China's Investment in Human Capital

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Abstract

This paper discusses evidence on human capital investment in China. Policies through the mid 1990s favor physical investment over schooling and urban human capital investment over rural. A more balanced investment strategy across rural and urban regions and types of capital is warranted.

In 1995, China, at all levels of government, spent about 2.5% of its GDP on investment in schooling.[1] At the same time, roughly 30% of its GDP was devoted to physical investment. In the U.S., those figures were 5.4% and 17% respectively. In South Korea, they were 3.7% and 30%. See Table 1 for a comparison of China with other countries in its expenditure of GDP on education. China is below average even among its peers in its expenditure on investment in people. Recent trends in investment in governmental human capital investment are favorable but the investment proportion is still low by world standards rising to 3.1% in 2001 (See Table 2). Its ratio of annual investment in physical capital to human capital is much higher than that in most countries.

This imbalance might be warranted. Perhaps the economic rate of return to physical capital is much greater than the economic rate of return to physical capital. Below, I summarize evidence that indicates that the true rate of return to education and skill formation is very high and that the imbalance revealed in Tables 1 and 2 is symptomatic of a serious distortion in current policy that retards economic development in China. Conventional methods for computing rates of return to human capital that are useful in less regulated labor markets and appled to the Chinese labor market give a misleading interpretation of the true rate of return to human capital. Other methods must be used to estimate the true return.

A basic result of economics is that resources should flow to their most productive use. A policy that equalizes returns across all investment types and across all regions increases economic growth. Current Chinese policy tends to ignore this fundamental rule by restricting the flow of resources accross regions and investing in education at different rates in different regions and investing in physical capital in an imbalanced fashion. This policy reduces the economic growth of China, and promotes inequality, both in the short run and in the long run.

In this paper, I first present the potential benefits that flow from investment in human capital.

[1] See UNESCO, *Statistical Yearbook* (New York: UNESCO, 1999).

Then I discuss the empirical evidence on the rate of return to education in China and evidence on regional and geographic imbalances in expenditure. I then consider alternative policy reforms that would foster skill acquisition and enable China to harvest the benefits of investment in both physical and human capital.[2]

I make main points. (1) The benefits of human capital investment are substantial. (2) The current level of investment in human capital in China is low by worldwide standards. (3) At this low level, investment in human capital is inequitably and inefficiently distributed accross geographical regions and rural and urban areas within the regions. (4) The imbalance in investment in human capital compared to physical capital reduces the return to physical capital and thwarts physical investment initiatives designed to foster growth in interior China. (5) A more balanced portfolio of investment will promote economic growth and reduce inequality in the long run. (6) Open labor markets and fewer restrictions on mobility will foster human capital at little cost to governments.

1 The Benefits of Human Capital Investment

When economists first began to measure the sources of economic growth, what previously had been considered an unexplained residual became identified as human capital. From studies of the development of the American economy, and the sources of growth of many countries around the world, it has become evident that human capital—the skill of the population—plays a major role in explaining differences in productivity and inequality among nations (Becker, 1964; Schultz, 1981). Human capital is another, very valuable, kind of capital. It is costly to acquire, like physical capital, and pays off over time, like physical capital.

[2]It is sometimes said that China invests much more in education than the official statistics suggest. Appendix Table 1 reveals that accounting for privately financed investment raises the official statistics on educational expenditures as a % of GDP by at most 10-15% (1994 levels) to say 3.3-3.4% in 2001, still low by world standards.

The term "human capital" suggests to some a depersonalization of the individual and is associated in the popular mind with a dehumanizing society that equates men with machines. In fact, it is just the other way around. The human capital concept recognizes that human beings are as important, if not more important, than physical capital in creating wealth and generating a successful economy. Investment in people is an appropriate concept for a people's republic. To understand how human capital affects the economy and why China should promote it, consider how human capital improves productivity.

First, human capital is productive because of its immediate effect on raising the skills of workers. So, for example, if you train an individual to be a better accountant, the accounting performance of that individual will rise. If you train a worker to fix an engine, the worker will be more productive in fixing engines. These are the obvious direct effects of making people more skilled.

Human capital also improves the adaptability and allocative efficiency of resources in society. It allows agents to allocate resources more effectively across tasks. It enhances the ability of agents to adapt to change and to respond to new opportunities (Schultz, 1975).

China is changing. Its labor markets, and capital markets are changing along with the rest of the world's economy. Numerous empirical studies demonstrate that more educated people and better skilled people are better adapted to change. They are able to benefit from opportunities that become available and create new opportunities of their own. They enhance productivity in the workplace. Greater skill also facilitates worker mobility across occupations, industries and regions in response to new opportunities. It helps people reallocate resources, both human and physical, toward more productive opportunities, and even to realize that those opportunities exist. A more educated workforce is a more flexible workforce. More educated people are better able to absorb new ideas, adapt to foreign technologies, improve local technologies, and understand and apply knowledge from outside China to local situations.

As China enters world markets, it will have access to newer forms of technology and organizational arrangements. The need for a more skilled workforce will increase. By world standards, the percent of college-educated workers is low (See Table 3) and there is substantial regional variability so that the educational infrastructure for modern growth is needed. While enrollment rates are increasing (See Table 4), there is still much room for improvement.

The new technology being brought into China by its investment in physical capital requires more skilled workers to operate it. In the language of economics, capital and skill are complementary. Each factor raises the productivity of the other. An investment strategy that emphasizes physical capital over human capital fails to capture the benefits that can arise from a more balanced investment strategy. It takes skilled workers to make the most efficient use of modern technologies and even though recent trends toward promoting education are favorable, there is still a huge gap to close. Fleischer and Chen (1997) analyze the impact of education on total factor productivity in regions in China. They find that the recent policy of promoting investment in noncoastal areas of China was thwarted by the low level of education in the noncoastal regions. An imbalanced investment strategy reduces the return on physical capital.

Numerous studies of agriculture in China and around the world reveal that education promotes productivity on the farm, and also helps the agricultural sector to adapt to changing markets and technologies. More educated farmers are better able to exploit opportunities in technology and trade. The development process is characterized by emerging technologies, emerging options, and by improved choices. Better-educated people are better able to make good choices, both on the farm and in the urban workplace (Yang, 2001).

Since so many studies from around the world demonstrate that education and skills are important determinants of economic growth, an important question for China and for many other countries, is whether or not there is adequate investment in human capital. Is there under-investment in edu-

cation or over-investment in education, relative to other types of investment? Are the investments in human capital, such as they are, distributed efficiently?

When we think about an appropriate investment strategy for China, and the development of its regions, it is very important to understand that optimizing over the full portfolio of investments-both human and physical capital-promotes the highest rate of growth. If China over-invests in one type of capital or under-invests in another, opportunities for improvement in wealth are lost. If it does not equalize returns and opportunities accross regions aggregate income is reduced and inequality is raised. By equalizing returns across assets and across markets in different regions of the country, greater national wealth and equality in the long run will be produced.

So a major question for China's leadership is whether there is under-investment or over-investment in education in China. Should the Chinese investment portfolio be readjusted? Should the portfolio be more balanced across the regions? What is an appropriate migration policy? What is an appropriate tuition policy to maximize economic returns?

