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Chapter 2

Skill Formation Systems of China and India*

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Abstract

This paper aims to provide an overview of the skill formation systems (SFSs) of China and India by analyzing various statistics and literature. It reveals that China enjoys much larger semi-skilled labor force than India does. The size of vocational education and training (E&T) is much larger in China and China offers much more training programs for informal sector. Compared to China, India seems to suffer more seriously from the poor quality of E&T. In particular, linkages between training and employment seem much weaker in India than in China which puts emphasis on employability skills. This paper provides possible supply-side and demand-side explanations for the different patterns of skill accumulation and distribution between China and India. For the supply-side explanations, E&T policies and individual incentives for acquiring skills are examined. It points out five key differences in those policies: the nation's leaders' views on education and work, linkages between E&T and employment, E&T for informal sector, incentives for improving the quantity and quality of E&T, and the financing of E&T. It seems that individual incentives for skill accumulation are more widely distributed in China than in India. For the demand-side explanation, small-scale demand for skilled workers due to the small-sized formal labor market seems to contribute to the larger skill-wastage of educated and trained persons in India.

Keywords: skill formation system, education and training, China, India

* Please note that this is only an interim report. This paper contains only preliminary analysis. Comments are welcome.

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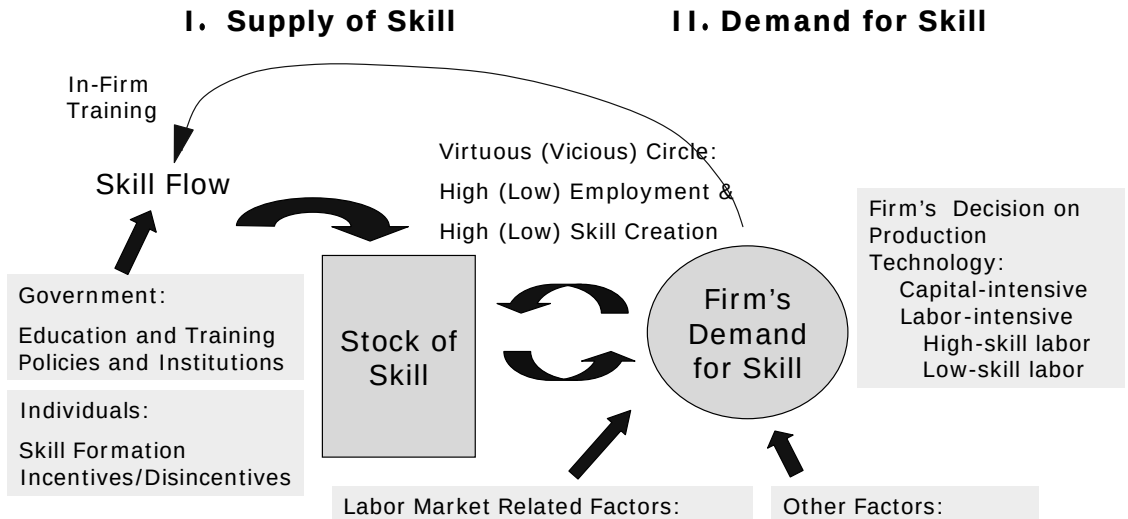
1 Introduction

This paper aims to provide an overview of the skill formation systems (SFSs) of China and India by analyzing various statistics and existing literature. Since this is an interim report, it also articulates what aspects we need to dig into further. By doing research further next year, we eventually aim to answer the following questions: What are the main features of SFSs of China and India? How have those two SFSs been formed? What is the incentive (or disincentive) structure framing those SFSs? Are there any linkages between each SFS and industrial comparative advantage? Roughly speaking, China has a comparative advantage in manufacturing, while India has a comparative advantage in service industries such as software industry. I hope that I can eventually explain some of the differences in comparative advantages of China and India by analyzing the differences in the two SFSs.

Figure 1 provides the analytical framework of a SFS. Although skills can be embodied in physical capital such as machines and capital deepening is crucial for industrial development, I focus on skills embodied in human being or firm organizations. Figure 1 shows that a SFS is composed of two sides: supply side and demand side. On the supply side, governments at various levels (e.g. central, regional, sub-regional etc.) influence the supply of skill by designing and implementing education and training (E&T) policies and institutions. Individuals' incentives or disincentives for acquiring skills also influence the flow of skill supply. For example, if one can easily earn a large amount of money once he or she has earned a college degree, people may have a strong incentive to invest in college education. By contrast, if there is little chance of finding a better job by receiving further education or if the cost of higher education (e.g. tuition) is too high, people may have little incentive to receive education. In such a situation, the skill flow into the system would be diminished. However, those incentives and disincentives are interconnected with other components in the system. They are constructed by E&T policies and institutions, labor market institutions and firms' demand for skill etc. Firms' demand for skills also affects E&T policies. For example, expansion of production by many firms may cause skill shortages and encourage government to reform E&T policies in order to provide more skilled workers to the rapidly expanding economy.

Figure 1: Analytical Framework of Skill Formation System



Source: Compiled by the author.

Firms' demand for skills is not exogenous but endogenous. Firms adopt a production technology such as capital-intensive, skilled-labor-intensive, or unskilled-labor-intensive technology. Firms adopt a production technology to maximize their expected profits which depend on various factors: the prices (wages) of skills, distribution or abundance of skills, labor market institutions and the power balance among government, labor and employers etc.[1] If there is a large pool of cheap unskilled labor, firms may adopt unskilled-labor-intensive production technology. If the cost of adjusting labor is large due to rigid labor market regulations, firms may adopt capital-intensive production technology and hesitate to expand employment. It should be noted that firms' demand for skills depends not only on skill-related factors but also on various factors such as entire economic conditions and business cycles, industrial policies, intensity of competition or condition of product market. When firm's demand for skills is huge, firms may provide training for their own employees and thus

[1] Concerning the theoretical literature on the relationship between firms' adoption of technology and labor market made up of skilled and unskilled workers, see Asuyama (2009) and Hornstein et al. (2005). Especially for the endogenous technology adoption of firms, see Acemoglu (2002).

contribute to increase the skill flow into the system. In this way, the supply and demand sides of skills are interconnected and reinforce each other. Such inter-linkage may generate a virtuous circle of high employment and high skill creation or a vicious circle of low employment and low skill creation.

This paper follows the above analytical framework and analyzes both supply and demand sides of SFSs of China and India, although it can not fully cover the various components and their inter-linkages in the SFSs. This paper is organized as follows: Section 2 compares the current stock of skills and every year's skill flow of China and India. Not only quantity of skills but also quality of skills are compared. Section 2 also provides an overview of the E&T institutions of two countries. It reveals that China enjoys much larger semi-skilled labor force than India does both in terms of quantity and quality. Section 3, 4 and 5 try to explain why such differences between two SFSs have been generated by analyzing education and training policies of the governments (Section 3), by analyzing individuals' incentives (or disincentives) for acquiring skills (Section 4) and by analyzing demand for skills (Section 5). In this report, Section 4 and Section 5 are only tentative analyses. Section 6 gives concluding remarks.

2 Quantity and Quality of Skills and Education and Training (E&T) Institutions

2.1 Stock of Skill

Table 1 shows the percentage distribution of Chinese and Indian workforce by level of education in 2005. While 39.6% of Indian workers are illiterate, only 7.8% have no schooling in China ("No schooling" can be regarded as a proxy for "Illiterate." According to the UNESCO statistics, only 7.4% of the adults are illiterate in China in 2005, while 35.5% of the adults are so in India in 2005 (UNESCO Data Center)).[2] The proportion of workforce with lower secondary education ("junior secondary" in China and "middle" in India) is much larger in China (44.1%) than in India (15.3%). By

[2] Recently, the education level of young workers are getting higher in India due to the recent policy efforts to expand basic education throughout India (For the recent education policy in India, see Section 3). For example, the literacy rate is about 90% for the age group 10-14 and then decreasing with age (See Figure 1 of Dougherty and Herd (2008)). If we restrict our sample in Table 1 to those of age 15-29, the sum of percentages of workers with "literate and up to primary" and "middle" increases from 40.4% to 50.0% for total workforce, and from 27.7% to 40.1% for rural female.

contrast, the proportion of postgraduate and above education is larger in India (1.4%) than in China (0.2%). Gender differences are more notable in India. The education levels of rural female, casual workers and agricultural workers in India are very low. Especially, the proportions of illiterate workforce to those groups are 66.0%, 54.3% and 51.4%, respectively.

Table 1: Distribution of Workforce by Level of Education

Unit: %

China (2005)	No Schooling	Primary	Junior Secondary	Senior Secondary	Undergraduates and College Students: Specialized Courses	Undergraduates and College Students: Full Undergraduate Courses	Postgraduates
Total	7.8	29.2	44.1	12.1	4.5	2.1	0.2
Male	4.4	26.4	47.8	14.1	4.7	2.4	0.2
Female	11.8	32.6	39.6	9.9	4.2	1.8	0.1
City	2.2	13.7	41.0	24.2	11.5	6.8	0.7
Male	1.3	12.6	42.2	24.9	11.1	7.1	0.8
Female	3.5	15.1	39.3	23.3	11.9	6.4	0.5
Town	4.8	22.2	47.0	16.3	7.3	2.3	0.0
Male	2.6	19.7	48.8	18.3	7.8	2.8	0.1
Female	7.7	25.5	44.7	13.8	6.6	1.8	0.0
Rural	10.9	37.8	44.7	5.9	0.7	0.1	0.0
Male	6.3	34.7	50.1	7.9	0.9	0.1	0.0
Female	16.1	41.3	38.4	3.6	0.5	0.1	0.0

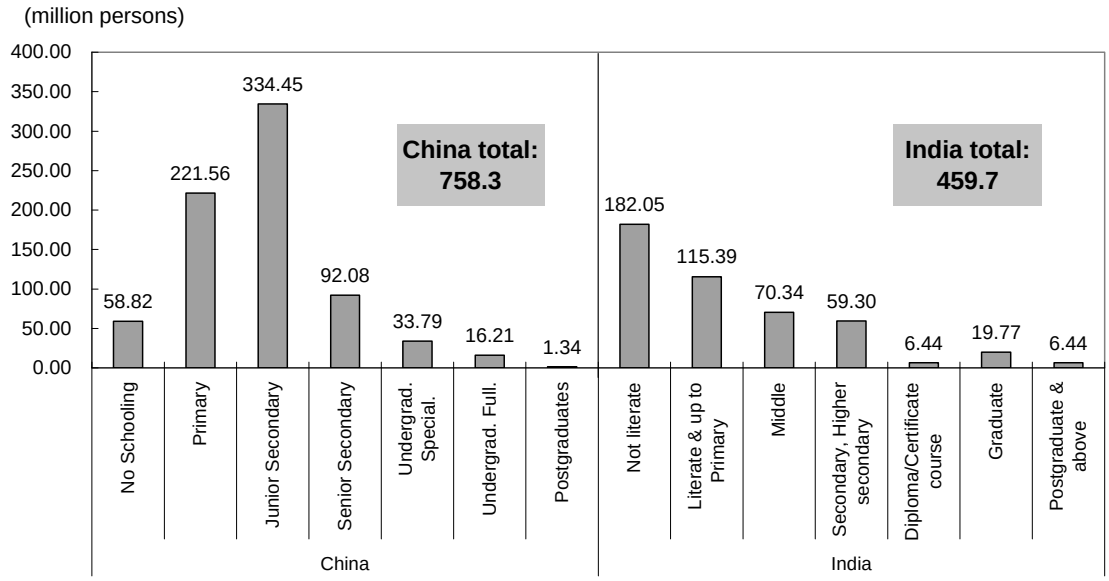
India (2004-05)	Not Literate	Literate & up to Primary	Middle	Secondary, Higher Secondary	Diploma/ Certificate Course	Graduate	Postgraduate & Above
Total	39.6	25.1	15.3	12.9	1.4	4.3	1.4
Male	28.5	27.9	18.3	16.3	1.7	5.5	1.6
Female	61.8	19.4	9.1	5.9	0.9	2.0	0.8
Urban	18.5	22.6	17.6	21.4	3.6	12.1	4.2
Male	13.3	23.0	19.3	24.0	3.6	12.7	4.1
Female	37.2	21.3	11.8	12.1	3.3	10.0	4.4
Rural	45.6	25.8	14.6	10.5	0.8	2.1	0.6
Male	33.9	29.7	18.0	13.6	1.0	3.0	0.8
Female	66.0	19.0	8.7	4.9	0.5	0.7	0.2
Self-employed	39.1	25.4	16.2	14.0	0.9	3.5	0.9
Regular salaried/ wage employee	12.0	18.6	16.9	24.9	5.8	15.7	6.1
Casual worker	54.3	27.7	12.6	4.8	0.3	0.3	0.0
Agriculture	51.4	25.2	13.2	8.6	0.3	1.2	0.2
Non-agriculture	23.0	25.0	18.2	19.0	3.0	8.7	2.9

Notes : China: all employed persons in 2005. India: all usually employed persons (ps+ss).
Sources : NBS (2007) and NSSO (2006)

Figure 2 shows the absolute number of workforce by level of education in 2005. The size of illiterate workforce in India is about three times as large as that in China. By contrast, China has a massive worker pool with primary and lower secondary education (221.6 million and 334.5 million respectively), while India only has 115.4 million

workers with primary education (including literate workforce without receiving formal primary education) and 70.3 million workers with lower secondary education. Although the total number of workforce with tertiary education is larger in China than in India, the differences are not so huge and India even has more workers with postgraduate and above education (6.4 million compared to 1.3 million in China).

Figure 2: Distribution of Workforce by Level of Education



Notes: China: All employed persons in 2005. India: All usually employed persons (ps+ss). Figures are calculated as [total employment * percentage in Table 1] . Undergrad. Special: "Undergraduates and College Students: Specialized Courses". Undergrad. Full.: "Undergraduates and College Students: Full Undergraduate Courses."
Sources: NBS (2007), NBS (2006), NSSO (2006), and Planning Commission (2008).

The above-mentioned skill differences between China and India may partly explain the differences in comparative advantages of the two economies. The abundant workforce with primary and lower secondary education in China is consistent with the large-scale manufacturing base in China. Nonexistence of such a large labor force with basic education combined with relatively abundant high-skilled workers with postgraduate education in India is consistent with India's development of advanced service industries and some innovative activities found in manufacturing industries such as automobile and pharmaceutical.

