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Education and Economic Growth
A Comparative Study of China and India[1]

Lakshmi K. Raut[2]

12.1 INTRODUCTION

The initial conditions in 1950 of the newly formed People's Republic of China (PRC) and newly independent India – the world's two most populous economies – were similar: low per capita income, high levels of poverty and low education. However, they followed dramatically different political systems – a highly centralized one-party system with first a command and then a socialist market economic structure in China and a multi-party democratic parliamentary political system with a highly regulated capitalist economic structure in India. China has attained a miracle by sustaining high growth rates and attaining the top rank in an international student assessment test. China sustained high growth rates, close to 10 percent, over the past 35 years. In recent years, Shanghai-China ranked top among the 74 countries of the OECD and 10 other countries in the PISA tests in science, mathematics, and reading for 15-year-old schoolchildren. India has not done as well. Except for a brief spurt of high growth in the 1990s and early 2000s, India's growth rates have been around 5 per cent during the period. In the PISA tests in 2009, India ranked

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[2] Corresponding author: Lakshmi K. Raut. Raut is a Visiting Fellow at the University of Chicago and a Visiting Professor at the Indian Institute of Management Udaipur. This chapter was prepared while on leave visiting Institute of Economic Growth, New Delhi, Indian Statistical Institute, Kolkata, and Indian Institute of Management, Udaipur.

next to last, just above Kyrgyzstan and in the Trends in International Mathematics and Science Study (TIMSS) test among 51 countries in 2005, India ranked near the bottom (Pritchett (2012) for PISA results and Das and Zajonc (2010) for TIMSS results). No country in the world achieved Newly Industrialized Country (NIC) status without providing its labour force a high-quality education or at least providing basic education first and later vocational secondary education and a high-quality tertiary education, at an internationally comparable standard. With high income growth over the past three decades, China reduced poverty by around 500 million people (World Bank, 2013). Like China, India would like to achieve persistent high economic growth and eliminate poverty.

What leads to sustained high economic growth? It has been argued in the literature that important sources of growth are globalization – along the lines of free international trade and capital movement – and policies that foster infrastructure, market competition, R&D and human capital.[3] The current administration in India has been pushing for foreign investment to achieve high growth. Of the two types of foreign investment – Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) – FDI is better for the economic growth of a developing country, as it brings more efficient and productive technology and management skills of the developed source country, whereas FPI is purely financial; FDI is long term and more stable, but FPI is short term and more volatile. Once an economy develops signs of problems, FPI leaves immediately, whereas foreign stakeholders of FDI try their best to salvage the company and may eventually prevent the economy from deteriorating. As technology brought in by foreign investors can spill over to the rest of the economy, FDI is an important engine of growth and the effectiveness and degree of such spillover depends on the absorptive capacity of the labour force, which is determined by its education level. The mechanism for growth through import of technology is similar. Among NICs in East Asia, growth has been FDI-led in Singapore and Taiwan and led by the purchase of foreign technology in South Korea and Japan. All these countries developed a highly educated labour force to complement superior, productive, foreign technology, which helped them achieve high growth (for cross-country evidence, see Borensztein et al., 1998; Levin and

[3] To see it simply, consider the growth accounting framework used in Raut (2007, Section 5). Let the aggregate output of an economy at time t be given by $Y_t = A_t F(K_t, b_t L_t)$, where K_t is the capital, $b_t L_t$ is the labour in efficiency unit, b_t is the productivity level of a unit of labour and L_t is the number of labour hours and A_t is the factor neutral productivity level, acting as an externality. Growth in b_t is an increasing function of the education level of a representative worker; the effective stock of capital K_t increases with R&D or FDI containing better technology; A_t increases with infrastructure, the stock of technological knowledge which depends positively on the education levels of the labour force and the R&D activities in the economy; A_t is the spillover effect. Growth in income comes from growth in A_t, K_t, L_t or b_t.

Raut 1997; and Raut 2007; for evidence on China, based on province-level data, see Lai et al., 2006).

The question is, where does FDI flow to? Simple economic theory tells us that the return to capital is a function of the productivity level of labour.[4] A more advanced technology embodied in FDI, especially in today's knowledge-based production technologies, will require skilled or better-educated labour to operate it and will produce greater output at a higher rate of return. Lucas (1990) argued that capital will flow to countries with better human capital. As argued earlier, the rate of return on FDI may also depend positively on infrastructure (for some cross-country evidence, see Raut, (2007) Section 5).

China has been able to draw a large amount of FDI, which has helped China to sustain its high growth performance. India could not draw much FDI, but it drew a relatively large amount of FPI through the stock market for a while, until it started falling with the declining growth rate of the economy (for more on this, see Srinivasan (2013)).

Developing countries can imitate the technologies of developed countries and grow rapidly, but only up to the point where the technology gap narrows. After that, they need to produce their own in-house technologies to maintain their growth; otherwise, they fall into what has recently been called the 'middle-income trap' – after reaching the middle-income level, the economy stops growing. To avoid the middle-income trap, Agenor and Canuto (2012) emphasize the importance of higher education. Some economists argue that the much advocated maxim of the endogenous growth literature – a higher level of education leads to a higher growth rate – is not consistent with the data of many countries; many of these economists recommend the policy of creating economic growth first and then providing basic education for the masses. For growth, the quality of education is more important than the level of education as measured by the number of years of education or the enrolment rates at the primary, secondary, and tertiary levels of education. In an endogenous growth framework, Raut (1995) argues, the driving force of long-run growth lies in mobilizing a talent pool from the population and then educating it and placing it in the appropriate sector. Cross-country empirical studies (first, Hanushek and Kimko (2000), followed by a number of other studies, such as Hanushek and Woessmann (2008, 2012) and the references there) showed that the quality of education of the labour force, as reflected in the TIMSS and PISA test scores, has a significantly positive effect on growth; and the econometric tests

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[4] The rate of return to capital, i.e., the marginal product of capital, $r_t = \partial Y_t / \partial K_t = A_t f'(\tilde{k}_t)$, where $\tilde{k}_t = K_t / (b_t L_t)$. Note that given everything else is constant, the higher the productivity level b_t of the labour, the higher is the rate of return to capital r_t.

of causality showed that better education level of the workforce leads to a higher rate of economic growth, but not the other way round.

Apart from providing absorptive capacity for FDI to be productive, education increases individual labour productivity, even in agriculture and hence increases overall economic growth. Zhu et al. (2008) analyzed the China Economic, Population, Nutrition, and Health Survey data for eight provinces during the period 1989–2004 and found that a large part of the income change during the fifteen-year period was due to increased returns to education and to the shift of skilled labour from agriculture to manufacturing. Education, especially female education, has many other positive effects, on the health of the whole family. Furthermore, education influences income inequality, the much debated ill observed growing in almost all economies (Piketty and Saez, 2014); educational inequality exacerbates earning inequality which, in turn, increases income inequality (see, for instance, Autor, 2014 and Summers, 2014).

In today's highly globalized world, countries that have caught up to the global technology frontier need to produce their own new technologies and products to retain their competitive edge and maintain growth. Thus, producing a large, talented, highly educated, innovative labour force is the key. Most developed countries are benchmarking their education systems to the world's top-performing schools, so that they produce a highly educated talented labour force to remain competitive in the global markets (for more on the international benchmarking of education initiatives taken by the OECD countries, see Tucker, (2011, p. 7)). Both India and China lack the large pool of skilled labour at the global standard that can produce and utilize new technologies and make their economies growing (for evidence on the dearth of qualified skilled labour, for instance, see Johnson and McGregor, (2006)).

Deng Xiaoping spearheaded the liberalization policies for China's education, industrialization and transition to a more efficient socialist market economy. During the Mao regime (1949–1976), China developed some infrastructure and the basic human capital of the labour force. Starting with the Deng Xiaoping regime in 1978, China made comprehensive reforms to provide, first, basic education for all, and then, higher education for a competitively selected talented group of students and vocational education for the rest. In 2009, China attained the world's top rating for basic education for the masses in Shanghai – one of China's provinces – as can be seen from the 2009 PISA test results. China is spreading the good techniques and experiences of Shanghai to the rest of the country to attain top-quality primary education for the whole economy and reduce inequalities in the basic educational outcomes. China has also been positioning itself to produce the top-rated technically educated work force for doing frontier technological research in the future to maintain its high growth and avoid the middle-income

trap (World Bank, 2013, Part I, Chapter 4, Part II, Chapter 2). India's educational performance, on the other hand, has remained very poor and the quality of its basic education has been deteriorating (see, for instance, the PISA results mentioned earlier and the results reported in the chapter later and a recent *New York Times* article, Rosenberg, 2014). This is true even for the state of Kerala, much lauded for its superior performance in attaining mass education and on other social development indicators, despite relatively low per capita income – known in the literature as the 'Kerala model of development'.[5]

In this chapter, I compare the education systems of China and India and examine what India can learn from the negative and positive experiences of China's policy experiments with education during the Mao and the post-Mao periods. I address three main topics:

1. The broad educational strategies followed by the two countries for primary, secondary, vocational and higher education.
2. The education delivery systems: The kind of centralization – decentralization – privatization of education financing and curricular reform policies that were followed by each country and how these policies affected their educational quality and disparities.
3. Parents' motivation to educate their children, children's motivation to learn and teachers' motivation to learn and teach better.