2 Under-Investment in Human Capital? Inefficient Geographical Distribution of Human Investment?

There is a low level of public support for education in most provinces of China. In addition, the existing funds are spent inefficiently. Since schooling is mostly funded at the local level, rich provinces tend to produce more human capital per capita then do poor provinces (See Table 5 for per pupil expenditure by region). The place of a person's birth is one of the most important determinants of that person's adult skill level. (Knight and Song, 1999) This is a powerful source of inequality in society across people over time and across generations. This source of inequality is reinforced by the vestiges of hukou policy that charges children of interregional immigrants above normal fees that

are as large as 10% of total family income just for the right to attend school. Resource constraints differentially affect access to schooling of individuals in different parts of China, especially in rural areas and in the West. Access to education is not uniform across regions. This creates serious regional disparities and is a major source of inefficiency in current policy (Li, undated).

Table 5 documents the variation in cross section per pupil expenditure across regions of China. (The first row of Table 6 shows the national average over all levels of education for 2001.) The variation is enormous and the positive relationship with provincial GDP per capita is fairly clear and precisely estimated.[3] See Figure 1. which plots the estimated regression line.[4] The accident of birth determines the quality of schooling received by students. (Knight and Song, 1999) Schooling finances are tied to the level of wealth in a region and regions spend different fractions of their GDP on education (See Table 7).

A policy of charging fees for access to education can be justified as a way to ration scarce resources to those who might benefit most from education. The extent of subsidy in Chinese education is substantial, as it is in many countries around the world (Table 8). Yet these fees operate inequitably between urban and rural households (See Tables 9 and 10 respectively). These fees are a substantial fraction of household income in rural areas. Table 11 presents evidence that tuition fees per child are a substantial fraction of household income even in urban areas and that this fraction doubles in rural areas. Access to education is not uniform across rural and urban areas.

There are benefits to education that are not directly captured by individuals. These externalities are likely to be quite large in China. For example, a better educated workforce produces new ideas and knowledge. Individuals may not capture all of the gains produced from their education, especially if the wages of the skilled are held down by government policy, as they are in China. So

[3]The R^2 is .70 and the regression is strongly statistically significant.

[4]The extreme outlier for Beijing reflects in part student in-migration to that region for education.

on the face of it, there is under-investment in human capital in China and in many other countries around the world.

What does the empirical evidence on the rate of return to education in the Chinese economy show? It is important to evaluate government activity on a quantitative basis, to screen the bad investments from the good ones, and to conduct policy on a factually informed basis. From cost-benefit analyses grounded in data, we can understand more clearly whether human capital projects or physical capital projects should be favored, and in what proportions. In making judgments using a cost benefit criterion, society can use its resources most efficiently. In the Chinese context, this is especially important, given that resources are scarce, and that the country as a whole is poor. So it is especially important to make wise investment decisions here.

Estimating the rate of return to education in China in the way economists in Western economies ordinarily do, by relating market wages to levels of schooling, you will find that the rate of return to education in China in the early 1990s is about 4% (Chow, 2001). This is a low rate of return. Heckman and Li (2003) note that the rate of return has risen to 7% in recent years. It is far below the rate of return to physical capital in industry that is estimated by some to be as high as 20% (Chow, 1993). Taken literally, these estimated returns suggest that there might be too much investment in human capital in China. To give you a benchmark figure, in the United States and many other countries, there are estimates that the rate of return to human capital is as high as 15% to 20%. This evidence suggests that the relatively high ratio of physical capital investment to human capital investment in China might be appropriate.

Understanding how labor markets function in China, one realizes how misleading such a conclusion would be, even for an historical analysis of educational policy. Labor markets are the markets that price human capital services and reward people for their skills. Wage policy in China historically guaranteed a low rate of return to skilled labor, and there are still many restrictions on wage

setting in the labor market. So the only thing we can conclude from standard rate of return to education analysis applied to historical Chinese data is that personal incentives to invest in skills are low, although this is changing. (See the evidence in Heckman and Li, (2003))

The low private rate of return does not reflect the true rate of return in the late 1980s or early 1990s. Labor markets are so distorted in China that wages do not reflect this true marginal contribution of educated labor to the economy. In order to show this, I draw on an analysis of data whose collection was supported by the Ford Foundation working in cooperation with the Chinese Academy of Social Sciences. Fleisher and Wang (2003) analyze these data. An analysis of this data suggests that the social return to human capital is much higher than the private return.

Instead of looking directly at market data and seeing what individuals are paid, they look at the productivity of education in the workplace in producing output. This is the direct return to education.

Focusing only on the direct return, they arguably underestimate the full return to education. They do not measure all of the other benefits to education and training I mentioned earlier, and so their estimate constitutes a lower bound on the return to education. Their econometric studies suggest that the return to education may be as high as 30% or 40% (Fleisher and Wang). The wages paid to skilled workers are only 10% of their marginal productivity in 1992. Unskilled workers are paid their marginal product. This demonstrates the extreme consequences of wage setting policies that fail to pay for productivity. Since workers get only a small fraction of their payment for skill, they have weak incentives to acquire skills.

The rate of return to education in production estimated by Fleisher and Wang is higher than anything found in the United States or Western Europe. And arguably they *underestimate* the true rate of return to human capital. So the available microeconomic data suggest that there is in fact substantial *under-investment* in human capital. Labor markets in China gave the wrong incentives

to workers in the late 1980s and early 1990s and likely do so today. If we compare estimates of the true productivity in education with wages paid, Chinese labor markets do not pay skill what it is worth. Fleischer and Chen (1997) show that returns to education exceed the returns to investment in all provinces of China except Beijing, Tianjin, and Shanghai, regions with high levels of education investment. They estimate that the lower levels of education in noncoastal China reduce the productivity of capital in those regions in half. An imbalanced policy that seeks to improve productivity in noncoastal China by encouraging investment in physical capital alone is much less effective than a policy that invests ina more balanced fashion in both human capital and physical capital. Thus China's support for education is low by world standards and its current expenditures are inequitably and inefficnently distributed.

3 Policies to Foster Human Capital and Promote Economic Growth

The low private return to education relative to the high social return is evidence of some distortions in overall investment policy. That poilcy reduces the incentives of individuals to acquire the appropriate amount of human capital. Chinese labor market policy and educational policy cause the national portfolio of investments to be distorted away from human capital toward physical capital investment, to be distorted away from the interior, and toward the coast, and to be distorted against investments in rural people. High rates of social return to investment can be realized by taking funds, even those borrowed from abroad, and funds created in the enterprises in China to invest in human capital and distribute the investment more equitably. Such a strategy would foster the creation of national wealth.

One way to encourage education and job training is to subsidize it. That approach entails a

substantial increase in government expenditure and may not be feasible. Recently, enrollments in college have increased dramatically (See the final column of Table 4) but there is substantial room for improvement. Further increase in direct governmental support for education may not be feasible.

Another way to foster human capital that entails less direct cost to governments is to free up labor markets for human capital. A free labor market that allows the same kind of incentives to operate as increasingly govern capital markets and product markets in China, would go a long way toward promoting skill formation. This would have a powerful effect on promoting human capital. If persons receive a 30-40% return on human capital investments, they would willingly pay the costs of schooling. A 4% or even a 7% rate is not that profitable.