Finally, it should be noted that the total employment in India is relatively small compared to its population. This is because the labor force participation ratio (LFPR) of female is low in India. The female LFPR in China is 71.0% in 2005, while it is 34.2% in India (Table 2). Then the total employment of China and India becomes 758.3 million

and 459.7 million respectively, although the total population is about 1.3 billion in China and 1.1 billion in India.[3]

Table 2: Labor Force Participation Rate (%) of age group 15+

	China			India		
	Total	Male	Female	Total	Male	Female
1980	79.3	87.4	70.8	61.8	86.7	34.5
1985	79.1	86.0	71.8	61.3	85.7	34.7
1990	79.3	85.1	73.2	60.9	84.7	35.1
1995	79.0	84.1	73.5	60.4	83.6	35.4
2000	77.8	82.6	72.7	59.3	82.6	34.3
2005	75.6	80.0	71.0	58.8	81.9	34.2

Source : ILO (2007)

2.2 Education and Training (E&T) Institutions and Skill Flows

This subsection compares education (both general and vocational education) and training institutions of China and India. In most cases in both countries, general and vocational education is supervised by the ministry dealing with education, and vocational training is supervised by the ministry dealing with labor and employment matters. This subsection also compares the size of annual skill flow generated from those institutions. It reveals that the size of vocational education and training (E&T) is much larger in China than in India and that China provides massive short-term employment trainings to the disadvantaged people systematically while India does not.

2.2.1 General and Vocational Education

Table 3 and 4 show the general and vocational education structures of China and India in 2005. With regard to the general information on Chinese education system, see UNESCO-IBE (2006a), Minami *et al*. (2008, pp.12-14) and Liu (2004, pp. 42-56 in particular). Concerning Indian education system, see UNESCO-IBE (2006b) and World Bank (2008).

[3] The employment statistics of India used in Table 1 and Figure 1 are based on usual activity status (ps+ss), which include persons who spent relatively longer time during the preceding one year on working (principal status: ps) and those who spent some time (not less than 30 days) on working (subsidiary status: ss) (NSSO 2006, pp.13-14). There is another measure of employment which is based on Current Daily activity Status (CDS). CDS is "determined on the basis of his/her activity status on each day of the reference week *using a priority-cum-major time criterion* (day to day labour time disposition)" (NSSO 2006, p.15). Total employment is 384.91 million on CDS basis, which is much smaller than the one based on usually status (ps+ss, 459.72 million) (Planning Commission 2008, Vol.1, p.82).

Table 3: General and Vocational Education Scheme of China (2005)

China (2005)		No. of Institutions	Total Enrollment (million)	Age
T	Higher Education	1,792	16.6	
	Postgraduates	(766)	1.0	
	Doctor's Degree		0.2	
	Master's Degree		0.8	
	Regular Undergraduates and Colleges	1,792	15.6	
	Enrolled in Full Undergraduate Courses	701	8.5	18-22, 23
	Enrolled in Specialized Courses	2,012	7.1	18-20, 21
	Vocational and Technical Colleges	921		18-20, 21
S	Secondary Education	90,462	101.1	12-18
US	Senior Secondary Education	27,976	39.0	15-18
	Regular Senior Secondary Schools	16,092	24.1	15-18
	Vocational Secondary Education	11,884	14.9	15-18
	Regular Specialized Secondary Schools	3,207	6.3	15-18,19
	Vocational Senior Secondary Schools	5,822	5.8	15-18
	Technical Schools	2,855	2.8	15-18
LS	Junior Secondary Education	62,486	62.1	12-15
	Regular Junior Secondary Schools	61,885	61.7	12-15
	Junior Secondary Vocational Schools	601	0.4	12-15,16
P	Primary Education	366,213	108.6	6-12
	Regular Primary Schools	366,213	108.6	6-12
	Schools for Juvenile Delinquents	77	0.01	
	Special Education	1,593	0.4	
	Pre-school Education	124,402	21.8	
	Adult Education	68,662	12.5	

Notes: The number of institutions offering postgraduate programs is not counted.
T: Tertiary, US: Upper Secondary, LS: Lower Secondary and P: Primary.
Source: NBS (2006)

Table 4: General and Vocational Education Scheme of India (2005-06)

India (2005-06)		No. of Institutions	Total Enrollment (million)	Age
T	Universities/Colleges	19,845	11.0	
	Research	-	0.1	
	Post-Graduate	-	1.0	
	Graduate	-	9.8	18-20, 21
	Diploma / Certificate	-	0.1	
US	Upper Secondary	168,427	40.0	14-18
	Below degree level prof./tech./vocational	8,760	1.6	
	Grade 11-12 (+2)	53,643	13.4	16-18
	of which Vocational Education at +2 level	9,583	About 1.0 (capacity)	
	Grade 9-10	106,024	25.0	14-16
LS	Upper Primary (Middle)	288,493	52.2	11-14
P	Primary	772,568	132.0	6-11
	Pre-primary	67,157	5.3	
	Special education	n.a.	n.a.	
	Other education	n.a.	n.a.	

Notes: Universities/Colleges include Universities, Deemed Universities, Institutions of National Importance and Degree Colleges. Below degree level professional/technical/vocational schools include Teachers' training schools, Technical & industrial and arts & crafts schools and Polytechnics. T: Tertiary, US: Upper Secondary, LS: Lower Secondary and P: Primary.
Sources: MHRD (2008c) and UGC.

In China, general education is composed of 6-year primary education (Primary education: P), 3-year junior secondary education (Lower secondary education: LS),

3-year senior secondary education (Upper secondary education: US) and higher education (Tertiary education: T). Total 9-year P and LS constitutes the compulsory education. The size of vocational education especially at US and T levels in China is large. In 2005, 42% of students (14.9 million) at US levels were enrolled in vocational schools such as Regular Specialized Secondary Schools (RSS), Vocational Senior Secondary Schools (VSS) and Technical Schools (TS).[4] At T level, 46% of the undergraduates and college students were enrolled in specialized courses.

In India, general education is composed of 5-year primary education (P), 5-year middle or upper primary education (LS), 2-year secondary education (US), 2-year higher secondary education (US) and higher education (T). Total 8-year P and LS education is compulsory. Since there is a national exam after 10-year education, the Indian educational system is called 10+2 system. In 1988, India introduced vocational education at +2 level (Grade 11-12) under the Centrally Sponsored Scheme (CSS) (MHRD 2008b, p.86; Planning Commission 2008, Vol. 2, p.20). According to the 11th Five-Year Plan (5YP), the enrollment capacity of vocational education at +2 level is one million students. This constitutes about 8% of total enrollment at +2 level (Planning Commission 2008, Vol. 2, pp.20-21). However, one million is not the actual enrollment but just the capacity. According to World Bank (2008, p.12), the average capacity utilization is about 42%. If we apply this utilization rate, only 3% of the students at +2 level are enrolled in vocational education. Either 8% or 3% is much lower than 15%, the target figure the Indian government aimed to achieve by 2000 (Planning Commission 2008, Vol. 2, p.20). Apart from this vocational education at +2 level under the CSS, there are various professional, technical, and vocational schools such as Teachers' Training Schools, Technical & Industrial and Arts & Crafts Schools, and Polytechnics. Those schools offer diploma and certificates and 1.6 million students were enrolled. If we add those 1.6 million students to those in vocational education at +2 level (one million capacity), they constitute 17% of the total enrollment at +2 level or 7% of entire US level.

The size of vocational education at US level is much smaller in India (2.6 million, 17% or 7% of the total enrollment) than in China (14.9 million, 42% of the total

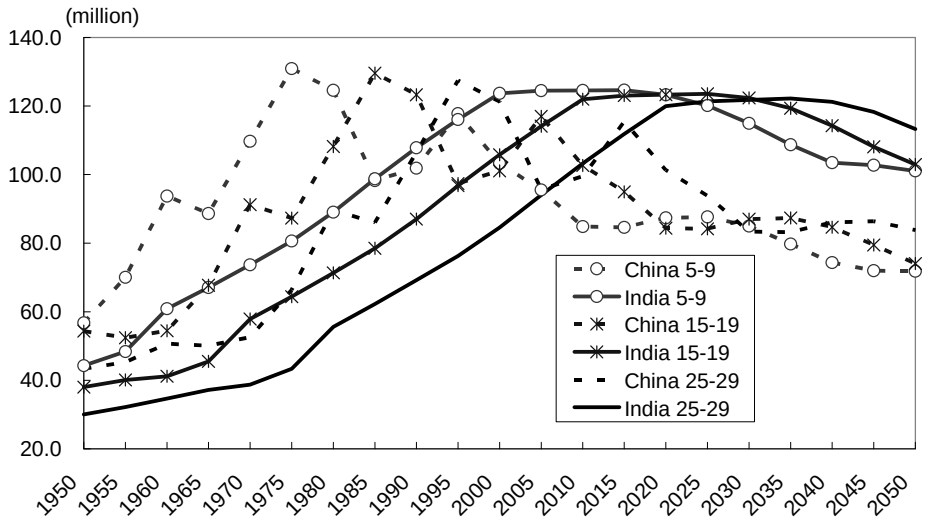
[4] RSS and TS were established around 1950 by modeling after technical schools of the Soviet Union. RSS originally aimed to foster technician and managers (cadre or *ganbu*) in industry, agriculture, medicine, teaching, finance etc., while TS aimed to foster skilled production workers (workers or *gongren*) mainly in manufacturing. VSS was established in the 1980s, and aimed to generate skilled workers mainly in light manufacturing and service industries (Liu 2004, pp. 43-47).

enrollment). Concerning the T level in India, there are a lot of institutions offering technical and professional education which include centrally funded institutions and many regional engineering colleges. Some of centrally funded institutions, such as Indian Institutes of Technology (IITs), Indian Institutes of Science (IISc), National Institutes of Technology (NITs), Indian Institutes of Information Technology (IIITs) and Indian Institutes of Management (IIMs), are famous for their advanced research and technical or professional education.

Although there was a large gap in terms of skill stock between China and India (see Figure 2), the gap in skill flow in 2005 was not so large. This is partly due to the recent educational policy changes in two countries (For more details on educational policy issues, see Section 3). India committed seriously to universalize the compulsory education since the mid-1980s and succeeded in increasing the skill flow at P level. By contrast, China has expanded the entrance quota for higher education since 1999. As a result, between 2000 and 2005, India overtook China in terms of total enrollment in primary education, while China overtook India in terms of total enrollment in tertiary education. Figure 1 in Appendix (AF1) which reports the long-tem skill flows by educational level since 1950 clearly shows those trend changes.

Demographic changes also influence the size of skill flows. The size of young population is shrinking in China due to the One-Child policy which started in 1979, while India still enjoys the growing young population (Figure 3). This demographic change is likely to be reflected in the size of total enrollment in primary education.

Figure 3: Young Population Prospects



Note : Medium variant.
Source : UN (2006)

Finally, it should be noted that India has much more educational institutions than China does (Table 3, 4 and AF1). The gap becomes larger with the level of education. For example, the number of institutions in tertiary education in India is 19,845, eleven times larger than that of China.

2.2.2 Vocational Training

Table 5 and 6 show the major vocational training schemes of China and India around 2005. With regard to the general information on Chinese vocational training schemes, see Nishioka (2005), Yamaguchi (2007), Mori (2007), Cooke (2005) and MoLSS (2002). For India, see DGE&T (2007c, pp.1-6), MoLE (various years), World Bank (2008), Okada (2008) and Uchida (1998).

Table 5: Vocational Training Scheme of China (2005)

		Composition of Graduates (%)		Duration of Training (%)	
Technical Schools		LPS	7.5	n.a.	
No. of Institutions	2,855	Laid-off	17.0		
Trainees (000)	2,733	Rural	17.8		
Graduates (000)	2,701	Employees	47.2		
		Others	10.4		
Employment Training Center		LPS	9.1	> 6 months	89.6
No. of Institutions	3,289	Laid-off	42.8	6 months-1 year	6.8
Trainees (000)	8,044	Rural	32.9	< 1 year	3.5
Graduates (000)	7,972	Employees	n.a.		
		Others	15.2		
Non-public Vocational Training Agency		LPS	18.0	> 6 months	82.8
No. of Institutions	21,462	Laid-off	9.5	6 months-1 year	11.3
Trainees (000)	9,552	Rural	41.7	< 1 year	5.9
Graduates (000)	8,932	Employees	n.a.		
		Others	30.8		
Enterprise Employee Training Center					
No. of Institutions	22,000				
Trainees (000)	30,000				
Graduates (000)	n.a.				
Total Above Four					
No. of Institutions	49,606				
Trainees (000)	50,329				
Graduates (000)	19,605				

Notes: LPS: Pupils of Labor Preparatory System, Laid-off: Laid-off and Unemployment workers. Rural: Rural workers, Employees: Enterprises' employees. Data for Non-public Vocational Training Agency are those for 2006.
Sources: NBS and MoLSS (2006), NBS and MoLSS (2007), and D. Yan (2008a ,p.166)

Table 6: Vocational Training Scheme of India (around 2005)

Major institutes under Craftsmen Training Scheme (CTS) (Around 2005)	No. of institutes	Seating capacity (000)
Industrial Training Institute and Center (ITI/ITC)	5,114	742.3
Govt. ITI	1,896	400.0
Private ITC	3,218	342.3
Advanced/Central Training Institute (ATI/CTI)	9	1.1
National Vocational Training Institute for Women (NVTI)	1	0.6
Regional Vocational Training Institutes for Women (RVTI)	10	2.8
Foremen Training Institutes	2	n.a.
The Apex Hi-Tech Institute (AHI)	1	n.a.
Total (excluding n.a.)	5,137	746.8

Apprenticeship Training Scheme (ATS) (As of March 31st, 2004)	Estts.facilities (Engaging)	Seating capacity (of which utilized) (000)	% utilization of seats	% of (SC+ST) out of total seats utilized
Trade Apprentices	32,413 (20,990)	246.1 (168.8)	68.6%	15.4%
Graduate, Technician & Technician (Vocational)	n.a.	92.1 (51.0)	55.4%	17.0%
Total (excluding n.a.)	32,413 (20,990)	338.3 (219.8)	65.0%	9.9%

Notes: Estts. facilities (Engaging) : No. of establishments having training facilities (of which those engaging apprenticeship training). Trade apprentices for workers Graduate apprentices are for engineers with degree. Technician apprentices are for engineers with diploma. Technician (Vocational) apprentices are for vocational education graduates. Trade apprentices are for those who have acquired a National Trades Certificate or who can demonstrate equivalent skills.