Many OECD countries have been sending their envoys to China to learn how Shanghai-China achieved high average PISA test scores with low inequality. Based on their findings and the analyses of PISA results by many educators and researchers (see, for instance, Cheng, 2011; OECD, 2011; Tan, 2013; Tucker, 2011; and Walker, 2011), the consensus is that quality teachers are the main vehicle for student performance. The ways to produce quality teachers and motivate them to teach better are complex and depend on the methods used to recruit and train teachers and make them accountable. Other important factors are the quality, choice, financing and infrastructure of schools; decentralization of the school

[5] A long-standing issue in the development literature has been whether to have growth first and then provide mass education, or whether to provide mass education first, or simultaneously with growth. See Bhagwati and Panagariya (2013) favouring the first approach and Sen (1981) for the latter approach; see Raut (1993) for some econometric issues on the earlier debate on Sen's argument. Recently, the debate became very heated and bitter; see, for instance, the news articles Acharya (2013) and Harris (2013). As I have argued earlier, the empirical evidence from the NICs and China suggests that these countries first provided basic education to the masses and higher education for a talented group of students and vocational education to the rest, which put these countries on high growth trajectories. With economic growth, these countries improved the quality of their education.

curriculum; degree of emphasis on exams; language of instruction; and common core exams to benchmark students' achievements across schools in the country and between countries. It is beyond the scope of this chapter to cover all these issues, but I will deal with a few important questions. I will also point out what we learn statistically from the public domain dataset, India Human Development Survey (IHDS) of 2005,[6] and about the importance of some of these factors that can be measured in this dataset. I then draw from the techniques that Shanghai-China and a few other East Asian countries adapted to attain high performance in PISA (measured in average score with low disparity) and what positive lessons India can learn to achieve higher educational attainment with equality.

This chapter is organized as follows:

- Section 12.2 briefly describes the education systems of China and India and the main education policies they followed since the 1950s.
- Section 12.3 describes the broad educational outcomes of the two economies.
- Section 12.4 provides some theoretical explanations for the observed variations in school outcomes.
- Section 12.5 uses the nationally representative public domain sample survey data, the IHDS 2005, to see what kinds of factors are conducive to learning for children from various social, regional, and economic groups in India.
- Section 12.6 concludes the chapter with policy lessons.

12.2 EDUCATION SYSTEMS IN CHINA AND INDIA

I describe the broad nature of the educational policies followed in the two countries since 1950. We will see that China first provided basic education to its masses mostly through the public education system and then developed its vocational and higher education sectors, providing higher education to a group of talented children and vocational education to the rest. After independence from Japan, South Korea also followed the same path. In the 1980s and 1990s, China was still a very poor country; so, its tax base was very low. As a result, China decentralized public financing of schooling to the state and local government levels, imposed school fees to cover costs and encouraged individuals and communities at the village and town levels to contribute to or even open private schools.

[6] The India Human Development Survey 2005 was the only nationally representative dataset available in the public domain at the time of writing this chapter.

India first subsidized higher education for its British-created elites through the public system, ignoring basic education and vocational education for the masses. Recently, India began trying to provide basic education and vocational education to all with public-private initiatives, but its attempts to reform education, implement decentralization and enforce laws such as ban on child labour and compulsory basic education for all mostly failed, due to the lack of political will and conflicts with interest groups.

I will also highlight the nature of the educational inequalities that resulted from the education policies of the two countries.

12.2.1 China

Since the establishment of the PRC in 1949, education has gone through a series of reforms. Its nature was dictated by the regimes of political leaders – Mao Zedong (1949–1976), Deng Xiaoping (1978–1996) and Jiang Zemin and others (1997 onwards).

Education has been the centrepiece of the major socio-political and economic reforms in the PRC. Before, China was a feudalistic economy and had a Confucian-style private education system that dated to 2000 BC. By passing the highly competitive civil service examination, one could win a position among the king's ministers and become part of the elite. Only male students participated in that examination. All citizens believed that by hard work, one could pass the examination, but the children of well-to-do families, which could afford more resources for preparation, had an advantage over the children of poor peasants who could not afford the time or cost of preparation or forego earnings. There are, however, examples of whole villages supporting the preparation of exceptionally talented and dedicated youth in the hope that they would pass the examination and share the benefits of their position in the state bureaucracy with people in their village.

The Confucian system attaches great value to education and produces in individuals the social values of diligence, hard work, and respecting teachers. This value system has survived all reforms to the present day and has produced a high social demand for education. Before 1949, citizens could migrate to cities freely and could avail the opportunity of earning an education, which was equally available to the whole population – although richer families had a slightly higher advantage and only a few could earn it. Just before 1949, the literacy rate (where 'literacy' was the knowledge of a few hundred Chinese characters or more) was only 2 per cent for women and 30 to 40 per cent for men and much lower in the rural sector (Pepper, 1987, p. 186 and Table 2); and only a very small percentage of the school-age population was actually in school – 25 per cent of the primary education age group (grades I–VI), 3 per cent of the secondary education age group (grades 7–12) and 0.3 per cent of the tertiary education age group.

Mao Zedong period (1949–1976) of educational reforms

After the PRC was created in 1949, Mao Zedong converted it into a command economy in the Marxist-Leninist mould. During the initial reconstruction and the first plan period (1949–1957), all schools were converted to state or public schools – either full time cadre or spare time schools in rural and urban areas for workers and farmers. Education was looked at as a vehicle for promoting social equality and for political/ideological development, but not as economic development leading to higher individual earnings, as Mao viewed it as bourgeois. His main goals were to train cadres, train workers for different skills and create unified secondary school and college entrance examinations. The teaching curricula and management of schools and colleges were modelled on the then Soviet Russian system. The policy target was set in 1956 to achieve universal primary education of 7–12 years with a strategy of *walking on two legs*, i.e., education to be provided by both public- and people-run schools, known as *minban* (Wang, 2003, Chapter 1; Tsang, 2000). Soon, people in the rural areas began migrating to the urban areas. To prevent overcrowding, the leadership introduced the *hukou* (family registration system), which classified individuals by birth location and forbade rural households from migrating to urban areas. Enforced by 1958, the *hukou* kept cities from overcrowding, but also created large disparities in the educational achievements and earnings through the leadership regime and a caste system or rural serfdom (Whyte, 2010).

The second phase of Mao's regime (1958–1965) included the second plan and the 'Great Leap Forward'. By building a large number of small-scale rural factories and making workers (as also peasants in agriculture) work hard, Mao wanted to transform China from a poor agricultural economy to a modern industrial one. To enable China to compete with other nations, Mao introduced the Soviet model of education and later adapted it to meet the Chinese needs – he modified the curriculum, introduced productive labour classes and made educational institutions run factories and factories run schools. Mao 'pushed the consolidation of the communes, set up communal mess halls and backyard iron blast furnaces, confiscated all private property and guaranteed food, clothing, and even haircuts to all' (Butterfield, 1982, p. 242). He introduced two types of schools – vocational secondary schools to teach applied science and 'key schools' in cities to prepare students for higher education; these students were to help make factories more productive and become the elite of the society (Tsang, 2000; Wang, 2003). The Great Leap Forward was disastrous. Around 16.5 million extra people died in three years due to exhaustion, malnutrition, and lack of food (see Butterfield, 1982, p. 242 for statistics and personal accounts of some survivors).

The third phase of Mao's regime (1966–1976) is known as the 'Cultural Revolution'. Finding that schools had become too elitist and discriminated against

children from disadvantaged poor and rural families, Mao abolished college entrance exams and selected students, faculty members and school administrators for colleges from among farmers, workers, and soldiers. Many city colleges and secondary schools were closed down and their faculties and teachers sent to teach in rural schools or work in rural factories. After Mao Zedong's death in 1976, the consensus was that China lost a whole generation of human capital formation during the 10 years of the Cultural Revolution – the darkest time in its history of education. However, some believe that despite losses in the higher education sector, gaps in enrolment rates and in the quality of primary education between rural and urban areas were substantially narrowed (Johnson, 2000; Pepper, 1987).

Educational reforms post Mao (1978 onwards)

After Mao's death in 1976, the Deng Xiaoping leadership (1978–1997), starting with the above initial conditions, elevated the Chinese economy into a miraculous growth path. Deng Xiaoping gave up the centrally planned command economic structure and introduced many reforms to transform China into a 'socialist market economy'. He introduced his 'open door' and 'let some get rich first' policies – he liberalized exports and imports of goods and services; encouraged huge inflows of FDI and high domestic investment, especially in infrastructure; replaced the commune mode of production in the production sector with the 'family responsibility system'; decentralized financing of public services, including education, to state/provincial and local governments and centralized much of the administration and permitted the centre to maintain the quality of the public delivery system.

During the Mao regime, agricultural production (and also industrial production) was organized into communes (teams). Each commune had a quota of output to supply to the centre and each worker in a commune earned a fixed compensation for their labour. Individuals did not have incentives to work hard or to produce more than the quota. These were inefficient modes of production. Xiaoping introduced decentralization and marketization of production. He replaced the communes in agriculture with the 'family responsibility system', in which each household in rural areas was given a plot of land to lease over a long period. The households were allowed to make their own production decision, including the type of crop to produce. After paying the government its quota (reduced substantially from the quota of the commune system), households could keep the proceeds or sell them in the competitive market or use them for their own consumption; they did not earn any compensation for their labour (for details, see Lin, 1987).

Coupled with the already attained basic education for the masses that the Mao regime had created, the incentive scheme of the family responsibility system increased the productivity of agricultural labour. Agricultural output began to grow at a high rate and rural poverty was reduced by a large extent. Industrial productivity and output growth in urban areas was also high – due to high

investment, high exports of manufacturing products, import of investment goods and FDI containing more efficient advanced technology, which was complemented by a growing, better educated labour force. As a result, the economy began growing at around 10 per cent per year and continues to do so (for a demystification of China's growth miracle, see Lin, 2011, 2013).

The Deng Xiaoping regime viewed education as the foundation of his four modernization plan (of agriculture, industry, national defence, and science and technology). Xiaoping emphasized the development of high-quality vocational and science and technology education. He reintroduced key schools in urban areas and central schools in rural areas and resumed national entrance examinations for admission into key middle and high schools and for higher education at the universities. To create a large pool of highly talented, technically educated workers, known as the elite class, entrance examinations were opened to the whole population. His regime recognized this elite class as crucial to carry out his four modernization plan. He reintroduced vocational education in secondary schools; its graduates were an integral part of his four modernization plan.