Freeing up the labor market for skills would allow the forces of private incentives to operate. Giving individuals the fruits of their skilled labor would motivate people to acquire skill without costing the government anything. It would allow private incentives to operate to create the investment pools for human capital. By unleashing the forces of individual incentives to create human capital, China will create wealth and create pools of finance for physical capital from the savings of its educated workers. It will expand its tax base and enhance its revenue from taxation.

Another policy that would promote growth is equalization of regional and urban and rural rates of return to human and physical capital. For decades, Chinese policy has favored certain regions over other regions (See Fleisher and Yang, 2003). Current policy has also allowed local governments to play a dominant role in the financing of education. Richer regions have more funds for education than poorer regions. Eliminating regional disparity in wages and opening up markets to allow freedom of migration and pursuit of opportunities throughout China would enhance economic development of the country as a whole. So would a centralized educational finance policy that served to allocate governmental funds from the center more evenly across the regions and among rural and urban areas. Western China and rural areas currently have low incomes and hence low support for education

but a very high return to it. National income will be increased by allocating more resources for education and training to poorer regions.

Many Chinese object to freeing up incentives in labor markets. Opening the labor market might risk some increase in inequality in wages at least in the short run. However, this policy produces the right incentives for people to acquire skills. As education is increased, and returns across regions are equalized, inequality at a point in time and over generations will be reduced. Given the right rewards and access to capital markets to finance education, people will gladly pay tuition for schooling, which would produce higher salaries. There is already some movement in this direction, of course, but much greater movement is indicated. China should rely on personal incentives to encourage schools to perform well as students shop among them and schools would gain resources directly from the students they educate.

For this system to operate effectively, credit markets for schooling should be developed to allow students to borrow against their future earnings. In the absence of such markets, it is only the young people from wealthy families that can pay tuition charges which currently are as high as 30-40% of mean income in rural areas (See Tables 8, 9 and 10). Inequality is increased across the generations since only the rich can send their children to school. These issues are compounded by the current practices that restrict mobility of labor across regions to equalize returns. Migrants face many restrictions. Of course, there has been a dramatic improvement freedom of mobility compared to the policies of the 60s and 70s. However the 5-10% increase in the cost of schooling for the children of migrants reduces social mobility and perpetuates intergenerational poverty.

A lesson that has been learned from many recent studies in the United States, Europe and other countries around the world is the value of the competition among schools in improving the performance of educational institutions (Heckman, 2000). If China encourages even more private organizations, such as private business schools, technological institutes, and the like to operate,

it can create an efficient educational infrastructure to promote the formation of human capital in China. This trend, well underway, should be accelerated.

Another potentially important policy goal is to further promote ties between industry and universities. Many universities have begun such partnerships but there is room for much further growth of these productive arrangements. Such partnerships allow the universities to respond to practical problems, and therefore help local industry solve some of the problems that accompany the introduction and improvement of technology. This will provide a source of financing by private industry for the educational enterprise.

In the United States, we have very successful firm—school relationships with schools at all quality levels, and not just those of distinguished universities, with high-tech computer firms. Many lesser schools have formed valuable partnerships working closely with companies like General Motors and BASF that need workforce training. By creating incentives and allowing individuals and organizations to trade and to bargain in human capital and in physical capital markets, the effectiveness of the educational infrastructure would be improved at no cost to governments.

Creating incentives and developing capital markets would promote investment in human capital. It is not necessary to use funds from the center or to presume that education and skill formation should be governmentally supplied. Freeing up the labor market and the market for education would harness the forces that promote acquistion of skills by fostering the training of individual workers by firms, or encouraging individuals to train themselves in the workplace to be better farmers, better factory workers and better managers. If freeing up labor markets is not a possible policy option, educational expenditures should be increased and equalized across regions to maximize the return on human capital investment.

One of the best established empirical findings from around the world is that human capital is extremely valuable in working with high technology physical capital. The two complement each

other strongly. The current unbalanced investment strategy of China emphasizes physical capital over human capital. As demonstrated by Fleischer and Chen (1997), this strategy undermines a strategy for promoting physical capital investment in rural areas and in noncoastal provinces. Returns to capital are low when the level of education of the work force is low. There are too few skilled workers to effectively operate the new technology rapidly being introduced into China and the skills being produced by the educational system are not always the ones needed by industry.

4 Inequality

In the short run, open labor markets will lead to greater inequality in wages, especially among the young and more able. The process of opening labor markets and increasing inequality is well underway in China and is a source of great public concern. More educated and more able persons benefit more from the new economy. In the long run, there will be less inequality as the population becomes more skilled and as opportunities for education and skill investment are spread more widely throughout Chinese society. And inequality across the generations will be reduced.

Even in the short run, a policy fostering human capital might reduce inequality. A major source of income inequality in China is the difference between rural and urban incomes. These differences are due to policies of the Chinese government that create inequality (Johnson, 2000; Fang, Wang and Yang, undated; Fleisher and Wang, 2003). Restrictions on labor migration from rural to urban areas has produced a disparity between urban and rural workers that in relative terms is among the highest in the world (See Cai and Yang, 2003). Labor reallocation is a major source of Chinese growth and is a force, even in the short run, toward reducing inequality. Adding to this is the disparity in the funding of education between rural and urban areas. On average, the rural labor force has four years less schooling than the urban labor force. Open labor markets, open capital

markets and geographical equity in spending on education will reduce inequality in the long run, not promote it, as returns equalize.

Even if the policies of open markets and free migration that I am suggesting raise inequality in the short run - and it is far from obvious that it will - inequality is not to be feared. Many Chinese fear inequality as a potential source of social instability. However, greater inequality plays an important role in stimulating people to acquire skills. Making people more skilled is not socially harmful. Enhancing skills raises the productivity of the nation and makes more resources available to society at large.

Human capital is the asset that ultimately determines the wealth of China. Fostering human capital will reduce inequality in the long run. Promoting human capital creates opportunities for everyone. The potential of the Chinese nation will be realized if its workers become educated and able to use modern skills to cope with the technology of the 21st century.

Current policy promotes a different kind of inequality. Place of birth currently determines a person's chances to become skilled and the amount of capital with which they can work. Current tuition policies for secondary school students discriminate against the children of the poor and the children of migrants. In comparing alternative policies, it is important to consider which inequality is less acceptable and not to assume that inequality is only associated with free labor markets. Impediments to migration create inefficiency and inequality.

5 Concluding Remarks

The true rate of return to education in China may be as high as 30% or 40%. Our knowledge of the true return to education is currently very limited as is our knowledge of the true rate of return to physical capital. More studies based on rigorous data are warranted. A more factually in-

formed knowledge base will improve government decision making. If governments evaluate projects, whether they are human capital projects, or investment projects for dams, or investment projects for roads or bridges, or for factories, they will make better investment decisions. Project evaluations play an important role in keeping good investments and promoting good projects and eliminating the bad. The value of factually informed cost-benefit econometrics is extraordinarily high. Cost benefit studies produce value for local governments, for provincial governments and for the central government. Research that creates and collects much richer data sets on the returns to all kinds of human and physical capital to guide policy formation will improve policy making.