Sources: ITI, NVTI, RVTI: MoLE (2006) and MoLE (2007).
Other data for CTS: DGE&T (2007c). Data for ATS: DGE&T (2007b).

In China, there are four major training institutions: Technical Schools, Employment Training Centers, Non-public Vocational Training Agencies and Enterprise Employee Training Centers. In total, those institutions train 50.3 million people. There are various types of training such as pre-job training, reemployment training for laid-off and unemployed persons, training for current employees, training for rural labor and rural migrants and business start-up training. In 1999, the Chinese government implemented the Labor Preparation System nationwide. The Labor Preparation System promotes one-to-three-year pre-job vocational training or education for the new entrants of labor force. It targets “urban primary and secondary high school graduates and rural primary and secondary graduates, who are not continuing their schooling but intend to

engage in non-agricultural employment or to move to urban cities to be employed" (MoLSS 2002, p.17). In some occupations, receiving a vocational qualification after pre-job vocational training or education is mandatory in order to start working (Nishioka 2005, p.25). Vocational skill testing and vocational qualification certification system introduced in 1994 contributes to the smooth transition from training to employment. Unlike vocational education, the duration of vocational training tends to be relatively short. For example, 89.6% of the graduates from the Employment Training Centers and 82.8% of the graduates from the Non-Public Vocational Training Agencies completed their training within six months.

In India, there are two most important vocational training schemes: the Craftsmen Training Scheme (CTS) and Apprenticeship Training Scheme (ATS) (Table 6). The main institutions under the CTS are public Industrial Training Institutes (ITIs) and private Industrial Training Centers (ITCs). As of 2005, there are 1,896 ITIs and private 3,218 with a training capacity of 742,330 persons (of which 399,988 in ITIs and 342,342 in ITCs). The number of ITI/ITCs increased from 54 institutions in 1953 and their enrollment capacity also increased from less than 10,000 in the early 1950s (World Bank 2008, p.20). Most of the growth occurred between 1980 and 2000, and it has been fueled mainly by the increasing number of ITCs (World Bank 2008, p.20). As of February 1, 2006, ITI/ITCs were offering training programs for 107 trades (of which 57 are engineering trades and 50 are non-engineering trades). The duration of training varies from six months to three years and the entry qualification also varies from Grade 8^{th} pass to 10^{th} pass, depending on the requirements of different trades (MoLE 2007, pp.211-226). After the completion of training, trainees take an All India Trades Test (AITT). Once they pass the AITT, they receive a National Trade Certificate (NTC). Other than ITI/ITCs, there are various training institutes: nine Advanced/Central Training Institutes which train crafts instructors of ITIs in 27 trades, one National and ten Regional Vocational Training Institute for Women (NVTI and RVTIs), two Foremen Training Institutes (FTIs) which train existing and potential shop floor foremen and supervisors in technical and managerial skills (DGE&T 2007c, pp.2-4).

The Apprentice Act 1961 "makes it obligatory on the part of employers both in public and private sector industries to engage trade apprentices according to the ratio of apprentices to workers other than unskilled workers in designated trades prescribed under the Rules" (DGE&T 2007b, p.2). There are four types of apprentices: Graduate Apprentices for engineers with degrees, Technician Apprentices for engineers with diplomas, Technician (Vocational) Apprentices for vocational education graduates, and

Trade Apprentices for those who have either attained a NTC or who can demonstrate that they have achieved equivalent entry pre-requisites (World Bank 2008, p.25). The Directorate General of Employment & Training (DGE&T) within Ministry of Labour and Employment (MoLE) is responsible for the Trade Apprentices, which account for 77% of overall apprentices in 2004, while the Ministry of Human Resource Development (MHRD) is responsible for other three types of apprentices. As of March 31, 2004, 32,413 establishments had training facilities with overall training capacity of 338,252 apprentices. However, these figures only indicate registered capacity. The actual number of establishments engaging apprenticeship training was 20,990 and the number of apprentices actually trained was 246,137 (the utilization rate is 69%). The duration of training for Trade Apprentices varies from six months to four years depending on the trade (DGE&T 2007b, p.2) (As of June 30, 2007, the apprenticeship training capacity in 187 trades have been utilized (MoLE 2008b, p.233)). All trade apprentices receive some amount of stipend ranging from Rs. 820 per month during the first year of training to Rs. 1,230 at minimum per month during the fourth year of training (DGE&T 2007b, p.3).[5] After the completion of the apprenticeship, apprentices take AITT and once they pass the test, they receive a National Apprenticeship Certificate (NAT).

The overall size of vocational training is much smaller in India compared to China. If we sum up the number of trainees in major training institutions (ITI/ITCs and ATC for India and four training institutions in Table 5 for China), the number of trainees in India becomes about 0.96 million, while it is about 50 million in China. However, it should be noted that this large gap may be partly due to the differences in the duration of training. As the India's 11th 5YP mentions, China provides more short-term vocational training modules than India does (Planning Commission 2008, Vol.1, p.87). Another difference in vocational training between China and India can be found in the training for disadvantaged people or informal sector. China provides massive training for the disadvantaged people (or people in informal sector) such as laid-off workers, unemployed persons and rural migrants by emphasizing the employment or reemployment of those people.[6] By contrast, in India, there is no structural training

[5] The Graduate, Technician and Technician (Vocational) apprentices receive stipend ranging from Rs. 1,090 to Rs. 1,970 at minimum per month.

[6] According to MoLSS (2002, p. 2), the labor force in the Chinese informal sector is mainly composed of "urban laid-off employees and the unemployed, school dropouts, some surplus workers in partially suspended or under-running enterprises, the retired, rural migrant workers, and those who work individually or with partners on non-agricultural production in rural areas".

system for the informal or "unorganized" sector which constitutes more than 90% of the Indian workforce (Planning Commission 2008, Vol.1. pp.88-89).[7]

Finally, if we calculate the overall size of vocational education (only at US level) and training, the gap between China and India is huge. China provides vocational E&T to 65.2 million people annually (14.9 million in vocational education at US level and 50.3 million in vocational training) which accounts for 8.6% of the entire workforce. India provides vocational E&T to about 3.1 million persons annually (Planning Commission 2008, Vol.1. p.88) which only account for 0.7% of the entire workforce.[8]

2.3 Quality of Skill

2.3.1 General Education

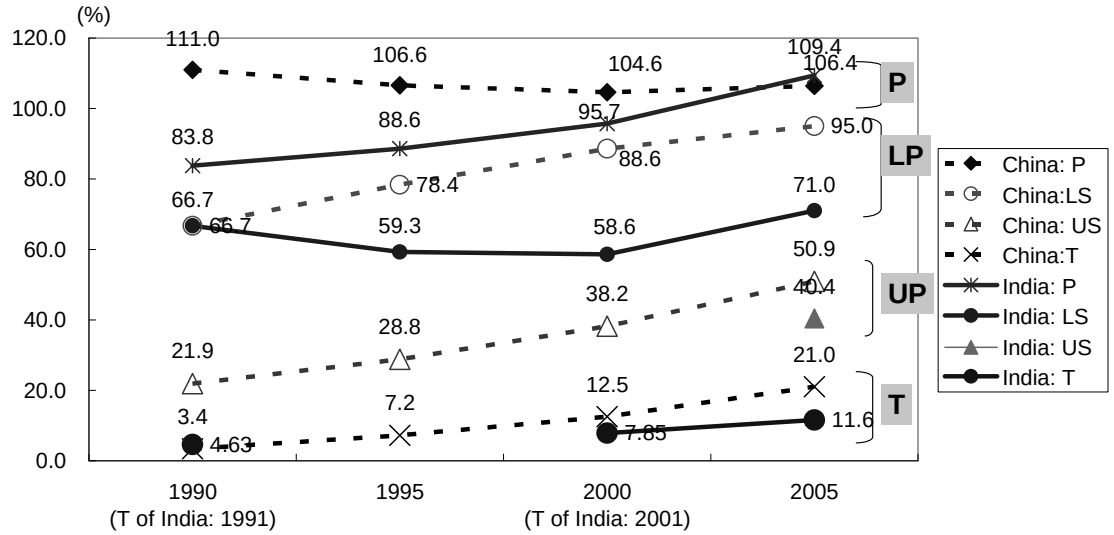
Compared to China, the quality of education and training in India seems to be rather poor. First, concerning the compulsory education (especially primary education), high dropout rates, poor educational achievements, teacher shortage in terms of absolute number, and high teacher absence rates are longstanding problems for India.

Although the gross enrollment ratio (GER) of Indian education caught up with that of China especially in terms of primary education (Figure 4), the GER does not imply whether children actually complete each level of education. In 2005-06, still 25.7% of Indian students dropped out before completing primary education, 48.8% did so before completing Grade 8 (lower secondary education), and 61.6% did so before completing Grade 10, although the dropout rates have been decreasing over time (Table 7). According to Minami *et al*. (2008), the dropout rates of Chinese students between 2001 and 2004 are only 0.1% for primary education and 2.6% for lower secondary education. Judging from their graph, those two dropout rates have always been less than 20% and in most periods less than 10% since 1950 (Minami *et al*. 2008, p.118).

[7] As explained in Section 5, the organized sector includes all the establishments in the public sector and non-agricultural private establishments employing 10 or more workers (The registrations for establishments employing 10-24 employees are on a voluntary basis). The unorganized sector is the remaining sector not organized.

[8] According to the 11th 5YP of India, there are 17 ministries and departments which are imparting vocational training to about 3.1 million persons every year (Planning Commission 2008, Vol.1. p.88). Judged from the explanation of Planning Commission (2008, Vol.1 pp.87-100), this figure "3.1 million" seems to include both vocational education and vocational training recipients.

Figure 4: Gross Enrollment Ratio (GER) of China and India



Notes: P: Primary, LS: Lower secondary, US: Upper secondary, and T: Tertiary education. Figures for "China: US" from 1990 onwards are those for pre-service. Figures for "India: T" in 1983, 1991, and 2001 are drawn from World Bank.
Sources: MoE's website, MHRD (2008c), and World Bank.

Table 7: Dropout Rates of Indian Students

Unit:%

Year	Primary (Grade 1-5)			Up to LS (Grade 1-8)			Grade 1-10		
	Boys	Girls	Total	Boys	Girls	Total	Boys	Girls	Total
1960-61	61.7	70.9	64.9	75.0	85.0	78.3	n.a.	n.a.	n.a.
1970-71	64.5	70.9	67.0	74.6	83.4	77.9	n.a.	n.a.	n.a.
1980-81	56.2	62.5	58.7	68.0	79.4	72.7	79.8	86.6	82.5
1990-91	40.1	46.0	42.6	59.1	65.1	60.9	67.5	76.9	71.3
2000-01	39.7	41.9	40.7	50.3	57.7	53.7	66.4	71.5	68.6
2005-06	28.7	21.8	25.7	48.7	49.0	48.8	60.1	63.6	61.6
SC	32.1	33.8	32.9	53.7	57.1	55.2	68.2	73.8	70.6
ST	40.2	39.3	39.8	62.9	62.9	62.9	78.0	79.2	78.5

Notes: SC: Scheduled Castes, ST: Scheduled Tribes
Source: MHRD (2008c).

In India, completion of primary or secondary education does not necessarily ensure that students have actually learned what they should have learned. By citing the survey conducted by the India's largest educational non-governmental organization (NGO), Pratham, Kingdon (2007, p.180) reports that 47% of grade 5 children could not read the story text at grade 2 level of difficulty, and that 55% of grade 5 and 25% of grade 8 children could not solve a simple division problem (three digits divided by one digit). Kingdon (2007) also indicates the poor educational achievement of upper

secondary education in India by examining the pass rates in the Uttar Pradesh high school exams (Kingdon 2007, p.181). For China, I could not find comparative information.

India also suffers from serious teacher shortage in terms of both quantity and quality. Table 8 reports the pupil-teacher ratio and teacher-school ratio of China and India. Pupil-teacher ratio is always larger in India than in China at either primary, lower secondary or upper secondary level. However, the most serious problem is that the teacher-school ratio is very low in India. In India in 2005, only 2.8 teachers (compared to 15.3 teachers in China) were allocated per one primary school on average. Although India tried to eradicate primary schools with only one teachers since the Operation Blackboard Campaign starting from 1986 (Nakamura 2006, p.23), the average number of teachers per school is too small to provide good-quality education. Teachers' high absence rates are also problematic in India. According to the unannounced visits to more than 3,700 Indian primary schools in 20 states in 2003, on average, 25% of teachers of public schools were absent from school at the time of the visit. In addition, 55% of teachers present at school at that time were not engaging in teaching (Kremer *et al*. 2005). It seems that China does not suffer from teachers' high absence rates and delinquency in teaching.

Table 8: Pupil-Teacher Ratio and Teacher-School Ratio

Pupil-Teacher Ratio (person)

	India			China				
	P (1-5)	LS (6-8)	US (9-12)	P (1-6)	LS: General (7-9)	US: General (10-12)	RSS	VS
1980	38	33	27	27	19	17	10	20
1990	43	37	31	22	16	13	10	13
2000	43	38	32	22	19	16	19	16
2005	46	34	33	19	18	19	31	21

Teacher-School Ratio (person)

	India			China		
	P (1-5)	LS (6-8)	US (9-12)	P (1-6)	LS: General (7-9)	US: General (10-12)
1980	2.8	7.2	18.0	6.0	28.1	18.2
1990	2.9	7.1	16.7	7.3	34.3	35.8
2000	3.0	6.4	14.0	10.6	51.8	52.0
2005	2.8	5.8	13.5	15.3	56.1	80.8

Notes: Pupil-Teacher Ratio for India is calculated by MHRD. For China, it is calculated by author as [Total enrollment/Number of teachers]. Teacher-School Ratio is calculated by author as [Number of teachers / Number of schools]. RSS: Regular Specialized Secondary Schools. VS: Vocational Secondary Schools.
Sources: MHRD (2008c) and ACMR

2.3.2 Vocational Education and Training (E&T): Poor Employment Outcome in India

With regard to vocational E&T, literature indicates that both China and India face similar problems such as a lack of appropriate facilities, equipment and qualified teachers, employment problem of graduates, a lack of linkage between E&T and industry, and a mismatch between supply and demand for vocational E&T. Since I could not find comparative data on most of those issues, it is difficult to judge which country faces more serious problems. However, if we consider employment the ultimate goal of vocational E&T, we can claim that vocational training of China seems more successful than that of India. To put it another way, India has weaker linkages between vocational training and employment.

