidly. For example, according to a survey in Beijing Municipality and Liaoning Province, from 1980 to 1985, the price for stationery and paper increased by 63.9%; for laboratory materials increased by 66.3%; for books and periodicals increased by 91.2%; for building maintenance materials and labor increased by 55.2% (Jiao 1988). The situation has deteriorated further since the mid-1980s, when the rate of increase of allocation of higher education was slowed down, while the inflation rate went up significantly. In 1985, the officially announced retail price index was 108.9% and the cost of living index was 111.9%; correspondingly, 106.0% and 107.0% in 1986; 107.3% and 108.8% in 1987; and 118.5% and 120.7% in 1988 (State Statistics Bureau 1989)! The high inflation has reduced the purchasing power of the institutional budgets and the real amount of resources available to the higher education system has been declining.

Third, the current financial difficulties of Chinese higher education are also due to

the low efficiency of the system. The expansion of higher education institutions in the 1980s took place without the state paying sufficient attention to the issues of economies of scale or cost effectiveness. The number of universities and colleges, the number of departments, and the number of staff increased too rapidly, and many very small universities were established, which meant that the rates of utilization of education inputs are very low, thus developing a high cost system. This is indicated by:

(1) *Low student to total staff ratio and student to teacher ratio.* In 1988 the student/staff ratio was 2.1 : 1 and the student/teacher ratio was 5.3 : 1 (State Statistics Bureau 1989), while the average level of student/teacher ratio is 12 : 1 elsewhere in East Asia and the Pacific (World Bank 1986).

(2) *Low rates of utilization of facilities.* The rate of classroom utilization was as low as 47% and laboratory utilization as low as 62% on some school days at some regular higher education institutions (World Bank 1986). Although most universities and colleges are under-equipped, idle equipment still accounts for over 20% of total equipment in some higher education institutions (Jiao 1988).

(3) *High unit costs in comparison with other countries.* The unit cost of the Chinese higher education system has been above 200% of the country's GNP per capita, while in developed countries it is about 50% of their GNP per capita, in East Asia and the Pacific about 100%, and in those Asian countries at a level of economic development comparable to that of China about 150% on average (Tan and Mingat 1989; World Bank 1985, 1986).

(4) *Over specialization of courses.* The Chinese higher education system is divided into 870 types of specialities. In engineering alone there are 378 types of specialities (State Education Commission 1988). The narrow specialization in many colleges and programs results in low utilization of specialized equipment and low teaching loads for faculty members. At an engineering university in Guizhou Province, there are three separate specializations in organic and inorganic chemical engineering and chemical engineering, and three separate specializations in mechanical engineering, and each of them has enrolled a single class. Therefore, both the student-teacher ratio and faculty workload are very low. In Shaanxi Province, the average teaching load of faculty members in higher education institutions was only 4.8 hours per week in 1988. The highly specialized nature of Chinese higher education has not only led to low internal efficiency, but also to low external efficiency. Students are locked into narrow fields of specialization and often lack flexibility and adaptability to technologically induced changes and labor market needs. There is evidence of a mismatch between demand and supply of highly qualified manpower (Guizhou Institute of Education Research 1988; Zhou 1988).

(5) *Diseconomies of scale.* One of the special features of the development of Chinese higher education in this period was that the expansion of enrollment was achieved

mainly through establishing new universities instead of tapping the potential of existing institutions. The total number of higher education institutions rose from 633 in 1979 to 1075 in 1988, but the average size of higher education institutions remains below 2,000 students (State Education Commission 1988). There are 381 universities and colleges with less than 1,000 students. This leads to very high unit cost. A survey of 136 universities and colleges in 1986 showed strong evidence of economies of scale: higher education institutions with enrollments of 2,000 or less had average unit costs considerably higher than those with enrollments of 4,000 students or more (World Bank 1986). Another survey of 114 universities and colleges in 1989 gave similar results (Min 1990). The economies of scale in the operation of higher education institutions are far from fully exploited.

In short, the current financial difficulties of Chinese higher education are caused by underfinancing, high inflation and low internal efficiency. The next section of this paper is to discuss the possible strategies for addressing these problems.

III. Strategies for addressing current financial difficulties in the Chinese higher education system

Given the current circumstances of economic austerity and financial retrenchment of the country, and the need to improve the financial situation of the higher education sytem in China, the following strategies should be considered: First, improving internal efficiency to turn a relatively high cost system into a more cost-efficient and cost-effective one. In recent years, the State Education Commission of China has come to realize the seriousness of the problems of low efficiency of its higher education system and formulated policies for higher education development in 1990s with emphases on: (1) stabilizing the size of total enrollment at its current level of about 2 million; (2) rationalizing the structure of higher education; (3) improving the efficiency of the institutions; and (4) raising the quality of instruction.

Efficiency could be improved by internal reorganization of universities and colleges to rationalize small departments, broaden specialities, eliminate duplications of programs, and make more effective use of staff and physical resources including raising student/teacher ratios and improving the rate of utilization of classrooms and laboratories. Arrangements should be made whereby institutions or departments could share expensive equipment, faculty and other resources.