Despite the weak data base on China, the indications are clear. China's economic performance will be enhanced by producing human capital and an educated work force. Economic performance will be enhanced by equalizing returns across all types of investments—physical and human and by reducing regional inequalities in access to education and dependence of educational decisions on the income of parents. Policies that foster human capital are entirely in keeping with the Chinese philosophy of government that emphasizes the dignity of the human being and the value of the individual in promoting it. Investing in people is a wise policy for a people's republic. Human capital has a high rate of return. Its formation would be promoted by freeing up labor markets, eliminating regional disparities in wages and access to education, and by opening human capital markets to finance the formation of human capital.

These factors all *reduce* inequality in the long run and do not raise it. Human capital would also be promoted by expanding the government budget on education and by equalizing expenditure across regions and improving mobility. However obtained, a more educated workforce based on equality of opportunity for all and a more equal society, would produce greater payoffs to people and capital and will produce greater national wealth.

References

[1] Becker, Gary (1964) *Human Capital.* New York: Columbia University Press.

[2] Chow, Gregory, 1993. "Capital Formation and Economic Growth in China", *Quarterly Journal of Economics*, August 809-842.

[3] Chow, Gregory, 2001. *China's Economic Transformation*, Princeton University, forthcoming Oxford: Blackwell.

[4] Fang, Cai, Denon Wang and Yang Du, 2002. "Regional Disparity and Economic Growth in China: The Impact of Labor Market Distortions," forthcoming *China Economic Review*, vol 13 (2/3).

[5] Fleisher, Belton and Jian Chen, 19997, "The Coast-Noncoast Income Gap, Productivity and Regional Economic Policy in China," *Journal of Comparative Economics*, Vol. 25, pp. 220-236.

[6] Fleisher, Belton and Xiaojun Wang (2003) "Skill Differentials, Return to Schooling and Market Segmentation in a Transition Economy: The Case of Mainland China", *Journal of Developmental Economics*.

[7] Fleisher, Belton and D. Yang (2003) "China's Labor Market," unpublished paper, Ohio State University, September.

[8] Heckman, James (2000) "Policies to Foster Human Capital" (with discussion), *Research In Economics*, vol 54, #1, pp. 3 - 82.

[9] Johnson, D. Gale, 2000. "Reducing the Urban-Rural Income Disparity in China", Office of Agricultural Economics Research, University of Chicago, November 30, 2000.

[10] Knight, John and Lina Song (1999), *The Rural-Urban Divide: Ecoooonmics Disparities and Interactions in China*, Oxford University Press.

[11] Li, Wensheng, (undated). "Financing of Higher Education in China", Peking University. This can be obtained from her Web site at http://iee.hedu.pku.edu.cn/jjlw/jjlw0020/jjlw0020.asp.

[12] Schultz, Theodore W., 1975. "The Value of the Ability to Deal with Disequilibria", *Journal of Economic Literature* 13, (September); 827-846.

[13] Schultz, Theodore W., 1981. *Investing in People*, Berkeley: University of California Press.

[14] UNESCO, 1999. *Statistical Yearbook* United Nations Scientific and Cultural Organization.

[15] Yang, Dennis, (1999), "Urban-Based Policies and Rising Income Inequality in China," *American Economic Review*, vol. 89, #22, pp. 306-310

[16] Yang, Dennis, (2001), "Education and Allocative Efficiency: Household Income Growth During Rural Reforms in China", forthcoming, *Journal of Development Economics*.

[17] Yang, D. and F. Cai (2003) "The Political Economy of China's Rural-Urban Divide," in *How Far Across the River? Chinese Policy Reform at the Millennium*, N. Hope, D. Yang and M. Yang (eds.), Stanford: Stanford University Press.

[18] Xie, J. Y. (1999) "Educational Problems of Rural-Urban Migrant Chinese," Northwest Population, April.

Table 1
Public Expenditures on Education as a Percentage of GNP in 1995

World	5.2
China	2.5
Philippines	3
Thailand	4.1
India	3.3
Malaysia	4.7
Singapore	3
Pakistan	2.8
Turkey	2.2
South Korea	3.7
Egypt	4.8
Mexico	4.9
Brazil	5.1
Argentina	3.8*
United States	5.4*
Japan	3.6*
Canada	6.9*
Germany	4.8
Russian Federation	3.5
Poland	5.2
Hungary	5.3

* Data was only available for 1994

Source: UNESCO, 1999

Table 2

Investment in Educational Expenditures at All Levels of Government

(In 100 Million of Yuans)

Year	Government Appropriations for Education	GDP	Educational Expenditure As Percentage of GDP
1991	618	21,618	2.9%
1992	729	26,638	2.7%
1993	868	34,634	2.5%
1994	1175	46,759	2.5%
1995	1412	58,478	2.4%
1996	1672	67,885	2.5%
1997	1863	74,463	2.5%
1998	2032	78,345	2.6%
1999	2287	82,068	2.8%
2000	2563	89,468	2.9%
2001	3057	97,315	3.1%

Source: China Statistical Yearbook, 2003

Table 3
Percent of Population By Level of Education and Region

Region:	Population (Age 6 and Over)	Fraction Within Each Province				
		Illiterate	Primary Education	Junior Secondary School	Senior Secondary School	College or Higher Level
Beijing	13239	4.99	14.86	35.67	23.99	20.49
Tianjin	9522	6.36	23.16	37.36	22.57	10.57
Hebei	62588	6.80	34.41	42.50	11.61	4.69
Shanxi	30192	5.66	31.63	45.41	12.67	4.63
Inner Mongolia	22236	11.93	29.70	37.82	14.91	5.64
Liaoning	39676	4.96	29.75	46.68	13.09	5.52
Jilio	25500	4.33	32.23	39.78	17.16	6.50
Heilongjiang	36007	6.12	31.07	43.24	14.71	4.87
Shanghai	15469	7.64	17.50	34.70	25.10	15.07
Jiangsu	69427	12.39	31.96	38.69	13.14	3.83
Zhejiang	43244	12.21	34.23	34.54	13.25	5.77
Anbui	58813	14.66	36.65	38.66	7.39	2.64
Fujian	32162	11.89	38.72	32.04	13.15	4.20
Jiangxi	38249	9.10	41.68	34.83	11.48	2.91
Shandong	83881	10.10	28.06	41.76	14.42	5.67
Henan	88118	7.76	29.51	46.47	11.97	4.30
Hubei	56354	12.41	39.25	32.25	12.23	3.86
Hunan	61435	7.23	37.26	38.69	12.47	4.35
Guangdong	71705	6.41	36.83	37.78	13.84	5.15
Guangxi	44120	8.60	39.57	37.03	11.32	3.48
Hainan	7273	7.88	34.55	39.35	14.62	3.59
Chongqing	28823	9.31	42.33	34.63	10.38	3.35
Sichuan	79863	12.24	39.58	33.99	10.44	3.75
Guizhou	34146	16.21	42.71	30.03	7.54	3.52
Yunnan	38413	20.30	46.15	25.19	6.37	1.99
Tibet	2406	37.99	46.63	11.72	2.87	0.79
Shaanxi	34241	13.03	35.43	34.59	12.99	3.95
Gansu	23833	18.11	38.36	28.86	11.61	3.05
Qinghai	4724	22.25	38.02	27.65	8.95	3.15
Ningxia	5068	14.98	33.82	33.60	11.94	5.66
Xinjiang	18220	7.74	35.80	31.73	14.85	9.88
National Total	**1,178,951**	**120,551**	**412,186**	**443,836**	**146,837**	**55,541**

Note: The data in this table are obtained from the Sample Survey on Population Changes in 2002. The sampling fraction is 0.988%.