Table 9 and Table 10 show the employment rates of graduates from training institutions in China and India. If we define employment rate as the ratio of employment in a certain year to the number of graduates in the same year, the employment rates of Chinese Employment Training Center in 2005 and Non-public Vocational Training Agency in 2006 are 70.0% and 83.6%, respectively (Table 9).

Table 9: Employment Outcome of Vocational Training in China

China	Graduates (000)	Employment (000)	Employment rate (%)
	(1)	(2)	(2)/(1) %
Employment Training Center (2005)	7,972	5,578	70.0
Non-public Vocational Training Agency (2006)	8,932	7,464	83.6

Sources:NBS and MoLSS (2006, 2007)

Table 10: Career Outcome of ITI Graduates in India (1999-2000)

Employment and education and training status of graduates, all trades (% of all graduates		(1) Wage employment	(2) Self-employed or employer	(3) Assisting parents in doing their job/business	(4) Studying at polytechnic	(5) Doing apprenticeship	(6) Unemployed and those who were not looking for	(7) (1)+(2)+(3)	(8) (1)+(2)+(3)+(4)+(5)
Andhra Pradesh	ITI	16.2	13.1	11.7	2.7	27.4	28.9	41.0	71.1
	ITC	6.5	3.3	13	1.1	2.2	73.9	22.8	26.1
Maharashtra	ITI	18.4	11.7	5.6	2.8	38.7	22.8	35.7	77.2
	ITC	27.8	7.8	6.1	2.5	29.2	26.6	41.7	73.4
Orissa	ITI	n.a.	n.a.	-	n.a.	n.a.	n.a.	16.2	n.a.
	ITC	n.a.	n.a.	-	n.a.	n.a.	n.a.	21.3	n.a.

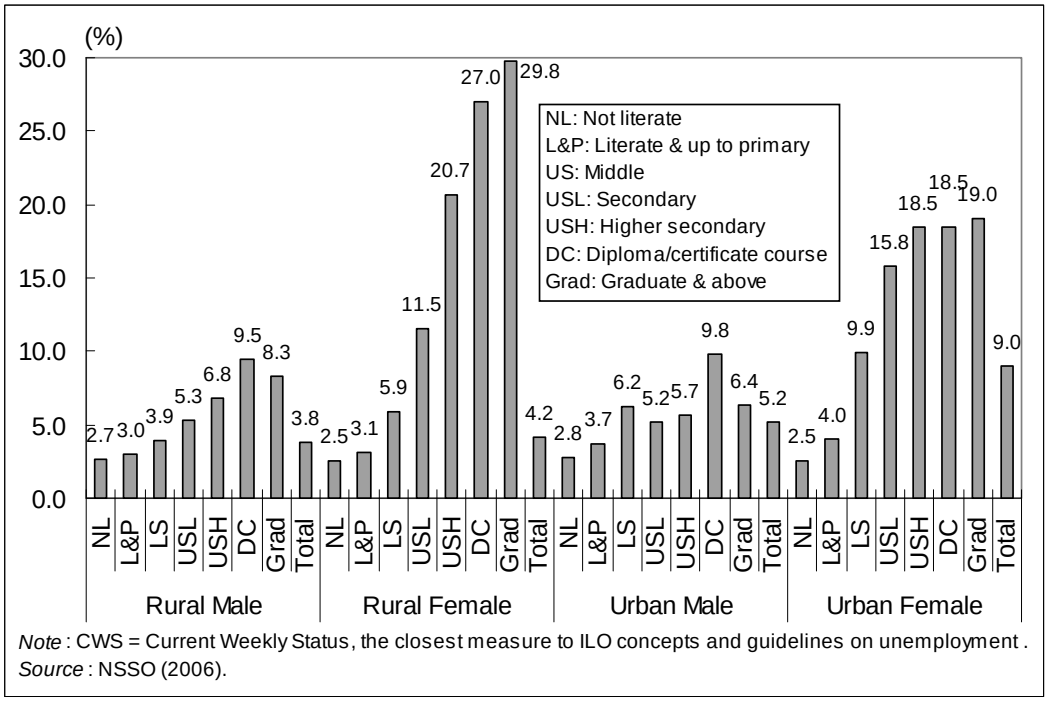
Notes:Surveys were conducted in 1999 and 2000.
Source: ILO (2003).

In India, the International Labour Organization (ILO) surveyed the career outcome of ITI/ITC graduates in three states (Andhra Pradesh, Maharashtra and Orissa) in 1999 and 2000 (ILO 2003). If we define employment rate as the percentage of

graduates employed (employment includes wage employment, self-employed or employer, assisting parents in doing their job or business), the employment rates are relatively low ranging from 16.2% for ITIs in Orissa to 41.7% for ITCs in Maharashtra (see column 7 of Table 10). However, more than 50 to 60% of the graduates who are not employed either go to polytechnic or do apprenticeship except the case of ITCs in Andhra Pradesh. Thus if we expand the definition of employment to include not only actual employment but also study at polytechnic and apprenticeship, the employment rates become comparable to those of China (again, except ITCs in Andhra Pradesh) (see column 8 of Table 10). Doing apprenticeship may increase the possibility of employment in the future. However, as ILO (2003, p.37) indicates, training costs are too high for an individual who has to invest in training at ITI/ITCs and then doing apprenticeship, up to four to six years in total, in order to become a skilled worker. In addition, World Bank (2008, pp.27-28) doubts the labor market relevance of apprenticeship training by citing the tracer study of trained apprentices conducted by DGE&T (DGE&T, 2003). According to the survey conducted in six states covering 246 enterprises, close to two-thirds of former apprentices surveyed were not employed in the trade for which they were trained, although a significant proportion of those surveyed were employed.

Weak linkages between skill acquisition and employment or ‘skill wastage’ can also be seen in general and vocational education in India. Figure 5 reports the unemployment rates of Indian labor force of age 15 years and above by educational level. It clearly shows that the higher the educational attainment is, the higher the possibility of unemployment becomes. However, it should be noted that even in China, unemployment problem of university and college graduates is reported recently.

Figure 5: Unemployment Rates in India by Educational Level (CWS, 2004-05, age 15+)



Note : CWS = Current Weekly Status, the closest measure to ILO concepts and guidelines on unemployment .
Source : NSSO (2006).

Labor exchanges or employment exchanges also function better in China than in India. Table 11 and Table 12 report the situation of labor exchanges (or employment exchanges) in two countries, respectively. First, it is clear from those tables that labor exchanges of China cover much larger population. The number of labor exchanges is 37,450 in China and 947 in India. The number of total job-seekers registered in 2006 is 47.4 million in China while 7.3 million in India. Second, the size of registered job-seekers and job vacancies are relatively balanced in China (47.4 million and 49.5 million in 2006 respectively), while the size of job-seekers registered in India's employment exchanges (7.3 million) is 116 times as large as the size of job vacancies notified (0.36 million). Finally, China's labor exchanges are more successful in terms of job placement. The total placement through China's labor exchanges was 24.9 million which accounts for 52.6% of registered job-seekers in 2006. By contrast, only 0.18 million placement which accounts for 2.4% of total registered job-seekers in 2006 was realized through India's employment exchanges. The poor performance of India's employment exchanges may be partly due to their nature that they only collect information from the organized sector which only constitutes less than 10% of Indian workforce. The Employment Exchanges (Compulsory Notification of Vacancies) Act, 1959 requires employers a compulsory notification of vacancies to the Employment

Exchanges. However, this act only applies to all establishments in the private sector and all non-agricultural establishments employing 25 or more workers (MoLE 2008, p.199).

Table 11: Employment Outcome of Labor Exchanges in China (2006)

	No. of Labor Exchanges	Total Registered Job Vacancies This Year (000)	Total Registered Job-seekers This Year (000)	Total Placement (000)	Placement / Registered Job Vacancies (%)	Placement / Registered Job-seekers (%)				
						Total	Female	Laid-off	Unemp-loyed	Rural workers
Total Labor Exchanges	37,450	49,512	47,359	24,930	50.4	52.6	53.0	55.9	51.7	58.0
Run by Labor Departments	24,777	34,627	34,284	18,449	53.3	53.8	54.9	55.7	54.4	60.2
Run by Other Organs	2,984	2,631	2,590	1,249	47.5	48.2	47.7	52.6	42.2	53.3
Run by Private	9,689	12,254	10,485	5,232	42.7	49.9	48.1	59.2	40.0	53.4

Sources:NBS and MoLSS (2007)

Table 12: Employment Outcome of Employment Exchanges in India (2006)

No. of Employment Exchange	Registration This Year (000)	Live Register (Total Deemed Job-seekers) (000)	Total Estimated Unemployed Job-seekers (000)	Vacancies Notified (000)	Submission Made (000)	Placement (Employment) (000)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
947	7,290	41,466	23,138	358	3,030	177
Placement Ratio (%)	2.4	0.4	0.8	49.4	5.8	100.0

Notes: Placement Ratio is calculated as [Placement / (2), (3), (4), (5), (6) or (7), respectively].*100 (%). Total Estimated Unemployed Job-seekers = (3) * 55.8%. 55.8% is the percentage unemployed out of total persons on the Live Register in 1988. Submission: Forwarding of applicant's particulars to an employer for consideration against a notified, advertised or speculative vacancy.
Sources: MoLE (2008) and DGE&T(2006).

Finally it should be noted that the poor employment outcome of vocational training in India is not only because of the poor quality of vocational education, but also because of the small size of organized sector (or formal sector). Since Indian vocational training schemes are mainly structured to provide trained workers to the formal sector, small-scale labor demand from formal sector may lead to the employment problem of vocational training. Such a demand-side problem will be further analyzed in Section 5.

3 Supply of Skill: Education and Training (E&T) Policies

Around 1950, literacy rates of China and India were both around 20%. However, by 1964, China already accomplished 66% literacy rate which is almost the same as that of India in 2004 (In 1961, literacy rate of India was still 34%). As was shown in the previous sections, India is currently lagging behind China both in terms of quantity and

quality of skill creation and its accumulation. How and why has India come to lag behind China despite the similar starting point around 1950? In this section, I aim to answer this question by examining the education and training (E&T) policies of China and India. First, I briefly summarize the history of E&T policies of two countries. Then, I point out some key differences in those policies, such as the nation's leaders' views on education and work, linkages between E&T and employment, E&T for the disadvantaged or informal sector, incentives for improving the quantity and quality of E&T, and the financing of E&T.

3.1 History of Education and Training (E&T) Policies

This subsection provides a brief overview on the history of E&T policies of China and India mainly after the late 1940s.[9] We can find different patterns of policy developments between the two countries: China first emphasized the basic education and then, since the economic reform beginning from 1978, has started to promote the vocational and tertiary education. By contrast, India first emphasized tertiary and technical education, and only after the mid-1980s, began to promote basic education seriously.

3.1.1 History of Education and Training (E&T) Policies of China

Nation Building (1949-1965): Dual Goals of Expanding Basic Education and Tertiary and Vocational Education

Soon after the establishment of the People's Republic of China (PRC) in 1949, China reformed its educational system modeling after the Soviet one. "Educational Policies during China's early years reflected a political emphasis on both economic development and social equity" as Hannum (1999, p.195) summarizes. First, faced with shortages of skilled workers who support the heavy and chemical industrialization, China built senior secondary vocational schools, i.e. Regular Specialized Secondary Schools (RSS) and Technical Schools (TS), and Colleges with specialized courses. At the same time, China emphasized eradicating illiteracy and spreading basic education nationwide. Mass education for workers and peasants was emphasized and a lot of worker-peasant primary and lower secondary schools were established nationwide (Zhuag 2001). Even

[9] For China, I mainly referred to Kojima (2001), Zhuag (2001), D. Yan (2008b), Liu (2004), Minami et al. (2008), Hannum (1999), Yamaguchi (2007) and Mori (2007). For India, I mainly referred to Nakamura (2006), Amagi (1963), Planning Commission (2008, Vol1. pp.87-100), Kohara (2004), and EFA's website.

after the abolition of worker-peasant schools in 1955, workers and peasants received adult education at the spare-time schools which provided education for people attending schools after work (Zhuag 2001).

Under the 'Great Reap Forward' beginning from 1958, a lot of primary and lower secondary schools and agricultural lower secondary schools were established in rural area. Those schools were financed by production brigades of the People's Commune (Kojima 2001). Mao Zedong advocated "work-study (*ban gong ban du*)," to combine education and production activities, and encouraged school-run factories and factory-run schools. Liu Shaoqi also proposed "two educational systems and two labor systems" i.e. full-time and part-time education and full-time and part-time work. Under their leadership, many work-study schools were established (Zhuag 2001). Although educational quality suffered from the increasing working hours in work-study schools, educational policies during this era seem effective to decrease illiteracy and expand basic education. As mentioned before, China accomplished 66% literacy rate by 1964.

Cultural Revolution (1966-1977): Destruction of Tertiary and Vocational Education and Promoting Basic Education

Under the Cultural Revolution (1966-1976), Mao Zedong suppressed intellectuals and many tertiary and vocational education schools were completely shut down or closed for many years. This drastic change can be clearly seen from Figure 2 in the Appendix (AF2). Mao also denied the two-track educational system by regarding it a bourgeois reproduction system in which full-time general education produces elites who govern the people while part-time work-study schools produces workers who are governed by the elites (D. Yan 2008b, p.42). Thus, most of work-study schools were reorganized into full-time schools. Instead, Mao proposed factory-run schools, where fostering basic academic skills were unvalued. Although the Cultural Revolution destructed the tertiary and vocational education in China, it seems successful in expanding the basic education nationwide at least in terms of quantity. The number of primary and lower secondary (junior high) schools continuously increased. "Primary school ever-enrollment rates reached 96.8 percent by 1975, and the junior high school progression ratio reached 90 percent by 1971" (Hannum 1999, p.199).