The promulgation of the *1985 CCP Decision* and the *1993 Outline for Reform and Development of Education in China* included the goals of achieving nine-year compulsory education for all by 2000; decentralizing the financing of education, including basic education, to the state/provincial and local government levels and restructuring higher education to be suitable for the Chinese industry. As the tax base of the Chinese economy was low at that time, due to the low per capita income, the central government was not in a position to provide many public services, including education; so, the financing of public services was decentralized out of necessity. To improve efficiency and to maintain the quality of education, the centre devolved most responsibilities to lower level governments, especially for the higher education sector, but retained oversight of administration and quality control.

> The 1985 decision stated that the key to restructuring higher education lies in eliminating excessive government control over schools and higher education institutions and under the guidance of the state policies and plans in education, extending the decision-making power of the colleges and universities and strengthening their ties with production units, scientific research institutions and similar sectors, so that they will have the initiative and ability to serve economic and social development … [T]he government began to engage in macro-management through legislation, allocation of funding, planning, information service, policy guidance and essential administration. (Mok and Ngok, 2008, p. 174)

In the newly introduced household responsibility system, quotas were lowered, so revenues from communes were low. Therefore, to finance part of the expense of

public education, the government introduced education surcharges in urban areas and education levies in rural areas; the remainder was to be covered by school-generated funds, external resources, and school fees. School-generated funds included student labour, profits from school-run factories and renting of school premises for outside activities (to the extent that it did not affect the academic performance of students). But even all these sources could not cover much of the total education cost in poor villages and remote areas – school fees for parents were a high 16 per cent in urban areas and about 35 per cent in rural areas (Heckman, 2005, p. 61, Table 12) – and these schools were of very poor quality. There has been a lot of discussion on whether this blocked urbanization too much and hindered growth (Au and Henderson, 2006).

Because rural households could not migrate to urban areas due to the *hukou*, the decentralization policy created a huge rural-urban gap in education. The government introduced public-run, low-cost, semi-private schools (*minban*) and private-run primary schools and oversaw curriculum and quality standards. The Hope Project was created for a benevolent public to contribute money and the proceeds used to compensate poor parents for sending their children to school, instead of making them work, and to cover the maintenance of school infrastructure. (See an account in *Not One Less*, an award-winning documentary-like movie made by the world-renowned director Zhang Yimou in 1999. The government used the movie to generate large contributions to the Hope Project from a sympathetic public. Also see the story of the movie and an analysis along the above line by Johnson, 2000). China enacted a law banning child labour and another making nine years of education compulsory for all and enforced both laws strictly (for further analysis of decentralization-centralization of education in China, see Hawkins, 2000; Mok and Wat, 1998; and Tsang, 1996, 2000).

The decentralization of school financing to local governments, with very little transfer of revenue from richer to poorer areas, led to much disparity in educational outcomes, and therefore, discontent among the Chinese. The 2006 *Revised Law of Compulsory Education* changed the structure of subsidies given to students to cover a portion of the unit school costs – 80 per cent in underdeveloped provinces, 60 per cent in medium developed provinces and nothing in developed provinces. The July 2010 *Outline for Medium and Long-term Development and Reform of Education* introduced universal preschool education.

Judiciously designing the decentralization process helped China achieve world-class education, as we will see in the next subsection.

Shanghai-China

China has 22 provinces and 4 municipal cities (Beijing, Shanghai, Tianjin and Chongching) under the jurisdiction of the central government and five autonomous

regions (Inner Mongolia, Guanxi Zuangxi, Ningxia Hui, Xinjang Uygure and Tibet). Shanghai, one of the largest cosmopolitan cities in China, has a population of around 21 million and the most developed education system. It has 16 districts and one county and is managed in a two-tier government system-municipal government (state-level government) and district/county-level government (local government). Except for five secondary schools, which are governed directly by the municipal government, all primary, junior, and senior secondary schools are governed by the district/county-level governments and the student-to-teacher ratio in these schools is around 15:1.

The central government has granted autonomy to experiment with and implement innovative curriculum reforms, teaching techniques, and teacher training methods. Successful techniques are transferred to the rest of the schools.

Shanghai was the first to implement universal nine-year compulsory education. It attained a net enrollment ratio of 98 per cent in preschool, 99.9 per cent in primary and junior secondary school, 97 per cent in senior secondary school (both general and vocational) and 80 per cent in universities for higher education. Shanghai outperformed all countries in PISA 2009 with an average score of 556 in reading assessment (compared to 536 for Finland, 515 for Australia and 500 for the US), 600 in mathematics (compared to 541 for Finland, 514 for Australia and 487 for the US) and 575 in science (compared to 554 for Finland, 527 for Australia and 502 for the US).[7]

What made Shanghai achieve top performance, defined as the highest average scores with very low inequality, in the PISA 2009 tests, which are designed to measure creativity and innovativeness? Most researchers and educators attribute Shanghai's success to the following factors.

Confucian culture, which instills in individuals a high value for education, high respect for teachers, the belief that everyone can succeed in education and in life with hard work, and in teachers a strong commitment to teaching excellence.

The success of the government's experimentation with and implementation of curriculum reforms. The first curriculum reform was introduced in 1988 to teach course materials that meet societal needs and find ways to raise student development. The second curriculum reform was introduced in 1998, to inculcate creative thinking and active learning in students, instead of rote learning and to help students master materials at the international standard. The new curriculum includes common core courses, to be mastered by all students and a number of elective and extra-curricular activities, which students can choose according to their tastes, preferences and personal drives, to participate in.

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[7] See OECD (2011, pp. 57–59).

Judicious utilization of the decentralized school management system, which helped achieve efficiency and excellence. This included teacher training; upgrading teacher recruitment standards; mentoring teachers; professional teacher development at the municipal, district and school levels; teacher appraisal, competition and accountability; forming parents-teachers associations (PTA) to involve parents in their children's learning process; ensuring teacher accountability and improving effectiveness of teacher assessment. Teachers in Shanghai teach very few hours a week; they spend most of their school time on professional development and in learning new teaching materials and preparing for classes.

To overcome disparity and inequality in educational achievement, the Shanghai municipal government introduced a number of measures. It phased out key schools and had parents choose a school for their children in their own neighbourhood. If parents wanted to send their children to a school they preferred, they were required to pay a fee. The government grouped low-performing schools with high-performing schools so that teachers could share teaching techniques and even sent teachers from high-performing schools to low-performing schools to mentor teachers by teaching there and also sent teachers from low-performing schools to high-performing schools to be mentored.

> Some colleagues ask, what is Shanghai's objective in participating in PISA? There are three objectives. First, we hope to use an international assessment system such as PISA to know where we stand in our basic education. Secondly, Shanghai has carried out basic education reform for many years. We hope to use an international benchmark to measure the effect of the reform. Thirdly, we will be able to learn progressive educational ideologies and techniques from our participation in PISA in order to improve our assessment approach. (Yinqiao Jiang, quoted in Tan, 2013, p. 5).

To learn more along these lines and other issues, see the excellent book by Tan (2013), which is like a magic school bus tour through Shanghai schools, and the *New York Times* article by Friedman (2013). For other accounts of the lessons that the US and other countries can learn from the strong and successful reforms in Shanghai, see OECD (2011), Sellar and Lingard (2013) and Tucker (2011). For further discussion on centralization-decentralization issues in educational development of Shanghai, see Ngok and Chan (2004).

12.2.2 India

In India, schools used to be available to all and there were schools in almost all villages – *patsala*s for Hindus and *madrassa*s for Muslims – until the 1830s, when Lord Thomas Macaulay 'put in place an elitist system designed to train a small

class of English-educated Indians serving' – in his own words – 'as interpreters between us and the millions whom we govern, a class of persons Indian in blood and colour but English in taste, in opinions, in morals and in intellect' (Arnove, 1984, pp. 379–380). It was assumed that those Indian elites would spread the modern education system, with subjects such as science and mathematics, to the masses; unfortunately, that has not happened so far.

During the first half of the twentieth century, before India's independence, Rabindranath Tagore and Mahatma Gandhi strongly opposed the education system introduced by the British in India. Both had proposed highly developed and well-thought-out alternative education systems for India, which coincidentally had similarities with the education theories of Dewey and Tolstoy and also with the education system that China later introduced, especially the financial decentralization and some of the curricula of the Deng Xiaoping regime. Tagore strongly emphasized mass education and as the government would not have enough tax revenue to finance education, he proposed that the management and financing of basic education be decentralized to the village level, with voluntary contributions from villagers. This is similar to what Deng Xiaoping did in China later, except that he made contributions mandatory. Tagore advocated teaching in *patsala*s in the style of Kalidas's Tapovan, as he believed that closeness to nature can nurture creativity in young minds. His curriculum emphasized a combination of art, music, and science. Tagore emphasized strongly that one's mother tongue and not English, be the medium of instruction and that the curriculum should include teaching materials that relate to the Indian context, instead of the foreign context that the British introduced, as that would make children creative. Tagore emphasized that science should be part of the curriculum. Using his own resources and time, he opened a school in Shantiniketan and Visva-Bharati University. Both used his own curriculum and teaching techniques and are in operation to this day, without changing his basic principles.

In his *Nayee Taalim*, Mahatma Gandhi had many ideas about basic education similar to Tagore's, with a few notable differences. He emphasized that in their first few years at school, children should not do formal studies and instead learn handicraft, especially *charkha*, to discipline themselves for later formal education. Gandhi's notion is the equivalent of 'preschooling' in modern education theory (see Heckman and Raut, 2013, 2016; and Raut, 2003, on the usefulness of preschool). Gandhi also recognized that in a poor country like India, the government would be unable to finance mass education and proposed that children in villages spend part of their time producing handicrafts for the market, the proceeds of which could be used to pay for their schooling. This was to be done judiciously, so that children were not misused or exploited by school authorities for personal gain and their studies were not hampered.