Table 4
Gross Enrollment Rate of Regular Schools by Age and Level

Year	According to Provincial Entrant Age Primary School Years	Ages 12 - 14	Ages 15 - 17		Ages 18 - 22
			No Employment History	Total	
1990	111	66.7	21.9	-	3.4
1991	109.5	69.7	23.9	-	3.5
1992	109.4	71.8	22.6	26	3.9
1993	107.3	73.1	24.1	28.4	5
1994	108.7	73.8	26.2	30.7	6
1995	106.6	78.4	28.8	33.6	7.2
1996	105.7	82.4	31.4	38	8.3
1997	104.9	87.1	33.8	40.6	9.1
1998	104.3	87.3	34.4	40.7	9.8
1999	104.3	88.6	35.8	41	10.5
2000	104.6	88.6	38.2	42.8	12.5
2001	104.5	88.7	38.6	42.8	13.3

Notes: The gross enrollment rate of regular schools by level is defined as the total enrollment of a school level divided by the total population within the age range for a given school level, which is then multiplied by 100. Junior secondary schools include regular secondary schools and vocational secondary schools.

Table 5

Per Pupil Expenditure By Region

(In 2001 Yuans)

Region	1998	1999	2000	2001
Beijing	4,973	6,347	7,910	10,098
Tianjin	1,936	2,163	2,530	3,042
Hebei	586	658	722	856
Shanxi	675	747	794	996
Inner Mongolia	926	1,063	1,106	1,399
Liaoning	1,217	1,340	1,456	1,627
Jilin	1,170	1,303	1,378	1,695
Heilongjiang	1,052	1,265	1,348	1,688
Shanghai	4,557	5,331	6,333	6,805
Jiangsu	1,151	1,296	1,360	1,474
Zhejiang	1,255	1,497	1,647	2,142
Anhui	554	612	603	705
Fujian	866	1,018	1,163	1,377
Jiangxi	522	567	620	793
Shandong	758	862	984	1,155
Henan	476	520	567	678
Hubei	683	756	831	993
Hunan	580	675	722	857
Guangdong	1,085	1,157	1,286	1,468
Guangxi	555	618	675	836
Hainan	771	890	885	1,046
Chongqing	749	793	855	1,033
Sichuan	639	697	751	918
Guizhou	428	500	561	672
Yunnan	960	1,044	1,101	1,281
Tibet	1,612	2,044	2,004	2,385
Shaanxi	663	761	808	1,040
Gansu	682	801	832	982
Qinghai	1,098	1,175	1,335	1,645
Ningxia	853	965	1,037	1,350
Xinjiang	1,225	1,319	1,412	1,859

Table 6
Average Educational Expenditure Per Student By Type Of Schools

Type of Schools:	Education Expenditures				
	Total	Expenditures For Daily Operations			Infrastructure Expenditures
		Subtotal	Individual*	Public**	
Total	1,982.37	1,778.69	1,102.42	676.27	203.68
Higher Education	13,334.23	10,785.71	5,334.29	5,451.43	2,548.52
Regular	15,445.23	12,390.48	6,154.82	6,235.66	3,054.75
For Adults	3,931.82	3,638.05	1,679.63	1,958.42	293.77
Specialized Seconday Schools	5,081.06	4,683.69	2,617.45	2,066.24	397.37
Technical	5,201.27	4,755.39	2,621.25	2,134.13	445.88
Teacher Training	5,448.07	4,995.85	2,869.47	2,126.38	452.21
For Adults	4,285.43	4,126.19	2,378.49	1,747.70	159.24
Technical Schools	4,284.99	4,021.52	2,313.06	1,708.46	263.48
Secondary Schools	1,746.04	1,595.33	1,020.78	574.55	150.71
Regular	1,744.44	1,593.81	1,019.98	573.84	150.63
Senior	3,503.36	3,068.45	1,691.36	1,377.08	434.91
Junior	1,372.35	1,281.87	877.95	403.92	90.49
Rural	1,013.65	968.11	699.95	268.16	45.54
For Adults	4,498.18	4,205.35	2,408.45	1,796.89	292.84
Vocational Schools	3,047.53	2,803.14	1,720.19	1,082.95	244.40
Primary Schools	970.10	927.05	709.46	217.58	43.05
Regular	971.69	928.54	710.63	217.91	43.14
Rural	797.60	768.34	608.58	159.75	29.26
For Adults	246.13	244.57	177.56	67.02	1.56
Specialized Education Schools	9,367.81	8,557.76	5,909.12	2,648.64	810.05
Kindergartens	1,526.84	1,487.53	1,004.07	483.46	39.31

Source: China Educational Finance Statistical Yearbook, 2002.

* Educational expenditure for teacher wages
** Office expenditure, books, equipment.

Table 7
Government Education Appropriations as a Percent of GDP

Region:	1998	1999	2000	2001
Beijing	5.403	6.213	6.851	7.594
Tianjin	2.576	2.607	2.629	2.907
Hebei	2.074	2.143	2.101	2.173
Shanxi	2.971	3.283	3.332	3.871
Inner Mongolia	3.172	3.350	3.184	3.615
Liaoning	2.203	2.219	2.199	2.247
Jilin	3.638	3.697	3.555	3.683
Heilongjiang	2.416	2.724	2.570	2.818
Shanghai	2.880	3.002	3.157	3.098
Jiangsu	2.115	2.205	2.122	2.091
Zhejiang	1.844	2.073	2.120	2.541
Anhui	2.238	2.418	2.379	2.659
Fujian	1.929	2.072	2.148	2.314
Jiangxi	2.191	2.373	2.430	2.822
Shandong	1.874	1.935	1.980	2.022
Henan	2.181	2.270	2.240	2.387
Hubei	2.154	2.265	2.266	2.446
Hunan	2.282	2.407	2.323	2.504
Guangdong	2.175	2.207	2.233	2.411
Guangxi	2.808	2.951	3.073	3.507
Hainan	2.813	3.033	2.822	3.165
Chongqing	2.501	2.616	2.771	3.091
Sichuan	2.426	2.606	2.702	3.026
Guizhou	3.517	3.820	4.140	4.671
Yunnan	3.799	4.070	4.233	4.705
Tibet	6.412	7.017	6.566	6.916
Shaanxi	3.756	4.073	4.023	4.689
Gansu	3.644	4.133	4.322	4.857
Qinghai	3.858	3.893	4.182	4.649
Ningxia	3.933	4.233	4.356	5.114
Xinjiang	4.174	4.399	4.190	5.182

Source: China Statistical Yearbook 1999 - 2003

Table 8
Chinese Tuition And Miscellaneous Fees For Education in 1999

Level of Education		Number of Students (Thousands)	Total Tuition And Miscellaneous Fees (Thousands of Yuans)	Tuition And Miscellaneous Fees (Thousand of Yuans)	Total Education Expenditure Per Student (Yuans)	Proportion by Student (%)
Higher Education		6,158	13,788,309	2,239	12,415	18%
Secondary Education	Specialized Secondary Schools	5,694	7,940,659	1,395	4,269	33%
	Technical Secondary Schools	457	449,120	983	3,394	29%
	Vocational Schools	4,112	2,287,771	556	2,501	22%
	General Secondary Schools	63,045	11,806,764	187	1,436	13%
Primary Education (Primary Schools)		139,715	9,283,666	66	695	9%

Source: Author's calculations according to NBS (2001), Statistical Yearbook on Educational Expenditure of China 2000, China Statistics Press, Beijing.