Reform Era (Post-1978): Promoting Tertiary Education and Vocational E&T

After the death of Mao Zedong in 1976 and the fall of the 'Gang of Four', in 1978, China started its economic reform under the leadership of Deng Xiaoping. Deng

Xiaoping had been critical of Mao's educational policy and appraised the importance of academic knowledge and science (For example, see D. Yan (2008b, p.47)). In order to accomplish the 'Four Modernization' in the areas of agriculture, industry, national defense, and science and technology, the government which faced with massive skill shortages started to restore and promote tertiary and vocational education. In addition, establishment of vocational schools was promoted in order to prevent unemployment of the youth who had been sent to rural area during the Cultural Revolution but came back to urban area, and also in order to alleviate the competition to get into university. Employment Training Centers were also established to prevent unemployment.

Up to the mid-1980s, the number of schools and total enrollment in primary, lower secondary and regular senior secondary education declined (See AF2). This is partly due to the agricultural decollectivization, i.e. the abolishment of the People's Commune system which had financed the education in rural area. Due to the introduction of the household responsibility system, some farms made their children work at farm instead of study at school in order to increase production and earn more income (Kojima 2001, pp.18-19; Zhuag 2001, pp.55-56)

In 1985, the Central Committee of the CCP issued 'Decision on the Reform of the Educational Structure', which is the guiding document of the current educational policy in China. Based on this Decision, China started various educational reforms to achieve a 9-year compulsory education; to delegate the responsibility for the administration and financing of basic education (including primary and both general and vocational secondary education) to the local governments (Liu 2004, p.35); to encourage the establishment of private schools; to expand the autonomy of schools by introducing the principal responsibility system (D. Yan 2008b, p.90); to put emphasis on vocational education; to promote the linkage between pre-job training and employment (Liu 2004, p89); and to reform the system of job-assignments to graduates from higher education by introducing the job selection by both employer and job-seekers (see Liu 2004, pp.34-35). Compulsory Education Law was promulgated in 1986. Upper secondary vocational education rapidly expanded. As a result, in the mid-1990s, the proportion of vocational education to the total enrollment in the upper secondary education reached 56.8% (Liu 2004, p246). Non-public Vocational Training Agencies also increased. Various components framing current Chinese vocational E&T system such as vocational qualification certification system (1994), Vocational Education Law (1996), Labor Preparation System (1999) were introduced.

Since the mid-1990s, faced with the increased lay-off of workers due to the

deteriorated performance of the state-owned enterprises (SOEs), the government started to provide vocational training and employment guidance to those laid-off workers and assist them towards re-employment. In the 2000s, the Chinese government implemented large-scale training programs for rural labor and rural migrants in order to assist their decent employment in rural or urban area and to increase their earnings (Mori 2007; Yamaguchi 2007).

Recently, China also put emphasis on tertiary education. In 1999, China expanded the entrance quota of universities and as a result, the number of students enrolled in higher education ('Regular Institutions of Higher Education') increased fivefold between 1998 and 2006. At the same time, the enrollment of upper secondary vocational education declined and some vocational schools had to face difficulties with student recruitment (Liu 2004).

3.1.2 History of Education and Training (E&T) Policies of India

Colonial Era and Nation Building (19c-1967): Promoting Tertiary and Technical Education

Under the British Raj in the 19th century, the British rulers promoted tertiary education provided in English in order to produce lower-level Indian officials who support the British colonial administration. Lower and upper secondary schools were also established but they just served as prep schools for university entrance exams (Amagi 1963, p.11). Those educational opportunities were restricted to a small number of wealthy elites.

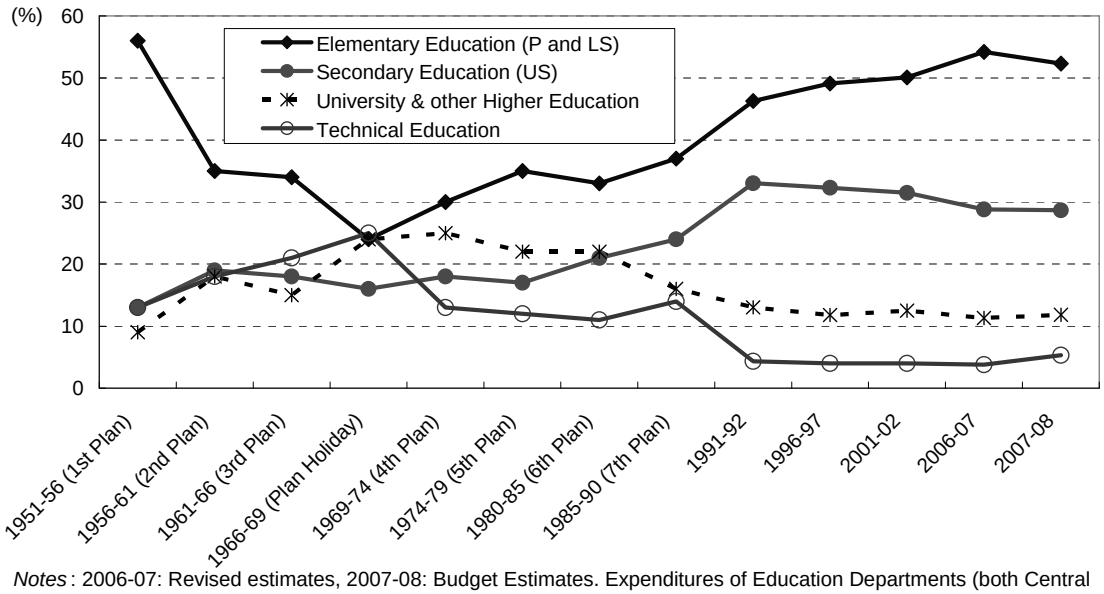
During the Indian independence movement, Mohandas Karamchand Gandhi opposed to the above elitist education, and instead advocated the introduction of free compulsory education nationwide and the introduction of handicrafts into the school education.[10] Gandhi's views on education were reflected in the first Five-Year Plan (5YP, 1951-56). The Constitution of India which came into effect in 1950 also had an article about free and compulsory education until age 14 (Article 45) although the expansion of compulsory education was stated as nonbinding target sought by each state (With the amendment in 1976, both the central and state governments became responsible for education).

However, from the second 5YP (1956-61), India started to put more emphasis

[10] The education Gandhi advocated is called 'Basic education'. However, the term 'basic education' I use in this paper simply denotes basic-level education including primary and lower secondary education and sometimes adult literacy, primary, and lower secondary education.

on tertiary and technical education under the strong leadership of Jawaharlal Nehru in order to generate skilled-manpower necessary for the heavy and chemical industrialization. This trend can be clearly seen from Figure 6 which shows the changes in the allocation of educational expenditure by level of education. During the first 5YP (1951-56), 56% of educational expenditure was allocated to primary and lower secondary education, while 9% and 13% were allocated to tertiary education and technical education respectively. However, by the Plan Holiday period (1966-69), the proportion of all those three levels of education became approximately 25%.

Figure 6: India's Educational Expenditure Allocation by Level of Education



Notes: 2006-07: Revised estimates, 2007-08: Budget Estimates. Expenditures of Education Departments (both Central and States) only.
Sources: MHRD (1995), CSO (2006), and MHRD (2008a)

National Policy on Education, 1968 (1968-1985): A Sign of a Shift towards Strengthening Basic Education

The first National Policy on Education (NPE) was approved in 1968. Although it advocated free and compulsory education and equalization of educational opportunity, it also stated that "science education and research should receive high priority" (MHRD 1968). In addition, lack of responsibility system and financial base impeded the expansion of compulsory education. The most notable development due to the NPE 1968 may be the acceptance of a common education structure, i.e. current 10+2 system, throughout the country (EFA website).

The Janata Party which ousted a government in 1977 also criticized the

education policy of the Congress Party as elitist and stressed the importance of primary, lower secondary and adult education. However, this advocacy did not seem to be fully reflected in the allocation of educational expenditure.

During this period from 1968 to 1985, the proportion of educational expenditure allocated to primary and lower primary education increased from 24% to 33%, and that allocated to tertiary education remained almost the same from 24% to 22%, while that allocated to technical education decreased from 25% to 11% (Figure 6).

National Policy on Education, 1986 (1986-2006): Promoting Basic Education

It can be said that from the 'National Policy on Education (NPE), 1986', which is further updated in 1992, India started to promote basic education seriously by increasing the central funding to the education. From the mid-1980s to the 1990s, India introduced various programs to expand basic education and improve its quality; Operation Blackboard (19886), establishment of District Institutes of Education and Training (DIET, 1988), Total Literacy Campaigns (1988), Minimum Levels of Learning (1989), District Primary Education Program (DPEP, 1994) etc. (For the details of the programs, see Nakamura 2006).

In 2001, India launched the Sarva Shiksha Abhiyan (SSA, Hindi which means 'Education for All' movement) which ultimately aimed to achieve universalization of primary and lower secondary education both in terms of enrollment and completion, with some interim goals. In 2002, the Constitution was amended to make compulsory education a fundamental right for all children in the age group of 6-14 years. Thus, each state now has a duty to provide compulsory education universally.

The proportion of educational expenditure allocated to primary and lower secondary education significantly increased from 33% in the sixth 5YP to 52% in 2007-08, while that allocated to tertiary and technical education decreased from 22% to 12% and from 11% to 5%, respectively. Due to the serious effort by the Indian government, the GER of primary education also increased substantially from 83.8% in 1990-91 to 109.4% in 2005-06, although there still remains quality problem as mentioned above.

National Skill Development Mission (2007-2012): Emphasis on Vocational E&T, Upper Secondary and Tertiary Education

Having achieved the substantial improvement in basic education and faced with India's progress towards a 'Knowledge economy' in recent years, the 11th 5YP (2007-2012)

again gave a very high priority to tertiary education (Planning Commission 2008, Vol.1. p.87). The Plan aims to increase the GER of tertiary education to 15% by 2011-12 and 21% by the end of the twelfth 5YP. A lot of new institutions such as 30 Central universities, 8 IITs, 7IIMs, 10 NITs, 20IIITs, 3 Indian Institutes of Science, Education & Research (IISERs), 2 School of Planning & Architecture (SPAs) are planned to be established. Various reforms, for example, curriculum revision at least once in every three years and expansion of autonomy and accountability of higher educational institutions, are proposed (Planning Commission 2008, Vol.2. pp.21-27)

Upper secondary education is also emphasized in the 11th 5YP. It aims to increase the GER to 75% at grade 9-10 level and 65% at entire upper secondary level by 2011-12 (Planning Commission 2008, Vol.2. pp.14-21).

The 11th 5YP also proposed to launch a 'National Skill Development Mission' (SDM) with an outlay of RS 22,800 crores (about US$4.7 billion). The SDM aims to provide "a pool of trained and skilled workforce, sufficient to meet the domestic requirements of a rapidly growing economy" and to enhance the training capacity of India's vocational education and training (VET) from current 3.1 million to 15 million. The SDM proposes various reforms; strengthening the linkages between VET institutions and industry through public-private partnership (PPP), moving away from regulation to performance measurement and rating/ranking of VET institutions; establishing a "National Skill Inventory" and a "National Database for Skill Deficiency Mapping" on a national Web portal; attaching a career counseling function to the Employment Exchanges; establishing 50,000 Skill Development Centers (SDCs); offering short duration modular training courses; and establishing a National Qualification Framework, etc. It also plans to upgrade ITIs (500 into centers of excellence (CoEs) and the remaining 1396 ITIs by PPP etc.) and 400 polytechnics and newly establish many ITIs and polytechnics (Planning Commission 2008, Vol.1. pp.87-100). The intake capacity of vocational education is planned to be expanded from the current one million students in 9583 schools to 2.5 million in 20,000 schools by 2011-12. The demand-driven vocational education programs in partnership with employers and the learning of soft skills such as computer literacy and English are emphasized (Planning Commission 2008, Vol.2. pp.20-22).

3.2 Some Key Differences in Education and Training (E&T) Policies

I raise five key differences in E&T policies between China and India: the nation's leaders' views on education and work, linkages between E&T and employment, E&T

for the disadvantaged or informal sector, incentives for improving the quantity and quality of E&T, and the financing of E&T. They seem to be important factors which lead to a large gap in current educational attainment between China and India.

3.2.1 Nation's Leaders' Views: Different Way of Combining Education and Work

It is interesting that both nations' leaders, Mao and Gandhi, proposed to combine education and work. However, their way of combining education and work or their meaning of work was different. 'Work' means factory production activities for Mao, while it means handicrafts for Gandhi. Mao proposed to combine education and factory production activities and encouraged the establishment of work-study schools (before the Cultural Revolution) and school-run factories or factory-run schools. At the same time, Mao emphasized the expansion of basic education among workers and peasants. Due to the educational policies embodying those views of Mao, China could start the economic reform in 1978 with a relatively egalitarian society where a large population including rural population was equipped with both basic education and factory production skills, at least in terms of quantity of skills.

Gandhi also proposed to combine education and work. However, what he meant by 'work' was traditional handicrafts. Gandhi opposed to industrialization, machinery, and large-scale factory production which the British Empire or Western civilization pursued. Instead, he proposed to teach handicrafts at schools and expand compulsory education nationwide. As mentioned before, from the second 5YP (1956-61), India started to put more emphasis on tertiary and technical education under the strong leadership of Nehru. However, Gandhi's emphasis on handicrafts was eventually embodied as the protection of small scale industries (SSIs) in India (Esho 2008, pp.22-23, 85-86). Nehru's emphasis on tertiary and technical education hindered the expansion of basic education and kept the India as an inegalitarian society in terms of educational opportunity and outcome. At the same time, Gandi's emphasis on handicrafts might result in the small scale accumulation of factory production skills and small demand for them, although more detailed examination is necessary.

3.2.2 Linkages between Education and Training (E&T) and Employment

As already mentioned in Section 2.3.2, linkages between E&T and employment are weaker in India than in China. From the foundation of the PRC, the Chinese government often promoted education in order to cope with the unemployment problem. For example, the origin of Technical Schools was the establishment of training classes

for 4 million urban unemployed people at the beginning of the PRC's founding (Liu 2004, p.44). One of the reasons that China promoted vocational education after 1978 was that vocational education was considered to prevent unemployment of the youth (Liu 2004, p.4). Various vocational training programs such as pre-job training under the Labor Preparation System, reemployment training for laid-off and unemployed persons, and training for rural labor and rural migrants also aimed to prevent unemployment. In sum, China has put emphasis on employability skills.