These ideas of financing basic education in poor villages were coincidentally utilized by the Deng Xiaoping regime to make up for shortages of school funds in poor rural areas. Like Tagore, Gandhi advocated that the mother tongue be used as the medium of instruction and that English be introduced as a subject in later grades. Both Tagore and Gandhi observed that in the British education system in India with English as the medium of instruction, teachers were not given the freedom to experiment with teaching materials and techniques and as students were assessed on test scores, they ended up learning by rote instead of through active and creative learning. Although a casual reading of Gandhi's writings on education might give the impression that he was against science and industrialization, a careful analysis would show that he was not as hostile as is generally argued (Kumar, 2005, p. 20, Chapter VII). For a detailed analysis of the education theories of Tagore and Gandhi, see Acharya (1997), Bhattacharya (2014) and Kumar (2005).

After independence, as documented in Article 45 of its Constitution (1950), India expressed its desire for achieving education for all children in the 6–14 age group. The curriculum was to be modern and science-based. But the then Prime Minister Jawaharlal Nehru, following the Soviet planning model and education system for industrialization, gave up the idea of mass education and instead focused on higher education; primary and secondary education was concentrated in the urban educated elite that the British had created. Nehru's lack of political will for providing basic education to the masses could have been due to pressure from the powerful group of land and capital owners, so that they could get cheap labour, as pointed out by Kumar (2005, p. 190).

The 2009 Right To Education (RTE) act and its main predecessors

Primary education was governed by states and union territories until 1976, when the forty-second amendment to the Constitution moved education to the *concurrent list*, and made the centre and states share the responsibilities of funding and administering education; in case of conflict, it vested the centre with the power to govern in all matters of education. At the time of independence, the policy-makers had it in mind to decentralize education to the local level of government, in the three-tier governance structure of central, state, and local government (Panchayat Raj), as Mahatma Gandhi had suggested. Although the Constitution gave the Panchayat Raj at the local level an important role in administering education, state and union territory governments exercised the most power in practice. It was tried many other times, but failed, due to the lack of political will to implement it. In more recent attempts, it was found that upper castes and property owners in villages gamed the system to become managers at the local government level, instead of letting democratically elected individuals become managers.

Another hope inspired and initiated from the centre is that a system of locally elected bodies, the Panchayati Raj, better known under the label 'democratic decentralisation' or 'democratic planning' will encourage the masses to participate in the management of local affairs and thereby weaken the power of the local political bosses … the most conspicuous immediate effect of such efforts has been to strengthen the grip of the rural elite, the self-elected boss class, over the masses. Whenever locally elected bodies are given powers worth scrambling for, they are almost invariably run in the interests of the dominant caste in land and wealth. The system of Panchayati Raj, like the basic democracies in Pakistan, has not, in general, thrown up any new leadership in rural areas. (Myrdal, 1968, p. 299), quoted in Govinda and Bandyopadhyay, 2006, p. 161).

Further efforts to decentralize the education system in India and its failures are summarized in Mukundan and Bray (2006, p. 228).

Interest in Panchayati Raj Institutions fluctuated during the initial post-Independence decades, but in the 1980s, they were the focus of a major resurgence of attention. This led the national government in 1992 to pass two amendments to the Indian constitution and to require all state governments to create a three-tier system of strong, viable and responsive panchayats at the village, intermediate and district levels of rural areas and in the municipalities of urban areas. State governments were expected to devolve adequate powers, responsibilities, and finances on these elected bodies, to enable them to prepare plans and implement schemes for economic development and social justice.

Also, see Govinda and Bandyopadhyay (2006) for another account of how attempts to decentralize the education system in India failed.

Not much was accomplished with the 1976 amendment. The Government of India (GoI) later introduced bills on the National Policy on Education, 1986 (NPE) and the Programme of Action, 1992 (POA), which provided for free and compulsory education of satisfactory quality for all children below 14 years before the twenty-first century. The GoI also committed to increase the resources available for education. The main objectives of the NPE 1986 were to assure equality of primary education across gender, race and geographical location and to improve the standards of teacher education through the formation of a National Council for Teacher Education. Not much was achieved, however, and a lot of disparities in attainment of basic education remained along the rural-urban, rich-poor, and ethnic lines.

The next most important event was the introduction of the 2009 RTE bill. I quote the main features of this bill from Hill and Chalaux (2011, Box 1).

> The Right of Children to Free and Compulsory Education (RTE) Act (2009), which came into effect on 1 April 2010, enshrines in law for the first time the rights of all Indian children aged between 6 and 14 years to free and compulsory

elementary education. Under the Act, the state is liable for all direct and indirect costs of education, including tuition and the provision of uniforms and textbooks, as well as ensuring access to a place at a neighbourhood school, or alternatively free transport to the nearest school. The government is also responsible for students' ongoing attendance and completion of their studies. Enforcement of the Act is to be monitored by central and state government child protection commissions. However, to encourage parent and broader community participation in school monitoring and decision-making, schools are required to form a School Management Committee (SMC) with at least three quarters parents, and at least half women. SMCs are empowered to monitor the performance of schools and the use of government grants, to prepare school development plans and to fulfil other functions prescribed by state governments.

The Act stipulates a number of minimum standards concerning teachers and school infrastructure. All private schools are required to obtain a certificate of recognition from a government authority which requires that all standards notified in the Act be met within three years. Schools failing to do so will be subject to punitive action. School buildings must be all-weather, have a kitchen for the preparation of mid-day meals, separate toilets for girls and boys, have access to safe drinking water and a library and playground. The student-teacher ratio is capped at 30:1 for grades I to V and 35:1 for grades VI to VIII. In addition, for each school offering upper primary education, at least one specialist teacher in each of the fields of social studies, languages and science and mathematics must be employed. All teachers are required to hold a minimum qualification, determined by state government rules, within a five-year phase-in period and are to be remunerated according to state government specified norms. All teachers are required to work a minimum of 45 hours each week and 200 days per year and are prohibited from engaging in private tutoring. Teachers are also required to hold regular parent-teacher meetings.

To increase choice and to promote an inclusive education system and classroom diversity, the Act requires all private schools to allocate at least 25 per cent of places in first grade to government-funded students from officially-defined minority groups and economically disadvantaged backgrounds. Schools will be required to ensure that education is provided freely to those pupils until the completion of grade VIII and will be reimbursed directly according to whichever is lower of the cost borne by the private school or the equivalent cost in a public school.

For further details on this bill, see Hill and Chalaux (2011) and for a depiction of the lack of political wills in implementing this and previous bills, see Little (2010).

12.3 EDUCATIONAL OUTCOMES

12.3.1 Aggregate Outcomes

Table 12.1 shows a few basic statistics on China's primary education and Table 12.2 shows the corresponding statistics for India, both taken from the UNESCO database. The salient features of the broader educational outcomes in the two economies are as follows.

1. A few studies point out that the enrolment ratios in basic education that India achieved by the turn of the past century were achieved in China over 20 years earlier. Our numbers for China in Table 12.1 do not go back that far in time, but a similar picture appears. For instance, as mentioned in the previous section, both China and India set the policy goal of achieving primary education for all by the year 2000, but whereas by the turn of the century China achieved a net primary enrolment ratio of around 99 per cent, India achieved only about 80 per cent and only 93 per cent 11 years later in 2011.
2. As the numbers in column (2) of the two tables show, life expectancy in primary education in China is larger, there is a lower drop-out rate in primary schools in China than in India.
3. Currently, secondary education gross enrolment percentages are in the mid-80s in China and in the mid-60s in India and the drop-out rates are slightly lower in secondary schools in China than in India.
4. Gross enrolment in tertiary education is comparable.
5. As is clear from column (6), the expenditure on public education as a percentage of GDP is generally much lower in China than in India. Though many recommend that China increase its public educational expenditures, it is important to note that China has achieved much better educational outcomes from its spending than India.
6. Expenditure per student as a percentage of per capita income at each schooling level is another expenditure measure which can be used in comparison. The allocations are comparable. China's costs are around 6 per cent in primary education, 12 per cent in secondary education and around 60–90 per cent in tertiary education and the corresponding figures for India are around 10 per cent in primary education, around 20 per cent in secondary education and around 60–90 per cent in tertiary education.
7. The student-to-teacher ratio in India is around 40:1 in primary schools and 30:1 in secondary schools, much higher than in China, where it is about 15:1 in both primary and secondary schools.