Table 9
Chinese Tuition And Miscellaneous Fee And Urban Household Income in 1999

Level of Education		Tuition And Miscellaneous Fee Per Student (Yuans)	Average Deposit Income Per Urban Resident (Yuan)	Mean Household Size	Average Deposit Income Per Urban Household (Yuans)	Proportion of Tuition to Household Income (%)
Higher Education		2,239	5,854	3.14	18,382	12.20%
Secondary Education	Specialized Secondary Schools	1,395				7.60%
	Technical Secondary Vocational Schools	983				5.30%
	General Secondary Schools	556				3.00%
		187				1.00%
Primary Education (Primary Schools)		66				0.40%

Source: Author's calculations according to NBS (2001), Statistical Yearbook on Educational Expenditure of China 2000, China Statistics Press, Beijing; and NBS (2000), China Statistical Yearbook on Price & Urban Household Income and Expenditure Survey 2000, China Statistics Press, Beijing.

Table 10
Chinese Tuition And Miscellaneous Fee And Rural Household Income in 1999

Level of Education		Tuition And Miscellaneous Fee Per Student (Yuans)	Average Pure Income Per Rural Resident (Yuans)	Average Household Persons	Average Pure Income Per Rural Household (Yuans)	Proportion of Tuition to Household Income (%)
Higher Education		2239	2210	4.25	9393	23.80%
Secondary Education	Specialized Secondary Schools	1395				14.80%
	Technical Secondary Vocational Schools	983				10.50%
	General Secondary Schools	556				5.90%
		187				2.00%
Primary Education (Primary Schools)		66				0.70%

Source: Author's calculation according to NBS (2001), Statistical Yearbook on Educational Expenditure of China 2000, China Statistics Press, Beijing; and NBS (2000), China Rural Household Survey Yearbook 2000, China Statistics Press, Beijing.

Table 11

Chinese Tuition Fee for Higher Education And Rural And Urban Household Income For The Five Provinces With the Lowest Resident Income in 1999 (In Yuans)

Five Provinces With Lowest Resident Income		Average Resident Income	Mean Household Size	Average Household Income	Tuition Fees for Higher Education	Proportion of Tuition to Household Income
Urban Areas	Henan	4,532	3.21	14,548	2,239	15.40%
	Jilin	4,480	3.09	13,843		16.20%
	Gansu	4,475	3.1	13,873		16.10%
	Ningxia	4,473	3.13	14,000		16.00%
	Shaanxi	4,343	3.17	13,767		16.30%
Rural Areas	Shaanxi	1,456	4.41	6,421		34.90%
	Yunnan	1,438	4.59	6,600		33.90%
	Guizhou	1,363	4.5	6,134		36.50%
	Gansu	1,357	4.86	6,595		33.90%
	Tibert	1,309	6.84	8,954		25.00%

Source: Author's calculation according to NBS (2001), Statistical Yearbook on Educational Expenditure of China 2000, China Statistics Press, Beijing; NBS (2000), China Statistical Yearbook on Price & Urban Household Income and Expenditure Survey 2000, China Statistics Press, Beijing; and NBS (2000), China Rural Household Survey Yearbook 2000, China Statistics Press, Beijing.

Appendix Table 1

Basic Statistics on Educational Funds (In 100 Millions of Yuans)

Year	Total	Government Appropriation for Education		Organization and Citizens Running Schools		Donations and Fundraising for Running Schools		Tuition and Miscellaneous Fees		Other Educational Funds		Percent Public	Percent Private
1991	731.5	617.8	84.5%	3.3	0.5%	62.8	8.6%	32.3	4.4%	18.5	2.5%	89.2%	10.8%
1992	867.0	728.8	84.0%	10.8	1.2%	69.6	8.0%	43.9	5.1%	24.7	2.9%	89.4%	10.6%
1993	1059.9	867.8	81.9%	20.4	1.9%	70.2	6.6%	87.1	8.2%	31.5	3.0%	89.0%	11.0%
1994	1488.8	1174.7	78.9%	26.2	1.8%	97.4	6.5%	146.9	9.9%	58.9	4.0%	87.8%	12.2%
1995	1878.0	1411.5	75.2%	30.2	1.6%	162.8	8.7%	201.2	10.7%	82.0	4.4%	84.9%	15.1%
1996	2262.3	1671.7	73.9%	48.0	2.1%	188.4	8.3%	261.0	11.5%	115.0	5.1%	84.7%	15.3%
1997	2531.7	1862.5	73.6%	62.9	2.5%	170.7	6.7%	326.1	12.9%	142.3	5.6%	85.6%	14.4%
1998	2949.1	2032.5	68.9%	85.9	2.9%	141.9	4.8%	369.7	12.5%	357.0	12.1%	87.3%	12.7%
1999	3349.0	2287.2	68.3%	128.1	3.8%	125.9	3.8%	463.6	13.8%	409.5	12.2%	87.4%	12.6%
2000	3849.1	2562.6	66.6%	3.0	0.1%	114.0	3.0%	594.8	15.5%	491.8	12.8%	87.1%	12.9%
2001	4637.7	3057.0	65.9%	4.2	0.1%	112.9	2.4%	745.6	16.1%	594.1	12.8%	86.8%	13.2%

Source: China Statistical Yearbook, 2003.

Appendix Table 2
Educational Funds in 2001 by Region (In 100 millions of Yuans)