One of the most significant opportunities for cost-saving is to achieve economies of scale, which lies in consolidating small institutions into larger ones together with efficiency measures mentioned above. This could considerably reduce unit costs in the long run. A simulation of cost behavior in the Chinese higher education system showed that the unit cost of a college with 2,000 students and a student/teacher ratio of 5 : 1 is about 400 to 500 yuan higher than that of a college with 4,000 students and a student/teacher ratio of 10 : 1, which is about 20% of the unit recurrent cost (World Bank 1986, Min 1989). Of course, restructuring and consolidating higher

education institutions would present a number of difficulties, one of which probably is the difficulty of coordinating different commissions, ministries, provincial departments or bureaux responsible for a number of small institutions which are inefficient and often duplicate facilities. The relevant administrative units should be encouraged to work together, rather than setting up competing establishments. The problems of administrative structures which prevent consolidation or restructuring should be overcome at both national and provincial level. In some cases capital expenditure is needed to enable two small institutions to combine on a single campus. Thus cost-benefit analysis is needed for such investment projects.

Second, developing a cost-sharing and cost recovery system. The Chinese higher education system charged students no tuition before 1989. It also provided free dormitory and a stipend for food and other allowances for students, which amounted to about 20% of the total recurrent expenditure. Thus one of the strategies for higher education institutions to address the current financial difficulties is gradually to reduce the level of student subsidies. Some changes have started recently: (1) In 1989, most of the universities and colleges started to charge a tuition of 200 yuan which covers about 8.6% of the unit recurrent cost. (2) Higher education institutions started to change the student stipends system, which used to be equally spread out to all students, into a new system of scholarship and loans (State Education Commission 1988). Scholarships are awards for top students and loans only for students from needy families. Since these charges are still experimental, each university has operated scholarships and loans according to its own specific situation, and the coverage varies from one institution to another. It is far from institutionalized. (3) In reducing the cost for operating student residence, some universities considered charging dormitory fees, and some started to take in commuting students. It has been proved feasible in the case of some local colleges and polytechnics which provide little or no residential accommodation that students and their families have been willing to make alternative accommodation arrangements.

Given the increasing financial pressure in the coming years, the Chinese higher education system should further develop its cost-sharing and cost recovery system by institutionalizing the tuition charge and gradually increasing tuition level, and reducing subsidies for student board and lodging, while increasing selective support for qualified students from poorer families to address equity issues, providing students with work-study opportunities, and establishing scholarships for academic distinction. These measures should not be considered temporary tactics. They should be long-term financing strategies for higher education development. Chinese higher education institutions only enroll about 2% of the college age population at present time. The demand for higher education is growing fast along with the economic and social development. Thus these measures will enable the higher education system to provide more student places, which was limited proportionally by the high level student subsidies and low level cost recovery.

Third, encouraging higher education institutions to generate more funds by themselves. This is one of the most promising strategies for significantly increasing resources to higher education. From Table 2, one could find that the revenue

generated by universities and colleges themselves has increased remarkably since 1985 when higher education institutions were given autonomy to do so. It increased from 63 million yuan in 1978 to 672 million yuan in 1987. Universities could generate funds by signing research contracts with industries, and by providing technical consultation for enterprises and communities. International experiences have shown that university-industry cooperation will not only help the universities financially, it could also speed up the overall scientific and technological progress and the economic development of the country (Brodsky *et al.* 1980; Langfitt *et al.* 1983). Universities in China have just begun to establish direct links with industries. They should be more aggressive and show more initiative in developing university-industry cooperation.

Universities could also generate revenue by providing training and educational service for industries, such as training students at the entrustment of industries and companies. Because these students are enrolled beyond the state plan, universities could seek full cost-financing from the employing units of these students. They could also run short-term programs, summer workshops, evening courses, and correspondance programs for updating knowledge and skills of current employees. The provision of these educational and training services could not only generate revenue for higher education institutions, it could also help improve the internal efficiency of universities. For example, in recent years, the Northwest University in Shaanxi Province has signed contracts with six ministries of the government and dozens of enterprises to produce more university-educated technical personnel for these units beyond the state enrollment plan. In return, the university received 30 million yuan from these customers. Now the university has 6,700 students as against 3,000 students a few years ago, while the student to teacher ratio increased from 3 : 1 to 7 : 1 (State Education Commission 1988). This shows the great potential of revenue generation of universities and colleges which has not been fully tapped at the present time.

Fourth, despite the large increase of the state appropriations to education in the 1980s, public expenditure on education in China remains relatively low in comparison to developed countries and other developing countries. In the 1980s, China spent less than 3.0% of its gross national product (GNP) on education, as compared with an average of 5.7% for developed countries and 4.0% for other developing countries (Jiao 1988; Tan and Mingat 1989). Thus, the Chinese Government should further raise its fiscal effort in education investment to the level comparable to the international average in a long run. More allocation from the government budget should be given to education as a whole and higher education specifically when this is economically feasible. To protect the share of education and higher education in the government budget, legislation on the level of education and higher education spendings is required.

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