Table 12.1: Basic educational statistics for China

Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2012	–	6.39	88.98	5.34	26.70	–	–	–	–	–	–	–	18	15
2011	–	6.33	86.61	5.06	24.33	3.55	31.63	30.22	22.79	–	–	–	17	15
2010	–	6.33	83.13	4.88	23.32	3.36	31.65	30.52	20.21	–	–	–	17	15
2009	–	6.34	79.18	4.66	21.82	3.35	32.48	31.35	19.03	–	–	–	17	16
2008	–	6.27	75.38	4.46	20.19	3.08	31.56	30.76	19.74	–	–	–	18	16
2007	–	6.10	71.26	4.26	19.97	2.88	32.30	30.63	19.90	–	–	–	18	16
2006	–	5.89	67.04	4.04	19.52	2.68	31.35	30.90	20.52	–	–	–	18	18
2005	–	–	–	–	18.34	2.52	32.35	31.85	21.87	–	–	–	19	18
2004	–	–	–	–	17.02	2.52	–	–	–	–	–	–	–	–
2003	98.70	5.59	60.18	3.62	14.97	2.54	–	–	–	–	–	–	21	19
2002	98.60	5.43	58.42	3.54	12.42	2.59	–	–	–	–	–	–	–	19
2001	99.10	5.31	58.14	3.41	9.83	2.35	–	–	–	–	–	–	22	19
2000	99.10	–	58.03	3.48	7.76	2.10	–	–	–	–	–	–	–	17
1999	99.10	–	58.24	3.47	6.61	1.91	32.60	37.41	23.98		11.54	90.00	–	–
1998	–	5.14	–	–	6.10	1.86	36.06	32.23	15.58	5.96		59.30	24	
1997	86.85	5.24	56.30	3.38	5.55	–	–	–	–	–	–	–	24	16
1996	86.96	5.34	54.51	3.27	5.07	1.87	–	–	–	–	–	–	23	16
1995	87.56	5.48	50.91	3.05	4.51	1.86	–	–	–	–	–	–	23	15
1994	89.02	5.61	47.70	2.86	3.71	2.00	–	–	–	–	–	–	22	14
1993	90.91	5.79	46.35	2.78	2.97	1.67	–	–	–	–	–	–	22	15
1992	93.04	6.00	43.49	2.61	2.90	1.67	–	–	–	–	–	–	22	15

Source: http://data.uis.unesco.org/index.aspx?queryid=181 and lang=en. The figures for 1999–2003 in column (1) from Ngok (2007, Table 5).

Note: (1) Net enrolment in primary school; (2) Life expectancy in primary school; (3) Gross enrolment in secondary school; (4) Life expectancy in secondary school; (5) Gross Enrollment Ratio (tertiary); (6) Public expenditures on education as a percentage of GDP; (7) Public expenditures on primary education as percentage of total public expenditures on education; (8) Public expenditures on secondary education as percentage of total public expenditures on education; (9) Public expenditures on tertiary education as percentage of total public expenditures on education; (10) Public expenditures on a child in primary education as a percentage of per capita GDP; (11) Public expenditures on a child in secondary education as a percentage of per capita GDP; (12) Public expenditures on a child in tertiary education as a percentage of per capita GDP; (13) Student-teacher ratio in primary school; (14) Student-teacher ratio in secondary school.

Table 12.2: Basic educational statistics for India

Year	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
2012	–	–	–	–	24.77	3.35	23.41	37.29	37.55				–	–
2011	93.34	5.63	–	4.77	23.27	3.43	23.56	37.12	37.55	7.07	13.49	53.88	35	26
2010	93.95	5.67	65.07	4.53	18.23	3.32	25.21	36.99	36.08	7.19	13.57	58.26	–	25
2009	93.94	5.69	61.30	4.27	16.40	3.21	26.68	34.92	36.45	7.27	13.03	68.72	–	25
2008	93.44	5.75	61.93	4.32	15.42	–	–	–	–	–	–	74.31	–	–
2007	93.29	5.71	58.66	4.09	13.48	–	–	–	–	–	–	–	–	–
2006	–	–	56.10	3.91	11.82	3.09	35.38	42.50	20.28	8.96	16.18	–	–	–
2005	–	–	55.14	3.84	11.00	3.13	35.59	42.89	19.55	9.02	16.69	54.98	–	–
2004	–	–	52.49	3.65	11.25	3.29	36.38	41.62	20.01	9.74	17.74	57.79	–	33
2003	85.78	5.26	50.75	3.52	10.89	3.55	36.08	41.67	20.09	10.99	19.66	60.85	41	32
2002	80.91	4.85	48.21	3.34	10.36	–	–	–	–	–	–	68.00	41	32
2001	81.19	4.81	46.33	3.21	9.78	–	–	–	–	13.31	23.22	–	40	33
2000	81.20	4.81	46.09	3.19	9.53	4.25	37.56	40.09	20.30	14.40	24.59	–	40	34
1999	–	4.72	44.20	3.05	–	4.34	30.05	37.80	17.00	11.84	24.64	94.02	35	34
1998	–	4.69	–	–	–	3.51	–	–	–	–	–	–	–	–
1997	–	4.77	46.81	3.28	6.53	2.83	–	–	–	–	–	–	–	–
1996	–	4.80	46.02	3.22	6.28	–	–	–	–	–	–	–	–	–
1995	–	4.83	45.81	3.21	5.57	–	–	–	–	–	–	–	–	–
1994	–	4.86	45.88	3.21	–	–	–	–	–	–	–	–	–	–
1993	–	4.80	45.42	3.18	–	–	–	–	–	–	–	–	–	–
1992	–	4.70	–	–	–	–	–	–	–	–	–	–	–	–

Source: http://data.uis.unesco.org/index.aspx?queryid=181 and lang=en.

Note: (1) Net enrolment in primary school; (2) Life expectancy in primary school; (3) Gross enrolment in secondary school; (4) Life expectancy in secondary school; (5) Gross Enrolment Ratio (tertiary); (6) Public expenditures on education as a percentage of GDP; (7) Public expenditures on primary education as percentage of total public expenditures on education; (8) Public expenditures on secondary education as percentage of total public expenditures on education; (9) Public expenditures on tertiary education as percentage of total public expenditures on education; (10) Public expenditures on a child in primary education as a percentage of per capita GDP; (11) Public expenditures on a child in secondary education as a percentage of per capita GDP; (12) Public expenditures on a child in tertiary education as a percentage of per capita GDP; (13) Student-teacher ratio in primary school; (14) Student-teacher ratio in secondary school.

It appears that India is much less efficient in its delivery of education than China. Most students in China attend public schools, as opposed to only around 50 per cent in India. The student-to-teacher ratio in China is almost half that in India and public expenditure as a percentage of GDP is much higher in India than in China. That means many resources are wasted in India's education sector – teachers are paid much higher salaries relative to GDP and yet are not producing good quality education. Furthermore, the sad fact is that 20 per cent of the days teachers in public schools do not show up.

12.3.2 Inequalities in School Outcomes

I mentioned earlier that China decentralized financing of education to state and local governments, with limited government transfers of resources. Schools in the villages were of low quality and teachers often were not paid for months. Furthermore, China introduced the *hukou*, which prevented rural families from migrating to urban areas. This led to a lot of inequalities in educational outcomes. Table 12.3 shows the net educational enrolments of children of ages 7–16 and 13–18 by sex, rural-urban location, and by geographical locations. It is clear that enrolments were much smaller for rural and female students and in remote areas such as the northeast, northwest, and southwest, which are underdeveloped. For further analysis of educational inequalities in China, see Hannum and Wang (2006), Tsang (2000), Whyte (2010) and Wu and Zhang (2010).

Table 12.3: Inequality in basic education in China in terms of enrolment ratio of the two school-going age groups

	7–16 Population			13–18 Population		
	Overall	**Urban**	**Rural**	**Overall**	**Urban**	**Rural**
Overall	90.16	94.06	88.51	66.26	76.1	60.82
By Sex						
Male	91.14	94.43	89.77	67.89	77.44	62.86
Female	89.07	93.65	87.12	64.51	74.74	58.56
Minority status						
Han: Overall	91.07	94.18	89.69	67.5	76.23	62.37
Male	91.94	94.52	90.8	69.17	77.63	64.43
Female	90.11	93.81	88.46	65.71	74.81	60.07
Minority: Overall	81.97	92.29	79.43	55.45	74.28	49.83
Male	83.97	93.02	81.8	56.79	74.7	51.65
Female	79.81	91.54	76.84	54.01	73.86	47.84

(*Cont.*)

(*Cont.*)

	7–16 Population			13–18 Population		
	Overall	Urban	Rural	Overall	Urban	Rural
By Region						
Region North	91.85	95.12	90.38	68.73	80.16	62.16
Northeast	88.67	93.87	84.23	63.90	77.93	49.70
East	91.26	94.22	89.80	68.20	77.06	62.25
Central-South	90.94	93.63	89.85	65.94	71.62	62.98
Southwest	86.09	93.35	84.20	61.07	77.06	55.46
Northwest	89.60	94.54	88.13	67.93	79.23	64.04

Source: (Hannum et al., 2010, Table 5).

In Table 12.4, I report the quality of basic education achievement in India by sex, ethnicity, rural-urban location, and by income groups, computed from the IHDS dataset. The measures of achievements are simple tests such as for reading, if a child could read letters, words, a paragraph; for math, if a child could read numbers, add, subtract, multiply and divide; for writing, if a child could write letters and a paragraph. We see that children in rural areas or from lower-caste background, or from the poorest 25 per cent population or females perform much worse than the rest.