Region	Total	Government Appropriation for Education		Organization and Citizens Running Schools		Donations and Fundraising for Running Schools		Tuition and Miscellaneous Fees		Other Educational Funds	
Beijing	319.2	216.1	67.7%	5.9	1.8%	7.6	2.4%	32.0	10.0%	60.5	19.0%
Tianjin	85.9	53.5	62.3%	2.8	3.3%	0.6	0.7%	11.3	13.2%	16.3	19.0%
Hebei	177.9	121.2	68.1%	0.7	0.4%	3.5	2.0%	34.5	19.4%	12.9	7.2%
Shanxi	97.9	68.9	70.4%	4.7	4.8%	2.9	2.9%	15.4	15.7%	7.9	8.1%
Inner Mongolia	71.9	55.9	77.7%	1.3	1.8%	0.4	0.6%	10.1	14.0%	4.9	6.8%
Liaoning	170.4	113.1	66.4%	2.6	1.5%	0.5	0.3%	29.4	17.3%	22.6	13.3%
Jilin	105.2	74.8	71.2%	7.9	7.5%	2.8	2.7%	16.9	16.0%	9.4	8.9%
Heilongjiang	142.7	100.4	70.3%	10.8	7.6%	0.6	0.4%	20.9	14.7%	18.3	12.8%
Shanghai	232.0	153.4	66.1%	19.3	8.3%	3.9	1.7%	32.8	14.1%	34.0	14.6%
Jiangsu	337.1	198.9	59.0%	1.6	0.5%	18.9	5.6%	52.4	15.5%	56.1	16.6%
Zhejiang	283.0	171.5	60.6%	4.5	1.6%	13.3	4.7%	36.0	12.7%	42.8	15.1%
Anhui	134.2	87.5	65.2%	4.0	3.0%	1.8	1.4%	28.5	21.2%	14.7	11.0%
Fujian	145.1	98.4	67.8%	8.4	5.8%	4.7	3.2%	20.5	14.1%	17.0	11.7%
Jiangxi	98.7	61.4	62.2%	4.1	4.2%	1.2	1.2%	18.7	19.0%	13.4	13.6%
Shandong	288.1	190.9	66.3%	1.7	0.6%	7.7	2.7%	51.5	17.9%	29.7	10.3%
Henan	195.9	134.7	68.7%	3.6	1.8%	4.5	2.3%	33.8	17.3%	18.8	9.6%
Hubei	199.1	114.0	57.3%	20.2	10.1%	5.9	3.0%	40.0	20.1%	37.4	18.8%
Hunan	177.2	99.7	56.3%	1.6	0.9%	4.0	2.3%	45.2	25.5%	24.7	13.9%
Guangdong	421.3	256.7	60.9%	0.9	0.2%	11.5	2.7%	84.3	20.0%	48.7	11.6%
Guangxi	112.3	78.3	69.7%	1.4	1.2%	1.2	1.0%	18.3	16.3%	13.0	11.6%
Hainan	25.7	17.3	67.3%	2.7	10.4%	0.8	3.2%	4.1	15.9%	2.5	9.9%
Chongqing	86.8	54.1	62.3%	0.7	0.9%	3.4	3.9%	11.3	13.1%	16.6	19.1%
Sichuan	202.9	133.8	66.0%	1.4	0.7%	4.1	2.0%	28.6	14.1%	33.7	16.6%
Guizhou	67.3	50.7	75.3%	6.2	9.2%	0.7	1.0%	9.9	14.7%	5.3	7.9%
Yunnan	115.8	97.6	84.3%	0.4	0.4%	2.1	1.8%	8.2	7.1%	6.5	5.6%
Tibet	10.3	9.6	93.1%	0.1	0.6%	0.1	1.3%	0.3	3.2%	0.3	2.5%
Shaanxi	135.4	86.5	63.9%	0.1	0.0%	2.8	2.0%	26.9	19.9%	13.1	9.7%
Gansu	68.7	52.1	75.9%	1.4	2.0%	0.7	1.1%	10.4	15.1%	5.0	7.3%
Qinghai	16.5	14.0	85.0%	0.1	0.4%	0.1	0.6%	1.5	9.1%	0.8	4.9%
Ningxia	19.5	15.3	78.2%	0.1	0.3%	0.1	0.7%	2.2	11.1%	1.9	9.7%
Xinjiang	93.8	77.0	82.1%	1.4	1.5%	0.3	0.4%	9.8	10.4%	5.3	5.7%

Source: China Statistical Yearbook, 2003.

Appendix Table 3
Government Appropriations for Education by Region (in 10000 Yuans)

Region	1997	1998	1999	2000	2001
Beijing	993,224	1,086,711	1,351,040	1,698,275	2,160,968
Tianjin	317,482	344,212	378,038	430,982	534,955
Hebei	790,452	882,622	979,261	1,069,418	1,212,158
Shanxi	425,097	441,510	494,727	547,718	689,074
Inner Mongolia	346,110	378,236	424,877	446,034	558,750
Liaoning	791,671	855,059	925,731	1,026,656	1,131,082
Jilin	499,038	566,702	614,027	647,520	748,477
Heilongjiang	629,461	676,213	789,124	835,947	1,003,536
Shanghai	1,004,761	1,062,297	1,211,292	1,436,730	1,533,926
Jiangsu	1,386,994	1,522,469	1,697,213	1,821,457	1,988,590
Zhejiang	837,939	919,749	1,111,920	1,279,741	1,714,622
Anhui	599,018	627,896	703,397	722,775	874,985
Fujian	610,901	634,109	735,496	842,125	984,196
Jiangxi	377,010	405,836	439,788	486,698	613,926
Shandong	1,245,393	1,342,184	1,482,785	1,691,665	1,908,783
Henan	905,482	950,190	1,038,857	1,150,617	1,346,540
Hubei	649,126	798,036	873,788	968,964	1,140,397
Hunan	695,986	711,488	800,694	857,729	997,202
Guangdong	1,541,211	1,722,525	1,868,330	2,157,815	2,566,792
Guangxi	495,397	534,343	576,463	630,073	782,555
Hainan	116,337	123,483	142,904	146,295	172,823
Chongqing	317,733	357,520	387,029	440,470	540,815
Sichuan	794,430	868,705	967,090	1,083,406	1,337,989
Guizhou	253,088	296,087	348,292	411,336	506,804
Yunnan	644,560	681,539	755,374	827,618	976,142
Tibet	44,329	58,462	74,104	77,128	95,944
Shaanxi	457,508	518,909	605,862	668,226	864,832
Gansu	299,451	316,938	385,206	425,021	520,918
Qinghai	70,768	84,939	92,795	110,234	139,900
Ningxia	77,983	89,451	102,231	115,671	152,583
Xinjiang	407,475	466,106	514,021	571,713	769,837

Source: China Statistical Yearbook, 1999 - 2003

Appendix Table 4
Total Student Enrollment

Region:	1998	1999	2000	2001
National Total	240,384,241	241,035,007	241,751,576	240,448,040
Beijing	2,218,477	2,174,088	2,153,466	2,140,082
Tianjin	1,804,453	1,784,719	1,708,408	1,758,600
Hebei	15,282,521	15,190,907	14,862,850	14,168,415
Shanxi	6,637,853	6,762,546	6,917,274	6,918,297
Inner Mongolia	4,145,545	4,082,590	4,043,869	3,993,913
Liaoning	7,130,453	7,053,463	7,074,084	6,950,324
Jilin	4,915,585	4,811,725	4,713,515	4,416,094
Heilongjiang	6,527,021	6,371,181	6,219,027	5,946,284
Shanghai	2,366,453	2,320,394	2,275,340	2,254,191
Jiangsu	13,426,189	13,375,358	13,434,499	13,487,480
Zhejiang	7,437,404	7,586,288	7,793,831	8,004,092
Anhui	11,505,481	11,739,051	12,024,068	12,405,530
Fujian	7,429,818	7,381,004	7,264,224	7,149,271
Jiangxi	7,894,416	7,918,413	7,875,303	7,739,936
Shandong	17,974,471	17,561,822	17,237,367	16,531,448
Henan	20,247,206	20,413,553	20,339,109	19,851,832
Hubei	11,864,724	11,796,546	11,698,552	11,483,950
Hunan	12,461,364	12,111,542	11,923,448	11,640,031
Guangdong	16,115,078	16,486,008	16,828,345	17,479,197
Guangxi	9,764,700	9,526,029	9,360,371	9,360,321
Hainan	1,624,829	1,640,490	1,658,112	1,652,412
Chongqing	4,843,717	4,981,906	5,168,483	5,234,451
Sichuan	13,794,206	14,171,503	14,476,383	14,578,052
Guizhou	7,016,699	7,118,414	7,349,912	7,538,801
Yunnan	7,207,141	7,391,940	7,540,879	7,621,079
Tibet	368,119	370,351	385,976	402,260
Shaanxi	7,947,063	8,134,145	8,291,423	8,312,233
Gansu	4,720,439	4,911,072	5,124,682	5,306,479
Qinghai	785,579	806,728	828,343	850,689
Ningxia	1,064,435	1,082,008	1,119,102	1,130,114
Xinjiang	3,862,802	3,979,223	4,061,331	4,142,182