Compared to India, Chinese vocational schools and labor exchanges seem to have more information about employment opportunities in firms and function better as the hub for employment information. This may be partly due to the Chinese tradition that government and schools had assigned graduates from upper secondary and tertiary education with jobs until the mid 1980s or 1990s. Thus, Chinese schools and government which run the labor exchanges still have relatively strong employment channels with firms, although the decline of SOEs seems to make those channels weaker (Liu 2004, pp.217-219). There are no such strong employment channels in India. The emphasis on employability skills seems much weaker in India compared to China. In addition, small employment opportunities in India's formal or organized sector to which training institutions and labor exchanges aim to provide trained workforce may also be responsible for the weak employment channels, as mentioned before.

3.2.3 Education and Training (E&T) for the disadvantaged / informal sector

This difference is already mentioned in Section 2.2.2. China tried to train disadvantaged people such as laid-off workers and rural migrants in order to incorporate them into the formal sector or provide higher income by raising their skills. In contrast, in India, there is no structural training system for informal economy which takes up more than 90% of Indian labor force.

3.2.4 Incentives for Improving the Quantity and Quality of Education and Training (E&T)

The Chinese E&T system embeds more incentive mechanisms for improving the quantity and quality of E&T, compared to Indian system. First, local government officials have incentives to meet the targets of school enrollment because of the carrot and stick provided by the upper-level government. For example, it is reported that some upper-level governments forced the lower-level governments to achieve the expansion target of compulsory education with the threat of denying all other achievements

without accomplishing the educational target. Failure to meet the educational targets would reduce the opportunities for the lower-level government officials to get financial incentives or promotion (Minami *et al*. 2008, pp.133-134). Liu also reported an example of vocational education in Zhejiang, where the provincial government announced that it would give an award to the cities which satisfies the student recruitment's target, while give an alert to those which do not meet the target (Liu 2004, p.125).

Second, at school level, school principals also have incentives to improve the quantity and quality of education, due to the principal responsibility system introduced in the mid-1980s. The principal responsibility system reduced the influence of the Chinese Communist Party (CCP) on schools and significantly enhanced the autonomy of school principals. School principals acquired the authority over personnel issues including hiring and firing of teachers, student recruitment and job placement, financing and management of schools, design of teaching and learning methods including curriculum content and course schedules. School principals could pay teachers based on their performances and "this acts as an incentive for teachers to assume more responsibility and to try to do better jobs" (Lin 1993, p.83). As Liu (2004) indicates, in the case of vocational schools, the poor job placement outcome of graduates makes it difficult to recruit new students and thus to meet the recruitment target, school principals has incentives to improve the educational quality and employment outcome.

Although further research is necessary, schools in India do not seem to have many incentives to improve quantity and quality of education. Dougherty and Herd (2008, p.10) mentions that the high level of teacher absenteeism in Indian primary schools seems linked to weak performance incentives (or weak monitoring system) and poor teaching conditions. World Bank (2008, p.31) claims that ITIs have few incentives to improve their performance because they are "part of the government – teachers and trainers are civil servants and resources are part of government budget – which is an obstacle to improving performance." ILO (2003, p.39) also presents the similar argument. Since ITI teaching staff are civil servants, it is difficult to move or replace them by other instructors needed for implementing new training course and thus the improvement of training program is hindered (ILO 2003, p.27).

3.2.5 The Financing of Education and Training (E&T)

E&T policies without financial basis are not effective. As seen form the history of Chinese E&T policies, the People's Commune contributed to the expansion of basic education in rural area by financing schools. The Chinese educational reform since the

mid-1980s aimed to increase the funding channels of education by encouraging the establishment of private-schools and diversification of educational funding into educational taxes, tuition and miscellaneous fees, income generated from school factories, and donation etc. Although an increase in tuition or miscellaneous fees has made the cost of education higher and contributed to the inequality expansion of educational opportunities, diversification of educational resources is likely to mitigate a shortage of educational fund.

In India, the growth of educational expenditure on basic education by the central government and the increasing number of internationally aided projects contributed to the expansion of primary education after the mid-1980s. However, as far as public ITIs, they are financed by government budget. This has resulted in a low-level of funding and a lack of flexibility. Considering this situation, ILO (2003, pp.45-46) proposed to reform the ITI funding mechanism to introduce enrollment-based funding and encourage income-generating opportunities. The National Skill Development Mission (SDM) mentioned above also advocated the public-private partnership (PPP) to increase the private investment in skill training. Although more careful investigation is necessary, India seems to be lagging behind China in terms of financial reform of E&T, and just started its reform recently. Since the financing issues of E&T are very important, further research should be done in the final report.

4 Supply of Skill: Individuals' Incentives for Skill Formation (Tentative Analysis)

Individuals' incentives or disincentives for acquiring skills also influence the flow of skill supply into the entire economy. If individuals' incentives for skill acquisition are strong, skill is likely to be rapidly accumulated in the entire society. In a simple framework, a rational individual calculates the net benefit (i.e. benefit minus cost) received by investing in education and only if the net benefit is positive, he or she would actually invest in education. The size of wage premium and employment opportunity expansion affects the benefit of education. The amount of tuition, the availability of educational loans, and the level of family income affect the cost incurred from educational investment.

Since my survey currently has not covered all the above aspects, I just introduce one interesting result concerning the skill premium in China and India. Table

13 reports the skill premium (private rates of return to education) in urban China in 2002 by the employment status of workers. We can observe that both permanent and temporary workers can earn much higher earnings by receiving college or above education compared to lower primary education or primary and below primary education. Those skill premiums are statistically significant. S. Yan (2008) also found that the private rate of return to education was statistically significant for both migrant workers and residents in Shanghai.[11] Therefore at least in urban China, even disadvantaged workers or workers in informal sector have incentives to pursue higher education.

Table 13: Private Rates of Return to Education in Urban China (2002)
(Base category: College or above education)

Employment Status	N Share %	Educational Category / Share %		Coef.	stdr
Permanent (including long-term contract) worker	6,215 76.9%	College or above (omitted)	12.9%	-	-
		Professional school	26.4%	-0.13 ***	0.025
		Middle level professional, technical or vocational school, and upper middle school	39.5%	-0.25 ***	0.028
		Lower middle school	19.5%	-0.37 ***	0.033
		Elementary school and below	1.7%	-0.38 ***	0.058
Temporary (including short-term contract) worker	903 11.2%	College or above (omitted)	5.2%	-	-
		Professional school	17.6%	-0.14	0.154
		Middle level professional, technical or vocational school, and upper middle school	49.3%	-0.23	0.150
		Lower middle school	25.5%	-0.43 ***	0.162
		Elementary school and below	2.4%	-0.54 ***	0.175

Notes: Omitted category: College or above. The *** significant at 1%, ** at 5%, and * at 10% level. Coef. and t represent estimated coefficient and t-statistics, respectively. The dependent variable is RPD (regional price difference)-adjusted log earnings. Other control variables are sex, minority status, Communist Party membership, occupation, ownership of the enterprise, industry and province.

Source: Author's calculation from the urban individual sample of the Chinese Household Income Project (CHIP) used in Asuyama (2008).

In contrast, as Dougherty and Herd (2008, p.17) mentions, the private rates of return to education in India are very low or statistically insignificant for casual workers, while statistically significantly high for wage-earning regular workers. In India, casual workers account for about 30% of total employment and more than half of them are illiterate. Unlike China, there are almost no incentives for disadvantaged workers or workers in informal sector to acquire higher education, if there are not many chances for

[11] It should be noted that even those migrant workers have completed compulsory education on average.

casual workers to enter the formal wage-earning regular employment market, i.e. if there exists substantial labor market segmentation.

The above results are not exactly comparable especially since Chinese sample only includes urban workers (and migrant workers in Shanghai in the case of S. Yan (2008)). However, it seems that most of Chinese workers including those in informal sector have incentives to invest in education, while in India, only workers in formal sector, which takes up for the small portion of total Indian employment, have those incentives.

5 Demand for Skill (Tentative Analysis)

So far, I have offered the supply-side explanation concerning the differences in skill distribution and accumulation of China and India. However, the demand-side factor also seems very important to explain those differences. As indicated in the previous sections, the large skill wastage of educated or trained people in India seems to be not only due to the supply-side problem such as the quality of E&T, but also due to the demand-side problem, i.e. small-scale demand for those skilled workers because of the small-sized formal labor market. This section confirms the smaller-sized formal sector of India compared to China by analyzing official statistics. Investigating the reasons for the differences in employment structure between the two countries is one of the most important subjects for future research.

Table 14 shows the structure of employment and gross domestic product (GDP) of the two countries. First, the GDP structure clearly shows the difference in comparative advantage between China and India: i.e. China has a comparative advantage in manufacturing while India has one in service industry, although service industry in China has gradually enhanced its presence. In 2005, the proportion of secondary industry is 47.5% in China, while 28.2% in India. The proportion of tertiary industry is 39.9% in China, while 52.6% in India. However, employment structure does not fully reflect this GDP structure. In 2005, the proportion of primary, secondary and tertiary industry is 44.8%, 23.8% and 31.3%, respectively in China and 58.5%, 18.2% and 23.4%, respectively in India. In particular, in India in 2005, the employment share of tertiary industry is less than half of its GDP share. In China, labor has moved from primary industry into secondary and tertiary industry over time. However, in India, such transition of labor market allocation seems much slower. The employment share of

primary industry is still large in India and that of tertiary industry is even smaller than that of China in 2005.

Table 14: Employment and GDP Composition by Broad Industry

Employment Composition (%) by Broad Industry

China				India			
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary
1980	68.7	18.2	13.1	1977-78	72.0	12.6	15.4
1985	62.4	20.8	16.8	1983	68.1	13.9	18.6
1990	60.1	21.4	18.5	1987-88	64.1	16.2	19.7
1995	52.2	23.0	24.8	1993-94	63.9	14.9	21.2
2000	50.0	22.5	27.5	1999-2000	61.7	15.8	22.5
2005	44.8	23.8	31.3	2004-05	58.5	18.2	23.4

GDP Composition (%) by Broad Industry

China				India			
	Primary	Secondary	Tertiary		Primary	Secondary	Tertiary
1980	30.2	48.2	21.6	1979-80	33.9	25.5	40.9
1985	28.4	42.9	28.7	1984-85	32.5	26.0	41.5
1990	27.1	41.3	31.5	1989-90	29.2	26.9	43.8
1995	20.0	47.2	32.9	1994-95	28.5	26.8	44.7
2000	15.1	45.9	39.0	1999-00	25.0	25.3	49.7
2005	12.5	47.5	39.9	2004-05	19.2	28.2	52.6

Notes: India's total employment is based on usual activity status (ps+ss). GDP is based on current prices. For China, Primary industry includes Agriculture, forestry, animal husbandry and fishery, Secondary Industry includes Mining and quarrying, Manufacturing, Production and supply of electricity, Water and gas, and Construction, and Tertiary industry includes all other economic activities not included in primary or secondary industry. For India, Primary industry includes Agriculture Forestry, Fishing and Hunting, Secondary industry includes Mining an Quarrying, Manufacturing, Electricity, Gas and Water, and Construction, and Tertiary industry includes Wholesale and Retail Trade and Restaurants and Hotels, Transport, Storage and Communication, and other services.

Sources: NBS (2006), CSO (2007a, 2008), IAMR (2006), and NSSO (2006).

Table 15 shows the composition of formal and informal employment of China and India. In 2005, the proportions of formal and informal employment are 33.6% and 66.4% in China, while 5.8% and 94.2% in India. Although those figures of China and India are not exactly comparable, since the definitions of formal and informal employment are different between the two countries (For the definition of formal and informal employment, see the notes of Table 15. I followed the definitions of OECD (2007)), it seems correct to say that the presence of informal sector employment is much larger in India than in China.[12]

[12] As OECD (2007, p.12) mentions, "the informal-sector employment refers to own-account workers and employers and employees in firms with fewer than 5 (or 10) employees including (unpaid) family workers" and domestic workers engaged by households. "According to ILO guidelines, informal jobs can be defined broadly or narrowly depending on national

Table 15: Employment Composition of Formal and Informal Sector

China	FE				IFE		
	Total	Urban TFE	Urban EFE	Rural FE	Total	Urban IFE	Rural IFE
1980	31.7	24.7	0.0	7.1	68.3	0.2	68.1
1985	38.8	24.7	0.1	14.0	61.2	0.9	60.3
1990	36.0	21.5	0.3	14.3	64.0	4.6	59.4
1995	41.4	21.2	1.3	18.9	58.6	5.5	53.1
2000	33.9	13.3	2.8	17.8	66.1	16.0	50.1
2005	33.6	9.6	5.2	18.8	66.4	21.2	45.1

Notes: Following OECD (2007), FE includes employment in state-owned, collective-owned, cooperative, joint-ownership enterprises, limited liablity corporations, shareholding corporations, foreign-owned enterprises including those funded by residents of Hong Kong, Macao, and Taiwan and township and village enterprises. IFE includes employment in registered private enterprises, self-employed and individual businesses. Unlike OECD (2007), I include irregular employment which seems to contain rural migrants and laid-off workers in FE into IFE.
Source: NBS (2006)

India	FE			IFE
	Total	FE -public	FE -private	Total
1977-78	7.8	n.a.	n.a.	92.2
1983	7.9	5.4	2.5	92.1
1987-1988	8.0	5.7	2.3	92.0
1993-94	7.4	5.2	2.1	92.6
1999-2000	7.0	4.8	2.2	93.0
2004-05	5.8	3.9	1.8	94.2

Notes: Following OECD (2007), FE and IFE is equal to the employment in organized and unorganized sector respectively. Organized sector includes all the establishments in the public sector and non-agricultural private establishments employing 10 or more workers (The registration of establishments employing 10-24 employees is on a voluntary basis.)
Source: IAMR (2006)