Table 12.4: Inequality in basic education in India in terms of basic learning indicators

	Overall	Rural	Urban	Male	Female	Low Caste	Bottom 25 per cent	Top 25 per cent
School type								
Private	42.40	34.83	60.42	43.60	41.09	37.59	34.16	49.02
Public	57.60	65.17	39.58	56.40	58.91	62.41	65.84	50.98
Reading: Can read								
Cannot read	9.15	10.77	5.41	8.17	10.27	10.31	18.18	5.24
Letter	13.05	14.31	10.12	12.44	13.73	14.51	18.63	10.36
Word	20.19	21.96	16.07	20.55	19.78	21.29	25.39	17.31
Paragraph	21.87	20.85	24.24	22.04	21.69	21.57	18.48	23.43
Story	35.74	32.11	44.16	36.81	34.54	32.31	19.31	43.66
Math: Can do								
Cannot	16.97	19.70	10.66	14.59	19.67	19.56	35.14	10.24
Number	31.89	34.79	25.17	31.91	31.86	33.58	38.07	27.70
Subtraction	27.57	25.28	32.87	28.19	26.87	26.85	17.91	31.45

(*Cont.*)

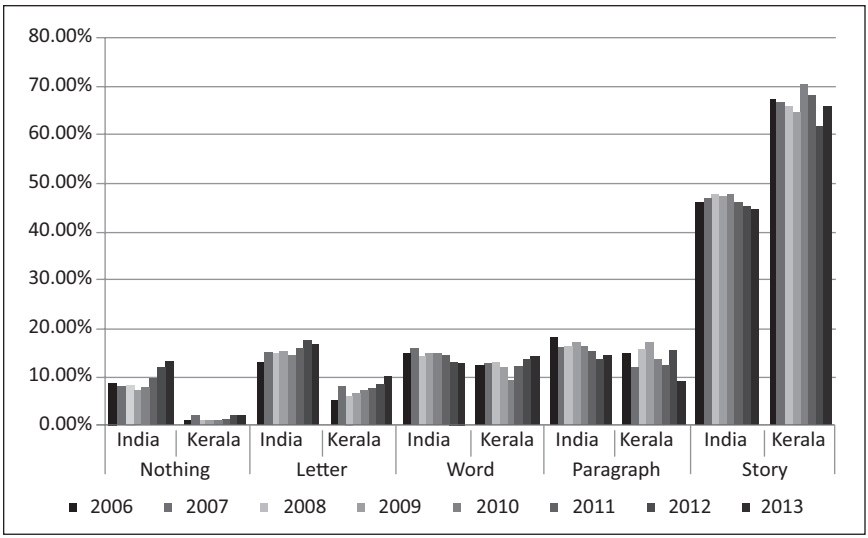
(*Cont.*)

	Overall	Rural	Urban	Male	Female	Low Caste	Bottom 25 per cent	Top 25 per cent
Division	23.57	20.23	31.31	25.31	21.59	20.01	8.88	30.61
Writing skills: Writes with								
Cannot write	30.76	34.39	22.36	29.48	32.20	33.70	52.01	22.82
2 or less mistakes	69.24	65.61	77.64	70.52	67.80	66.30	47.99	77.18

Source:

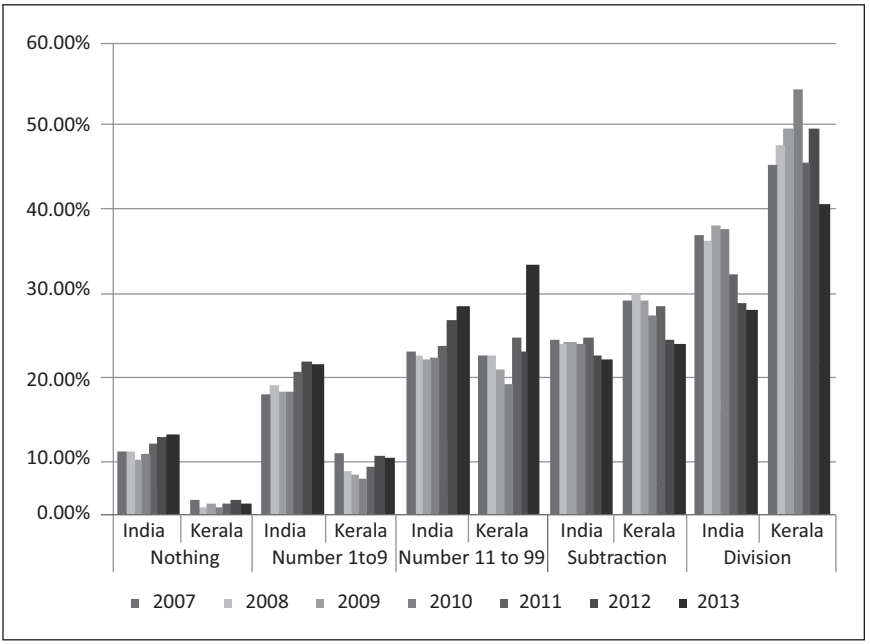
The survey in our dataset was not collected for other years; so, to compare school performance over time, I use data from the ASER, which uses similar measures of school performance, but only for the rural sector. As Kerala was able to achieve universal basic education long before any other states in India did, I also report Kerala's school performance data over time. These are shown in Figure 12.1 for reading performance and Figure 12.2 for math performance. It is clear that in India and even in Kerala, school performance has been deteriorating over time. This is also noted in a *New York Times* article, Rosenberg (2014). The PISA 2009+ results also show that the quality of education in India is very poor; see for instance, Pritchett (2012), Walker (2011).

Figure 12.1: Reading performance of primary school children in India and Kerala over time, 2006–2013



Source:

Figure 12.2: Math performance of primary school children in India and Kerala over time, 2007–2013



Source:

12.4 EXPLANATIONS FOR OBSERVED EDUCATIONAL OUTCOMES

We saw a lot of variation in student performance and educational outcomes. How can these patterns be explained? The educational outcomes of children – enrolment and drop-out rates and the number of years of schooling completed, test scores or any other measures of school outcomes – depend on parental, child-specific and teacher and school factors. We discuss each of these factors below.

12.4.1 Parental Factors

Parents decide if their young children should go to school, what kind of school they should go to and for how many years. Why do parents invest in their children's human capital? Quite a few models analyze these questions theoretically and empirically. I restrict my discussions to models applicable to developing countries like India and China. Educational loans are rare and credit markets are imperfect in these countries and these countries lack formal, publicly provided old-age

pension programmes. In such countries, many hold that 'children are the poor man's capital', i.e., children add to parents' income – when parents are too old to work, they will depend on their children for old-age support, and when parents are still working, their income will be supplemented by their children's. My first dive into the field of development economics research (my PhD research) was to formulate the old-age support motive for having children and investing in their human capital in an overlapping generations model and to study its economic implications (Raut, 1990).

In this model, I assumed that children give a fixed fraction of their earnings to their parents as old-age support. Greater investment in the human capital of children can produce higher earnings for their children, and thus, parents can obtain more old-age support, but it reduces parents' current consumption. The parents will balance this trade-off to decide an optimal human capital investment in their children. I looked at the effect of school subsidies and public old-age pension programmes on education, population growth, and economic growth. This basic model was extended later by assuming that individuals have two-sided altruism and the amount of old-age transfers from children to parents is decided endogenously by children in a Nash equilibrium. The model was estimated using Indonesian household survey data to understand the motives for parents' investment in their children's human capital and whether the investment was socially optimal, or whether there was underinvestment (for details, see Raut and Tran 2000, 2005). The results would be similar if children were supplementing parents' incomes with child labour instead of adult labour when parents are old or both.

In the above models, if the rate of return to education is lower for some groups – for example, people living in rural and remote areas, female workers, lower castes, or any group discriminated in the labour market – children in those groups will have fewer years of schooling, higher drop-out rates, and lower enrolment ratios. Many empirical studies estimate the private rate of return to education using the Mincer earnings function. For example, Raut and Tran (2005, p. 407) estimate the rate of returns to be 9.4 per cent for Indonesia; Heckman (2005, p. 61) notes that the rate of return from schooling estimates for China varies from 7 per cent to as high as 20 per cent; and Agrawal (2012, Section 6.2.4) estimates the rates of return to education in India to be 5.5 per cent for primary education, 6.2 per cent for middle level education, 11.4 per cent for secondary education, 12.2 per cent for higher secondary education, and 15.9 per cent for graduate education. These and many other studies also find that the rate of return to education is lower in rural areas and for females and lower-caste students either because they go to lower-quality schools or because there is labour market discrimination. So, improving and equalizing school quality for all groups and banning labour market discrimination are good ways to improve school outcomes.

If parents are credit-constrained – that is, they cannot borrow from the market or can borrow only at exorbitantly high interest rates – their children will not go to school at all or drop out. To see it simply, consider the situation in which parents do not have enough income to pay for their children's education after financing consumption. The children of these parents will not be able to go to school. Suppose, they could borrow from the market to pay for their children's education and to supplement their own consumption and pay back the borrowed amount with interest later. Higher educated children will earn a higher amount and transfer a higher amount to their parents. The parents can end up having a higher net income because of the extra transfers from their children and hence higher consumption. Laws banning child labour and requiring that parents provide their children compulsory basic education can mitigate this problem. Both China and India have such laws. The government in China has enforced both the laws – banning child labour and mandating parents to provide their children nine compulsory years of basic education. That has helped China achieve basic education for all. In India, both laws exist mostly on paper; very little effort has been put to enforce them. Many researchers attribute this failure to the lack of political will (see for instance, Kumar, 2005 and Weiner, 1991). After considering much evidence and talking to parents, policymakers and government officials all over India, Weiner (1991, p. 12 and 133) concludes:

> India has made less of an effort to move children out of the labour force and out of their homes into the school system than many other countries, not for economic or demographic reasons, but because of the attitudes of government officials, politicians, trade union leaders, workers in voluntary agencies, religious figures, intellectuals, and the influential middle class toward child labour and compulsory primary school education.
>
> [I]t should be noted that members of the Indian middle class conceptualise a distinction between the children of the poor and their own children. A distinction is made between children as 'hands' and children as 'minds'; that is, between the child who must be taught to 'work' and the child who must be taught to 'learn,' the acquisition of manual skills as distinct from cognitive skills. Thus, traditional Hindu notions of social rank and hierarchy are subtly incorporated into the ways educated Indians distinguish between education for the children of those who do manual work and those who are in services.

Parents may derive intrinsic value from their children's education – they may derive utility from educating their children, or values could be instilled by Christian missionaries or other religious groups campaigning to persuade the masses of the usefulness of education, so that they can read God's words directly from the Bible

(in the case of Christian missionaries), or so that they can read the philosophy of a political doctrine, such as communism, in the case of Mao Zedong in China. Also, the values of education can be inculcated in individuals by a culture that practises a cultural philosophy, such as Confucian philosophy, which teaches that education is valuable to individuals and society, one should respect one's teachers and with hard work all can succeed at school and in life. In Tagore's philosophical view, education produces enlightenment, so it goes directly in the utility function. Kerala achieved universal basic education long before the rest of India. Many attribute this achievement to missionaries and the government (see, for example, Lankina and Getachew, 2012; Mathew, 1999). They worked hard to persuade Keralites that education is valuable, and built public schools to provide free basic education for all. Kerala's experience shows that there are ways to achieve basic education for all if there is political will.