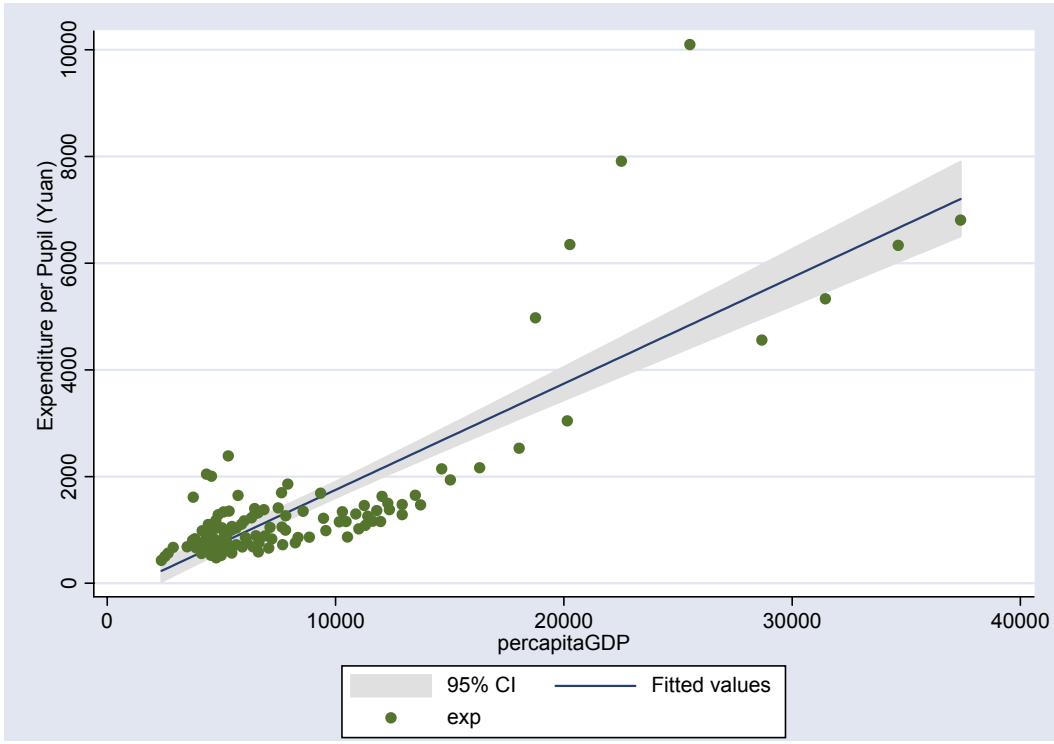
Appendix Table 5
Student Enrollment By Level of Education in 2001

Region	Higher Education	Specialized Schools	Regular Secondary Schools	Vocational School	Primary School	Kindergarten	Total
National Total	**7,190,658**	**4,579,780**	**78,360,256**	**4,664,308**	**125,434,667**	**20,218,371**	**240,448,040**
Beijing	336,484	117,771	720,127	83,736	664,443	217,521	2,140,082
Tianjin	153,998	81,060	592,393	69,432	665,495	196,222	1,758,600
Hebei	350,518	226,930	5,017,618	353,652	7,476,512	743,185	14,168,415
Shanxi	165,034	205,296	2,143,065	122,836	3,389,408	892,658	6,918,297
Inner Mongolia	99,613	97,650	1,393,826	178,419	1,893,508	330,897	3,993,913
Liaoning	372,336	143,044	2,323,395	154,398	3,230,517	726,634	6,950,324
Jilin	217,849	95,969	1,488,101	107,718	2,210,103	296,354	4,416,094
Heilongjiang	271,435	116,315	2,520,588	80,619	2,587,506	369,821	5,946,284
Shanghai	279,966	121,242	810,794	75,212	730,450	236,527	2,254,191
Jiangsu	585,528	416,043	4,151,077	162,775	6,864,985	1,307,072	13,487,480
Zhejiang	293,078	129,261	2,629,996	337,693	3,462,761	1,151,303	8,004,092
Anhui	252,226	156,214	3,726,556	436,356	6,918,509	915,669	12,405,530
Fujian	167,377	134,026	2,383,000	184,646	3,546,212	734,010	7,149,271
Jiangxi	196,455	151,036	2,732,769	116,261	4,055,035	488,380	7,739,936
Shandong	449,360	310,508	7,021,844	382,205	6,991,932	1,375,599	16,531,448
Henan	369,149	313,996	6,833,861	387,103	10,707,257	1,240,466	19,851,832
Hubei	453,277	215,076	3,824,736	130,286	6,280,480	580,095	11,483,950
Hunan	331,301	240,910	4,255,858	198,813	6,012,579	600,570	11,640,031
Guangdong	381,926	238,370	4,896,988	222,918	9,529,844	2,209,151	17,479,197
Guangxi	151,604	157,710	2,886,924	116,788	5,252,872	794,423	9,360,321
Hainan	26,050	30,698	446,098	8,822	1,025,278	115,466	1,652,412
Chongqing	161,648	77,056	1,540,317	78,289	2,777,859	599,282	5,234,451
Sichuan	316,701	192,474	4,282,666	178,857	7,948,490	1,658,864	14,578,052
Guizhou	108,159	114,765	1,846,015	74,427	4,901,665	493,770	7,538,801
Yunnan	119,039	128,645	2,004,622	136,782	4,604,962	627,029	7,621,079
Tibet	6,793	6,819	71,710	1,126	311,993	3,819	402,260
Shaanxi	313,718	136,784	2,547,486	165,699	4,615,707	532,839	8,312,233
Gansu	110,898	91,582	1,459,845	52,657	3,189,816	401,681	5,306,479
Qinghai	17,918	12,296	244,629	6,719	501,740	67,387	850,689
Ningxia	23,154	22,913	334,786	11,391	651,082	86,788	1,130,114
Xinjiang	108,066	97,321	1,228,566	47,673	2,435,667	224,889	4,142,182

Appendix Table 6
Pupil-Staff Ratios

Year	Schools (in 10 Thousands)	Enrollment	Faculty And Staff	Educational Population	Proportion of Education Population	Pupil/Staff Ratio
1985	144	21753	1261	23014	22	17.25
1990	136	23654	1432	25086	22.2	16.5
1996	155	30401	1549	31950	26.2	19.62
1997	157	31076	1577	32653	26.7	19.7
1998	155	31809	1580	33389	27	20.13
1999	159	32672	1596	34268	27.5	20.47
2000	149	32093	1592	33685	26.8	20.15
2001	135	32135	1574	33709	26.6	20.4

Educational population is defined as faculty plus staff plus enrollment.


Expenditure per Pupil (Yuan)
0
2000
4000
6000
8000
10000
0
10000
20000
30000
40000
percapitaGDP
95% CI
Fitted values
exp