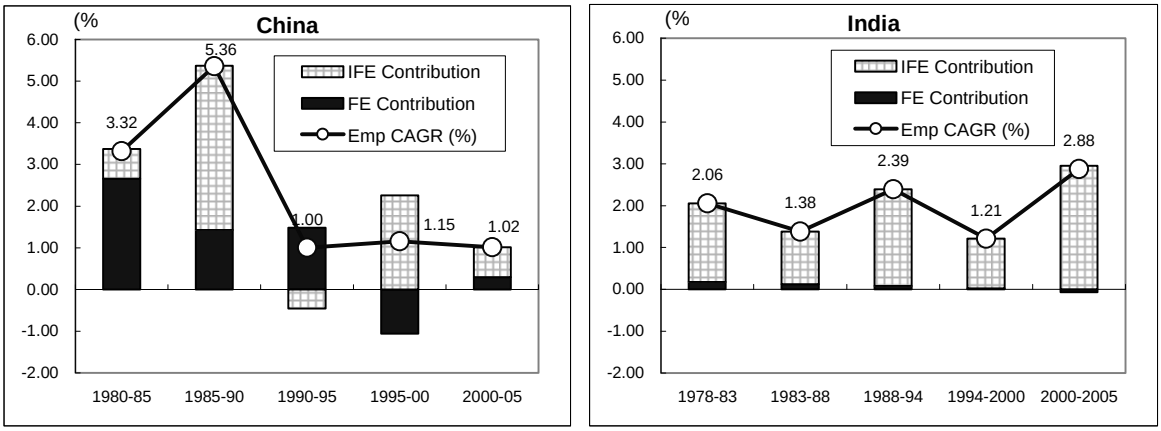
However, in order to make the above judgment more solid, I need to analyze more statistics based on other definitions of formal/informal employment. For instance, the Indian statistics used in Table 15 are collected by DGE&T and often used to show the large presence of informal sector in India. In Table 15, the formal employment in India is defined as employment in organized sector which includes all the establishments in the public sector and non-agricultural private establishments employing 10 or more workers. However, the registration of establishments employing 10-24 employees is on a voluntary basis, and thus, the size of organized (i.e. formal) employment is likely to be underestimated. Calculation based on National Sample Survey (NSS) and Economic Survey is necessary and would complement the analysis based on DGE&T's statistics. For instance, Planning Commission (2008, Vol.1, pp.67-69) analyzed NSS data and found that the proportion of formal non-agriculture employment slightly increased from 24.9% in 1999-2000 to 26.3% in 2004-05, if the formal employment is defined as employment in all public establishments and all private establishments hiring more than 10 workers. This increase in formal employment was due to the employment expansion of private enterprises. This result

circumstances from "non-compliance to national labour legislation, income taxation, social protection or non-entitlements to certain employment benefits (advance notice, severance pay, paid annual or sick leave etc.)."

based on NSS is different from the trend observed in Table 15 based on DGE&T's data. Data from DGE&T shows the continuous decline of formal employment in terms of its proportion, while data from NNS indicate that the employment share of formal sector increased in recent years (Even if we analyze the non-agriculture employment based on DGE&T's statistics, we can observe the shrinking trend of formal employment). Thus, it is necessary to examine the trend more carefully by collecting various sources of data in future research.

Exploiting the data used in Table 15, Figure 7 shows the contribution of formal and informal employment to the total employment growth in the two countries. In China, although the contribution of formal employment was negative in the late-1990s reflecting the massive lay-off of workers, contribution of formal employment is much larger than that of India in all other periods. Although India experienced higher employment growth rate than China did in the 1990s and 2000s, nearly all of the employment growth was due to the expansion of informal employment. However, this analysis is also tentative and further investigation based on other statistics is needed.

Figure 7: Employment Growth and Contribution of Formal and Informal Employment



Notes: Emp CAGR: Compound annual growth rate of total employment, FE: Formal employment and IFE: Informal employment.
For China, following OECD (2007), FE includes employment in state-owned, collective-owned, cooperative, joint-ownership enterprises, limited liablity corporations, shareholding corporations, foreign-owned enterprises including those funded by residents of Hong Kong, Macao, and Taiwan and township and village enterprises. IFE includes employment in registered private enterprises, self-employed and individual businesses. Unlike OECD (2007), I include irregular employment which seems to contain rural migrants and laid-off workers in FE into IFE.
For India, following OECD (2007), FE and IFE is equal to the employment in organized and unorganized sector respectively. Organized sector includes all the establishments in the public sector and non-agricultural private establishments employing 10 or more workers (The registration of establishments employing 10-24 employees is on a voluntary basis.)
Sources: NBS (2006), IAMR (2006), Planning Commission (2008), and DGET (2007).

Although more careful examination is necessary, it still seems correct to say that the presence of informal employment is much larger in India than in China. A large

size of informal employment (i.e. a small size of formal employment) in India leads to a small size of labor demand for educated or trained workers since formal E&T mainly aims to produce skilled workers suitable for formal employment. Without enough labor demand, supply-side E&T reform would only expand existing skill wastage. Therefore, either expanding the formal sector and its labor demand (demand-side reform) or introducing E&T for informal employment to increase the productivity and earnings of informal sector (supply-side reform) is important to reduce the skill wastage in India.

Why is informal employment much larger in India compared to China? In order to answer this question, it is necessary to examine what kind of production technology (e.g. capital-intensive, skilled-labor-intensive, or unskilled-labor-intensive technology) firms in China and India have chosen to exploit and why those firms have chosen a certain type of technology. Possible reasons for a large and non-declining informal employment in India are: excess labor in the formal sector, low relative price of capital or unskilled-labor to skilled-labor, and incentives for keeping the size of employment small due to some policies such as the small scale industry (SSI) policies and labor-related laws (e.g. Factory Act, 1948 and Industrial Disputes Act, 1947). Although examining the types of production technology chosen by firms in China and India and investigating the factors influencing the firms' technology choice are very important, these areas are left to future research.

6 Concluding Remarks

This section summarizes the major findings and discusses the areas for future research. This paper has provided an overview of the skill formation systems (SFSs) of China and India by analyzing various statistics and literature. It reveals that China enjoys much larger semi-skilled labor force than India does. Workers with primary and upper secondary education are much more abundant in China, while illiterate workers and workers with postgraduate education are relatively abundant in India, although tertiary education in China and primary education in India have been expanding these days due to the recent educational reforms of those countries. Those differences in skill distribution are consistent with the industrial comparative advantages of China and India: China has a comparative advantage in manufacturing which exploits a large number of semi-skilled workers, while India has a comparative advantage in advanced service industries and some innovative activities found in manufacturing industries such

as automobile and pharmaceutical which demand highly educated workers.

The comparison of E&T institutions of China and India revealed that the size of vocational E&T is much larger in China than in India and that China offers much more training programs for the disadvantaged or informal sector in order to prevent unemployment. Compared to China, India seems to more seriously suffer from the poor quality of education and training (E&T): high dropout rates, poor educational achievement, teacher shortage in terms of absolute number, and high teacher absence rates in compulsory education; and poor employment outcome of vocational training. In particular, linkage between training and employment seems much weaker in India than in China which puts emphasis on employability skills.

Although both China and India started from the literacy rate of about 20% around 1950, India is currently lagging behind China both in terms of quantity and quality of skill creation and its accumulation. Section 3, 4 and 5 tried to explain why skill distributions of China and India are different and why skill gaps between the two countries have widened since 1950, by analyzing the supply-side and demand-side factors. Section 3 briefly summarized the history of E&T policies of the two countries and pointed out five key differences in those policies: the nation's leaders' views on education and work, linkages between E&T and employment, E&T for the disadvantaged or informal sector, incentives for improving the quantity and quality of E&T, and the financing of E&T. Section 4 compared the individual incentives for acquiring skills, although the findings are tentative. It seems that most of Chinese workers including those in informal sector have incentives to invest in education, while in India, only workers in formal sector, which takes up for the small portion of total Indian employment, have those incentives. Section 5 provided a tentative analysis of demand-side factors. It seems that the large skill wastage of educated or trained people in India seems to be not only due to the supply-side problem such as the quality of E&T, but also due to the demand-side problem, i.e. small-scale demand for those skilled workers because of the small-sized formal labor market. Section 5 confirms the smaller-sized formal sector of India compared to China by analyzing official statistics.

One of the most important areas for future research is to investigate reasons for a larger informal employment in India compared to China by examining the types of production technology chosen by firms and investigating the factors influencing the firms' technology choice. More detailed research on individuals' incentives/disincentives for skill accumulation, incentives for government officials and school teachers and staff to improve the quantity and quality of E&T, and the financing

of E&T is also necessary. Finally, at least briefly examining the situation of in-firm training, the role of big industrial conglomerates and inter-firm linkages in skill creation, and labor market segmentation due to the caste system in India and household registration (*hukou*) system in China, would be helpful to understand the SFSs of China and India more comprehensively.

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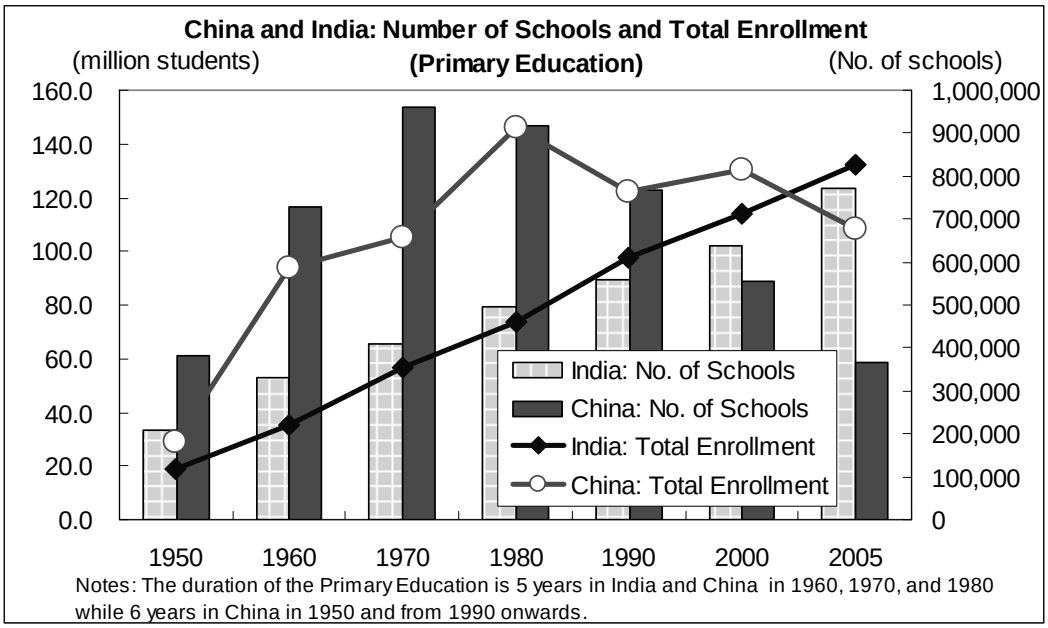
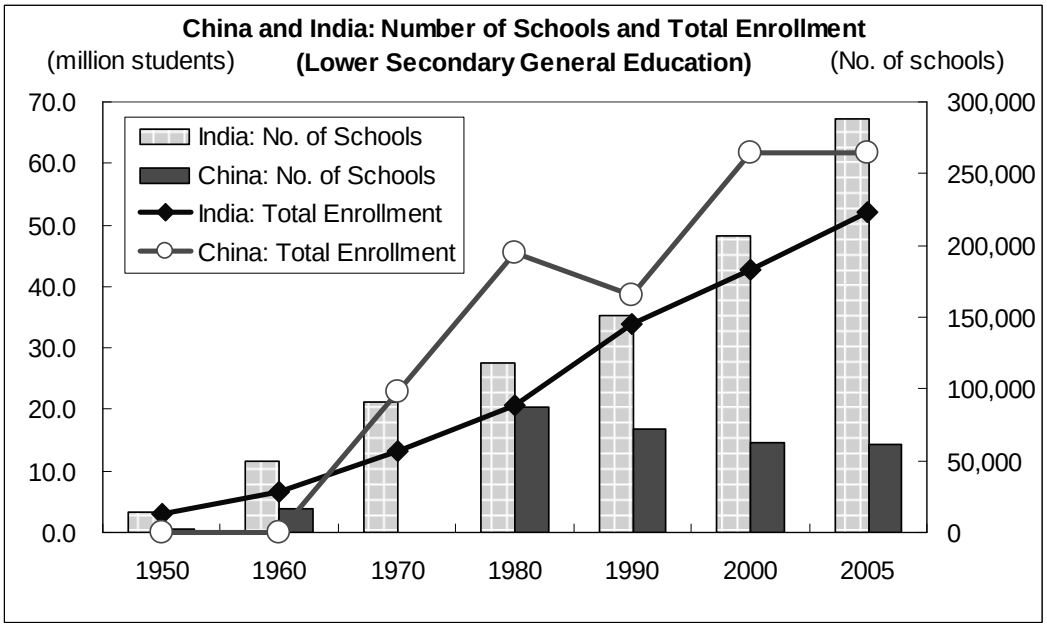
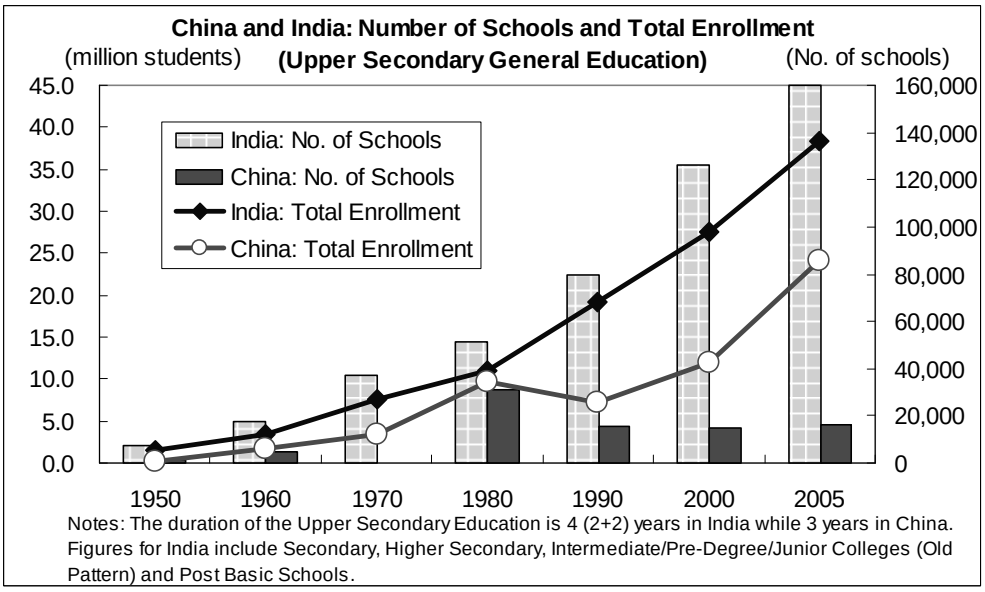
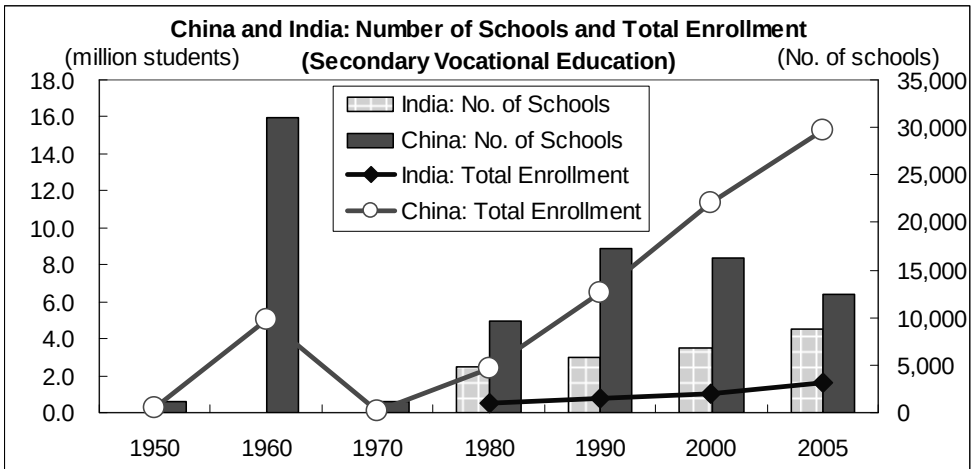
Appendix Figure 1: Number of Educational Institutions and Total Enrollment in China and India by Level of Education