12.4.2 Child-specific factors

There are also many child-specific cognitive and non-cognitive skills that determine school outcomes. One such skill is the child's motivation to work hard to do well in school. Children also vary in their innate abilities, which affect their school outcomes. These kind of skills can be boosted at early ages by investment in preschool, but the gains do not sustain in the long run. However, during the boosting period, the child may gain self-confidence, which can have lasting effects on the child's school outcomes and other activities. The importance of these effects on school outcomes and labour market success has been argued and demonstrated empirically (Heckman and Raut, 2013, 2016; Raut, 2003). Both China and India are trying to have preschool for all.

Children from very poor family backgrounds (such as from SC/ST) may lack many cognitive and non-cognitive skills that are important for learning in schools. Irrespective of caste, children from poor families have disadvantages similar to that of poor lower-caste children, as those disadvantages stem from their parents' inability to spend on their health and nutrition, which negatively affects their learning ability. In Shanghai-China, the school system tries to identify children who do not do well because of their disadvantaged family background and then help them, which is the right approach. India, however, introduced the affirmative action type of policies, which is to reserve a certain number of seats in schools and in government employment for SC/ST children. The policy defeats its own purpose of helping the disadvantaged, because it tends to favour mainly the relatively well-off in the SC/ST caste groups (for more on this, see Arnove, 1984). An appropriate policy in this regard should be to identify all students, not just SC/ST and lower-caste students and help them more to do well in school.

12.4.3 Teacher and school factors

Worldwide, educators and education researchers agree that quality teachers constitute the most important factor in students' school outcomes (see for instance, OECD, 2011 and Tucker, 2011). Teachers' motivation to teach well and learn new materials to teach and how to teach better are all important for student performance. How can we motivate teachers to do so?

The quality of teachers in public schools in India is very poor. Worst of all, teachers do not show up around 20 per cent of the days (for an empirical study, see Kremer et al., 2005). Again, the lack of political will has led to this situation, because the government does not monitor or penalize these teachers, who are government employees and earn much more than teachers in private schools and enjoy many benefits such as pension and health-care subsidies.

Good-quality private schools perform better than public schools (for some empirical evidence, see Chudgar and Quin, 2012). But, the poor cannot afford good-quality private schools. Also, in remote villages, there might not be any private schools, or if there are some private schools, they may be of very poor quality. So, privatization of schools is not the solution. China and many other East Asian countries achieved excellent school outcomes through their public education system. Why can it not be achieved in India? I have noted earlier many techniques that Shanghai-China adapted to produce excellent teachers. India can try some of those techniques for its public schools.

12.5 DETERMINANTS OF SCHOOL OUTCOMES IN INDIA – AN ECONOMETRIC ANALYSIS

In this section, I estimate a version of the production function for school outcomes that I discussed in the previous section and examine the factors that are statistically significant for school performance. I carry out this analysis for various socio-economic and income groups. I use the public domain dataset IHDS 2005, which is collected jointly by the National Council of Applied Economic Research (NCAER) and the University of Maryland. I briefly describe the dataset and the variables that I use as regressors in the ordered logit model of educational outcomes.

The survey collected data on a nationally representative sample of 41,554 households in 1,503 villages and 971 urban neighbourhoods.

For school outcomes, I use the assessments of reading, writing and arithmetic skills for children aged 8–11 years that were collected in this dataset. These tests measure very basic cognitive skills in reading, writing, and arithmetic. For reading, it has data on:

1. Cannot read at all;
2. Can read letters, but not form words;
3. Can put letters together to read words, but not read whole sentences;
4. Can read a short paragraph for two or three sentences, but not fluent enough to read a whole page;
5. Can read a one-page short story.

For mathematics, it has data on:

1. Cannot read numbers above 10;
2. Can read numbers between 10 and 99, but not able to do more complex number manipulation;
3. Can subtract a two-digit number from another;
4. Can divide a number between 100 and 999 by another number between 1 and 9.

For writing, it has data on:

1. Can write a paragraph with two or less mistakes;
2. Cannot write.

The dataset has above test scores on about 11,700 children.

As the test scores of each type are ordered, I use an ordered logit model for each type of test score. I use the following as determinants of test scores – some of these are created using principal component analysis for a number of mixed discrete and continuous attributes. The importance of these variables is self-explanatory and has been highlighted in the previous section.

Family characteristics: log of Monthly Per capita Consumption (MPC), highest grade attained by adults in the household, amount spent on school fees, books and private tuition of the child.

School characteristics: teacher-student ratio, school's infrastructure, provision of free mid-day lunch, public versus private, English medium *versus* local language school and if the school performs formal teacher evaluations. The school infrastructure variable is constructed using principal component analysis from a number of variables related to school infrastructure. Formal teacher evaluation would provide information on teacher quality.

The dataset does not have data on any of the individual characteristics such as IQ scores that we talked about in the previous section. So, we do not have those in our empirical model. I estimate the model of each of the three types of test scores for the overall, rural-urban, and the bottom 25 per cent and top 25 per cent income groups (more precisely, monthly per capita household consumption). Parameter estimates with *t*-statistics in parentheses are shown in Tables 12.5–12.7. The absolute value of *t*-statistics is shown in parentheses under each estimate.

Table 12.5: Determinants of reading scores of elementary school children of ages 6–11 for various groups

				Households MPC	
Variables	**Overall**	**Rural**	**Urban**	**Bottom 25 per cent**	**Top 25 per cent**
Intercept (Story)	–3.944	–3.890	–4.153	–3.952	–1.911
	(16.92)	(14.89)	(7.63)	(7.27)	(2.05)
Intercept (Paragraph)	–2.946	–2.930	–3.015	–2.939	–0.873
	(12.72)	(11.28)	(5.57)	(5.42)	(0.94)
Intercept (Word)	–1.890	–1.876	–1.929	–1.847	0.230
	(8.19)	(7.25)	(3.57)	(3.42)	(0.25)
Intercept(Letter)	–0.787	–0.780	–0.757	–0.797	1.469
	(3.41)	(3.02)	(1.39)	(1.47)	(1.57)
Family: Log of MPC	0.416	0.380	0.470	0.293	0.174
	(11.82)	(9.60)	(5.64)	(3.25)	(1.36)
Family: Highest education	0.087	0.087	0.086	0.085	0.096
level of adults (21+)	(20.71)	(18.37)	(9.22)	(11.65)	(8.61)
School: English medium	–0.217	–0.337	–0.024	–0.067	–0.208
	(2.77)	(3.15)	(0.20)	(0.31)	(1.46)
School: Public	0.075	0.086	0.237	0.511	–0.483
	(1.05)	(0.97)	(1.84)	(4.14)	(2.52)
School cost (total)*1000	0.148	0.244	0.085	0.493	0.032
	(9.25)	(9.76)	(4.25)	(8.22)	(1.78)
School: Student-teacher ratio	–0.005	–0.006	–0.001	–0.005	–0.004
	(7.67)	(7.67)	(0.30)	(4.94)	(1.83)
School: Free mid-day lunch	0.239	0.285	0.115	0.278	0.319
	(3.62)	(3.62)	(0.91)	(2.49)	(1.77)
School: Formally	0.109	0.147	–0.060	0.210	0.171
Evaluates teachers	(2.69)	(3.20)	(0.68)	(3.11)	(1.52)
School infrastructure	5.051	3.501	9.788	4.872	4.864
Principal component 1	(4.47)	(2.70)	(3.91)	(2.44)	(1.72)
Number of observations	10384	7942	2442	10878	1693
–2 log likelihood	29834	2367	6404	3540	4152

Note: Absolute value of *t*-statistics are in parentheses. An absolute *t* value greater than 1.96 indicates the parameter estimate is significant at level less than 0.05 or lower.

Table 12.6: Determinants of math scores of elementary school children of ages 6–11 for various groups

Variables	Overall	Rural	Urban	Households MPC	
				Bottom 25 per cent	Top 25 per cent
Intercept (Division)	–5.336	–5.337	–4.690	–6.512	–2.186
	(22.56)	(20.02)	(8.74)	(11.28)	(2.44)
Intercept (Subtraction)	–3.954	–4.022	–3.094	–5.172	–0.650
	(16.90)	(15.24)	(5.82)	(9.01)	(0.73)
Intercept (Number)	–2.231	–2.275	–1.429	–3.470	1.180
	(9.62)	(8.71)	(2.69)	(6.09)	(1.31)
Family: log of MPC	0.533	0.510	0.461	0.639	0.111
	(15.05)	(12.76)	(5.64)	(6.70)	(0.91)
Family: Highest education	0.083	0.081	0.086	0.073	0.096
level of adults (21+)	(19.55)	(17.06)	(9.23)	(9.83)	(8.75)
School: English medium	–0.077	–0.221	0.141	0.139	–0.270
	(1.01)	(2.09)	(1.24)	(0.63)	(1.96)
School: Public	0.234	0.232	0.411	0.658	–0.360
	(3.24)	(2.62)	(3.21)	(5.17)	(1.95)
School cost (total)*1000	0.141	0.225	0.099	0.547	0.060
	(9.40)	(9.78)	(5.21)	(9.12)	(3.16)
School: Student-teacher ratio	–0.002	–0.002	–0.002	–0.001	0.000
	(2.91)	(2.17)	(1.21)	(1.21)	(0.03)
School: Free mid-day lunch	–0.053	–0.049	–0.005	0.005	–0.017
	(0.80)	(0.62)	(0.04)	(0.04)	(0.10)
School: Formally	0.121	0.188	–0.144	0.236	0.082
Evaluates teachers	(2.93)	(4.02)	(1.63)	(3.38)	(0.74)
School infrastructure	6.247	5.234	9.368	8.159	3.968
Principal component 1	(5.50)	(4.01)	(3.75)	(3.98)	(1.43)
Number of observations	10347	7915	2434	3531	1683
–2 log likelihood	26318	20308	5932	8929	4037

Note: Absolute value of *t*-statistics are in parentheses. An absolute *t* value greater than 1.96 indicates the parameter estimate is significant at level less than 0.05 or lower.