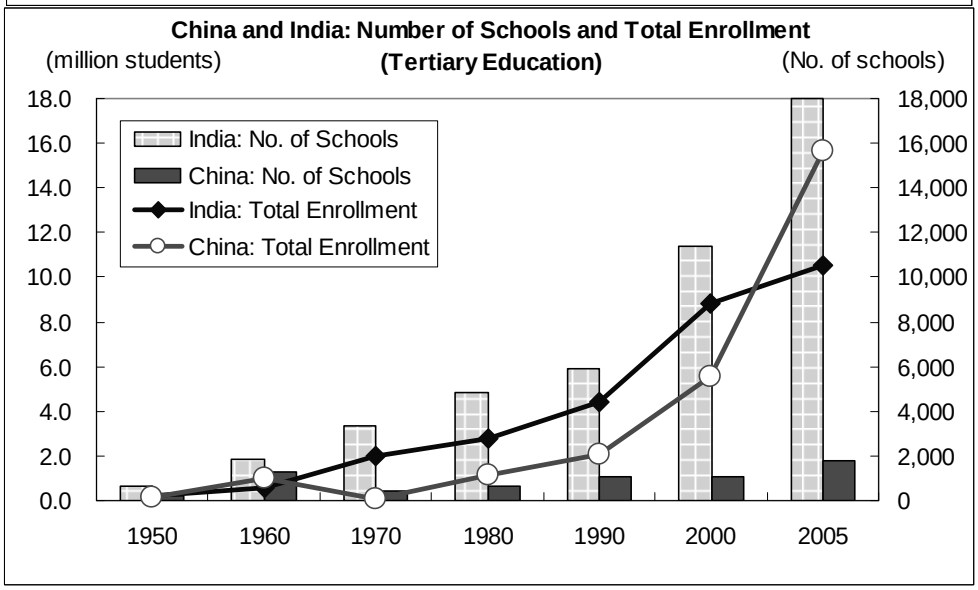




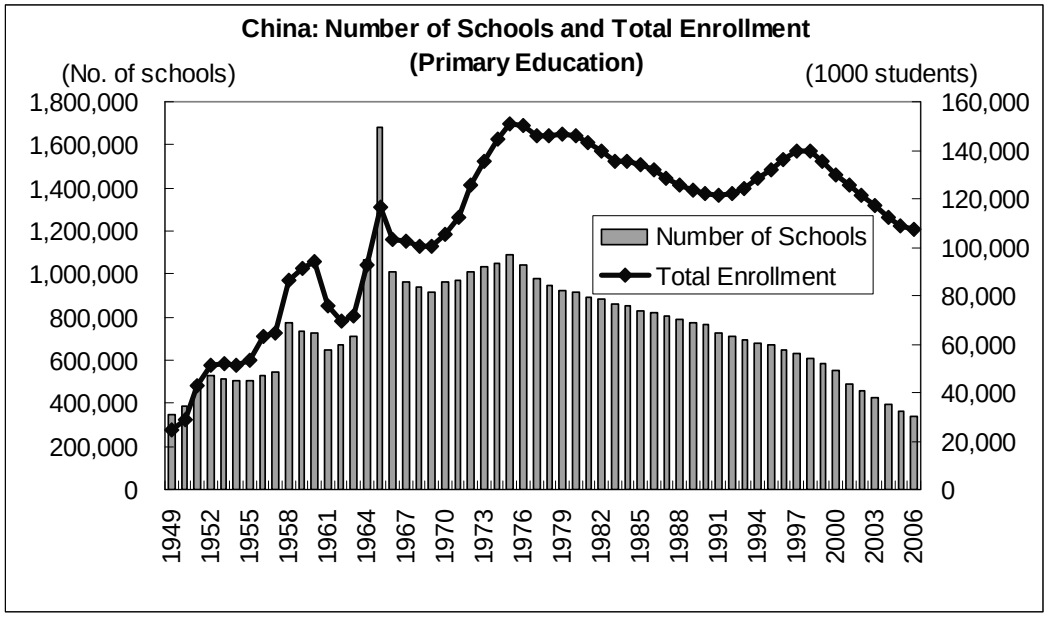
Notes: The duration of the Upper Secondary Education is 4 (2+2) years in India while 3 years in China. Figures for India include Secondary, Higher Secondary, Intermediate/Pre-Degree/Junior Colleges (Old Pattern) and Post Basic Schools.

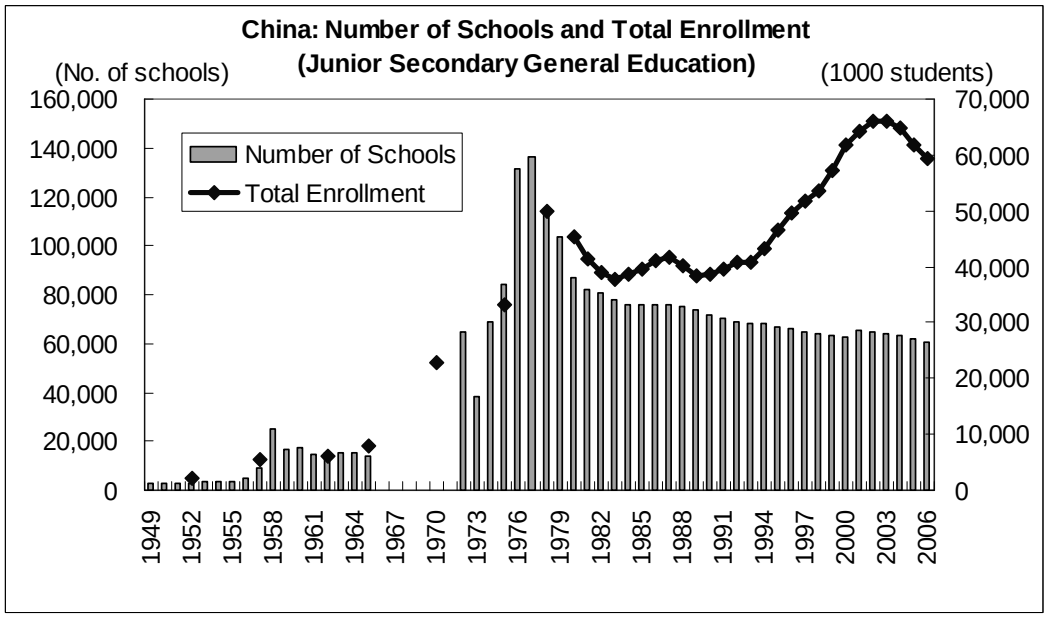


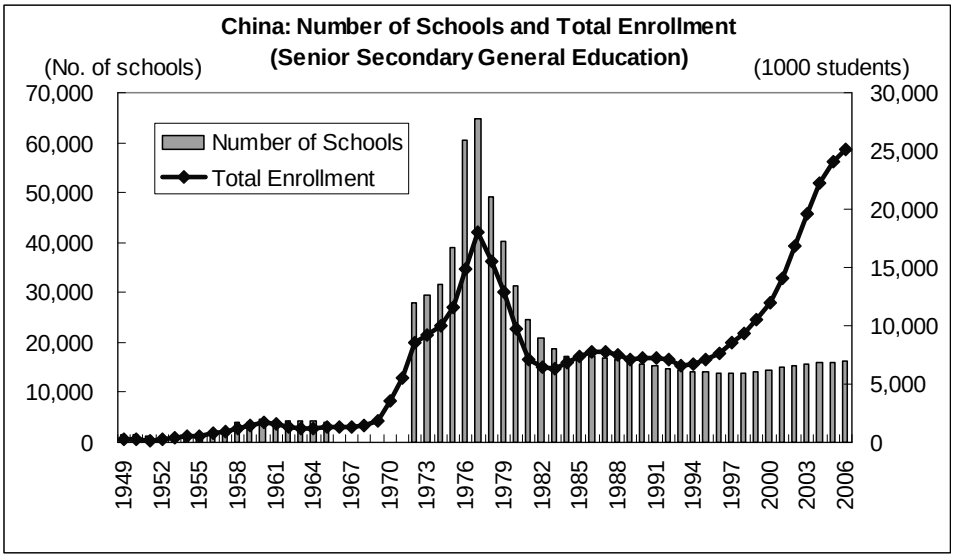
Note: India's figures in 1980 are those for 1981. Secondary vocational schools includes Regular Specialized Secondary Schools, Vocational Secondary Schools (senior and junior) and Technical Schools for China, and below degree level professional / technical / vocational schools (Teachers' training schools, technical & industrial and arts & crafts schools and Polytechnics) for India. Vocational Education at +2 level is not included in India.

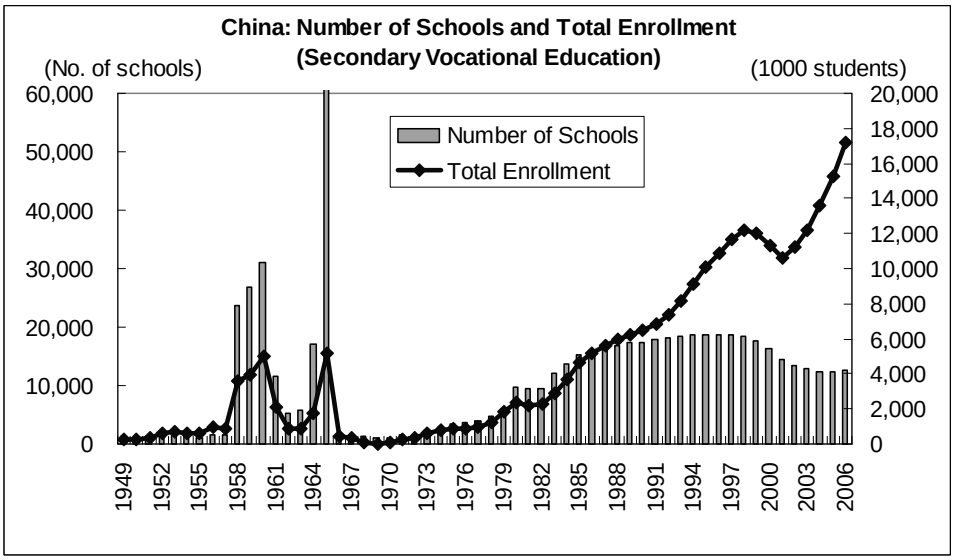


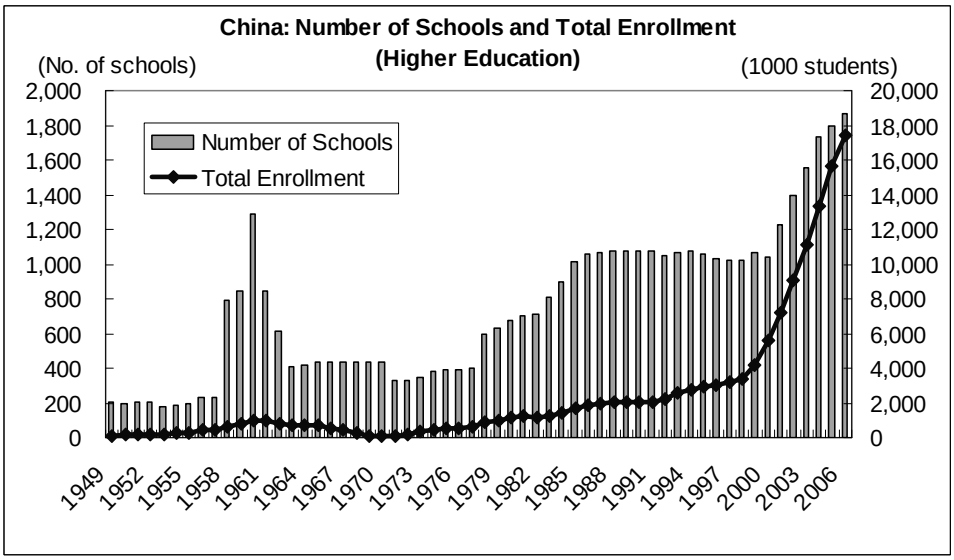
Appendix Figure 2: Number of Educational Institutions and Total Enrollment in China by Level of Education






China: Number of Schools and Total Enrollment
(Senior Secondary General Education)
(No. of schools)
(1000 students)
Number of Schools
Total Enrollment
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
30,000
25,000
20,000
15,000
10,000
5,000
0
1949 1952 1955 1958 1961 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006


China: Number of Schools and Total Enrollment
(Secondary Vocational Education)
(No. of schools)
(1000 students)
Number of Schools
Total Enrollment
60,000
50,000
40,000
30,000
20,000
10,000
0
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1949 1952 1955 1958 1961 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006


China: Number of Schools and Total Enrollment
(Higher Education)
(No. of schools)
(1000 students)
Number of Schools
Total Enrollment
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
1949 1952 1955 1958 1961 1964 1967 1970 1973 1976 1979 1982 1985 1988 1991 1994 1997 2000 2003 2006