Table 12.7: Determinants of writing scores of elementary school children of ages 6–11 for various groups

Variables	Overall	Rural	Urban	Households MPC: Bottom 25 per cent	Households MPC: Top 25 per cent
Intercept	–2.882	–2.937	–2.165	–4.482	–0.995
	(9.83)	(9.15)	(2.83)	(6.77)	(0.72)
Family: Log of MPC	0.471	0.461	0.432	0.684	0.233
	(10.42)	(9.35)	(3.61)	(6.18)	(1.22)
Family: Highest education	0.076	0.074	0.083	0.070	0.092
level of adults (21+)	(14.72)	(13.00)	(6.66)	(8.05)	(6.22)
School: English medium	0.187	0.155	0.215	0.075	0.071
	(1.60)	(1.03)	(1.12)	(0.25)	(0.30)
School: Public	0.027	–0.076	0.363	0.316	–0.816
	(0.30)	(0.71)	(2.04)	(2.14)	(2.93)
School Cost (total)*1000	0.186	0.182	0.176	0.502	0.074
	(6.89)	(5.20)	(4.09)	(5.98)	(1.90)
School: Student-teacher ratio	–0.001	0.000	–0.006	–0.002	–0.001
	(1.19)	(0.05)	(2.54)	(1.76)	(0.31)
School: Free mid-day lunch	0.277	0.322	0.267	0.388	0.517
	(3.34)	(3.37)	(1.51)	(2.91)	(2.00)
School: Formally	0.187	0.228	–0.026	0.260	0.088
Evaluates teachers	(3.74)	(4.14)	(0.22)	(3.28)	(0.56)
School infrastructure	5.412	3.756	10.724	6.735	0.453
Principal component 1	(3.82)	(2.37)	(3.14)	(2.83)	(0.11)
Number of observations	10292	7868	2424	3512	1677
–2 log likelihood	11725	9491	2208	4500	1460

Note: Absolute values of *t*-statistics are in parentheses. An absolute *t* value greater than 1.96 indicates the parameter estimate is significant at level less than 0.05 or lower.

Main findings and policy suggestions

Family resources: With a few exceptions, family income and education level of adults in the family and the amount spent on a child's education always, as expected, have significant positive effects on all test scores for children from the top 25 per cent income group.

Free mid-day lunch has positive effects on reading and writing test scores for children from rural and poor families, but no effect on mathematics scores.

Public school has positive effects on most test scores of disadvantaged kids from the rural group and the bottom 25 per cent income group, but mostly negative effects on the test scores of children from the top 25 per cent income group.

School quality: Children going to schools where class sizes are low, infrastructure is better and teachers are formally evaluated for teaching effectiveness have significantly positive effects on almost all test scores for disadvantaged children.

12.6 CONCLUSIONS AND POLICY LESSONS

The chapter argues that globalization, along the lines of free international trade and FDI inflow, can lead to persistent high economic growth in a developing country, as has been the case with China. However, for high growth to persist and for the economy not to fall into the middle-income trap (the economy grows for a while to become a middle-income country and then stops growing), which could be the case for India, a country needs to provide its masses education at the global standard.

The chapter then examines the basic education systems and education policies that China and India followed. The chapter also uses the public domain nationally representative survey data, IHDS 2005, to find what factors are statistically significant to improve the basic education of children from disadvantaged families.

Since the creation of the PRC in 1949, all the political regimes made education the centrepiece of their economic reforms. Their education strategy has been to provide basic education to its masses and gradually add vocational and higher education, upgrade curricula to global standards and improve the quality to meet the development needs of the economy. In the processes, China achieved high-quality basic education and stunned the world in the 2009 PISA tests, in which Shanghai-China turned out to be the top performer – highest average scores with low inequality. Now, China is planning to upgrade its higher education to the world standard so that it can produce new technologies and new products to keep its market shares in the competitive global market. All this is attained through a predominantly public education system.

In India, before independence in 1947, Rabindranath Tagore and Mahatma Gandhi had pushed for basic education for all at the village level and outlined viable schemes for financing it, but interest groups and a lack of political will influenced the then Prime Minister Jawaharlal Nehru to follow the Soviet-style industrialization strategy and abandon the idea of basic education for all and push instead for higher education through the public system. One cannot have higher education without basic education and as only the elite that the British Raj created during their rule could provide their children basic education, access to education

was restricted mostly to the elite. Coincidentally, however, China adapted some of these same ideas later to make basic education for all viable through a public system. Basic education for all was tried in India with public-private initiatives. While mass education has gained a good momentum, the quality of education has been deteriorating over time. In the 2009 PISA tests, India ranked next to last among the 74 participant countries and outcomes on ASER tests for India and even Kerala, deteriorated between 2006 and 2013. However, there is still a lot of inequality in educational attainments in both China and India: females and children from rural areas, poor families, and lower castes have lower achievements than the rest.

India can learn public education governance and how to make it efficient, from China. In the 1980s, when Deng Xiaoping came to power after Mao Zedong's death, China was still a very poor country; so, tax revenues were too low to finance public services. Deng Xiaoping decentralized the financing of public services, including education, to state and local governments. While education was decentralized out of necessity, the Deng Xiaoping government saw an opportunity to use it to make delivery of education more efficient. They judiciously decentralized the public administration and curriculum of schools and gave local governments the flexibility to run their schools according to local needs and to have local residents participate in running schools. The centre, however, kept control over curriculum and teacher standards.

Many coercive policies can be carried out in a one-party political system, as in China, but not in a multi-party democratic parliamentary political system, as in India. For instance, China could force a one-child policy on the public, whereas India could not implement even a less stringent birth control policy. Indira Gandhi tried and lost heavily in the election as a result. However, by proper design of incentives (rewards and punishments), it is possible to accomplish most policies without coercion.

Based on the experience of China and other East Asian countries, the chapter recommends the following politically feasible education policies for India. The education system should be decentralized to the local (Panchayat Raj) level. Parents should be required to participate in the learning process of their children, by attending regular meetings of the Parents-Teachers Association (PTA) and by providing inputs into teacher performance evaluations, to hold teachers accountable. The centre should not, however, decentralize the financing of education to local governments, so that the government can use the financing instrument to reduce inequality and maintain educational quality across schools. The curriculum and administrative decentralization would be good instead. India tried to decentralize education many times but failed, due to the lack of political will. It is unfortunate that teachers in public schools do not show up 20 per cent of the days. They are

government employees, paid much better than teachers in private schools. These inefficiencies can be removed by making parents the main stakeholders of an education system, part of their children's learning process and part of the evaluation of teachers' performance for promotion or to retain their jobs and by freeing school administrations from local interest groups. This is how the Shanghai-China public school system works efficiently – by basing retention and promotion of teachers on the assessments by parents, other teachers and the principal.

Current research on the causes of successful education in East Asia, including research on Shanghai-China's secrets to reach the top, reaches the consensus that the quality of the teacher is the main vehicle for student performance. Cultural factors (such as the Confucian philosophy practised all over East Asia that creates teachers who teach well, students who respect their teachers and learn from them and parents who value education and believe that all can succeed in education and in life with hard work) are conducive, but may not transfer to India. Teacher quality can be, however, improved by proper public policies. For instance, teachers should spend more time on professional development to learn new teaching methods and materials. The nationwide school system can organize conferences on teaching materials and methods so that teachers can develop professionally. Teachers should be rewarded and recognized for good performance and demoted or fired if their performance does not improve after training. The academic qualifications and screening process standards for selecting teachers in public schools need to be raised.

The curriculum should be decentralized and innovative elective subjects and extra-curricular activities should be introduced to foster creativity in children's learning, but the centre should make sure that the schools have common core course materials. Common core exams are most important for benchmarking standards for schools all over the country. Over time, the curriculum needs to be upgraded to benchmark Indian standards to global standards. Low-performing public schools, teachers and children need special help and resources to improve their performance. Common core examinations can be used to identify low-performing public schools, teachers, and children. The US is trying to adapt this approach to improve its decentralized education system. To help low-performing schools, teachers and children in Shanghai-China, many techniques are followed: low-performing and high-performing schools are grouped together and teachers from high-performing schools mentor teachers from low-performing schools and go to those schools to demonstrate effective teaching methods. Also, teachers from low-performing schools come to high-performing schools to learn by watching classroom teaching. Japan also follows similar methods. India should try the same.

It is also important for Indian policy-makers to have the political will to enforce the law banning child labour and the law requiring parents to make their children complete their basic education. China and most other East Asian countries have

been able to implement both the laws. To overcome financial hardship on parents because of such laws, China introduced the Hope Project and got NGOs and international organizations to help the parents. India can have similar efforts or create a work-for-education project for parents to get better-paid public work so that they can support their family without income from child labour.

The empirical analysis in the chapter using the IHDS 2005 dataset suggests that the following factors are statistically significant to improve learning of disadvantaged children: improvement of school infrastructure, improvement of teacher quality by carrying out formal teacher assessment, lowering class size, and the Mid-Day Meal (MDM) plan. The MDM plan is useful for at least two reasons: it provides parents an incentive to send their children to school and also supplement their nutrition to help improve their learning abilities. Furthermore, the econometric evidence shows that poor and village children perform better in public schools than in private schools.

China adapted many of those policies to achieve world-class education for all. Why not India?

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