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What Others Can Learn

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Building Human Capital in East Asia: What Others Can Learn

Jandhyala B. G. Tilak

Abstract

The East Asian region is extremely dynamic in terms of both economic and socio-political changes. Starting from very low levels of development in the 1950s and early 1960s, several economies in the region such as the Republic of Korea, Singapore, Taiwan (China), and Hong Kong (China), have been able to achieve and maintain significantly higher levels of economic growth compared to many other developing countries. There are a number of factors which have helped fuel these high rates of growth and education is one such factor.

This paper presents a detailed analysis of investments in human capital—and specifically education—in East Asia. It reviews region’s past trends in education, changes in education policies, and emerging issues. It focuses on three important dimensions of the patterns of expenditure on education, namely: (i) allocation of resources to education sector as a whole; (ii) allocation of budgetary resources among primary, secondary and tertiary education; and (iii) cost recovery measures and the role of the private sector in education.
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Foreword

This paper, entitled Building Human Capital in East Asia: What Others Can Learn Professor Jandhyala B. G. Tilak of National Institute of Education Planning & Administration (NIEPA), India, was prepared for a project on Social Development in East Asia. The project was organized by the World Bank Institute under the auspices of the Program for the Study of the Japanese Development Management Experience which is financed by the Human Resources Development Trust Fund established at the World Bank by the Government of Japan.

The principal objectives of this Program are to conduct studies on the Japanese and East Asian development management experience and to disseminate the lessons of this experience to developing and transition economies. Typically, the experiences of other countries are also covered in order to ensure that these lessons are placed in the proper context. This comparative method helps identify factors that influence the effectiveness of specific institutional mechanisms, governance structures, and policy reforms in different contexts. A related and equally important objective of the Program is to promote the exchange of ideas among Japanese and non-Japanese scholars, technical experts and policy makers.

The outputs of the project on Social Development in Asia include seven papers on topics such as pension systems, health insurance, education, and employment policies which are scheduled to be published in the WBI Working Paper series. In addition, a set of papers focusing on the social policy experience of Japan over the past fifty years is being processed separately as a book-length manuscript.

Farrukh Iqbal, Program Director
World Bank Institute
Building Human Capital in East Asia: 
What Others Can Learn*

Jandhyala B. G. Tilak

National Institute of Educational Planning and Administration, New Delhi, India

*There is probably no easier way to combine equity and rapid growth (than investment in education). The whole of East Asia is [a] testimony to the veracity of this proposition.


Introduction

Despite recent economic crisis, particularly in financial markets, the economic miracles of East Asian economies continue to receive wide attention from all over the world. The over-crowded, resource-poor East Asian economies have succeeded so remarkably well on the economic front that they surpass not only some developing countries but also certain developed countries in terms of economic growth rate and income distribution (see Mundle (1998a, 1998b); Ito (1997); ADB (1997a, 1997b); World Bank (1993); Tang and Worley (1988)). For example, after attaining independence in 1965, Singapore transformed itself by 1990 into a “thriving modern economy with the second highest standard of living in Asia” and by 1996 it had left small Western European countries behind in gross domestic product (GDP) per capita (Ito 1997). The Republic of Korea1 was able to achieve a rate of growth in its GDP of 9.4 percent per year during the 1980s, followed by a rate of growth of 7.2 percent during 1990–95 and with a per capita GNP of about $10,000 (Purchasing Power Parity or PPP$ 22,290 in 1995), it was able to join the Organisation for Economic Co-operation and Development (OECD) in 1996. Corresponding rates of growth in Singapore were 6.4 percent and 8.7 percent, and in Hong Kong 6.9 and 5.6 percent. Taiwan registered a rate of growth of 8.8 percent during the 1980s; and its gross national product (GNP) per capita was $12,780 in 1995. The four tigers were added to the list of advanced economies in International Monetary Fund’s World Economic Report 1997 (IMF 1997). The spectacular performance in terms of economic growth and human development of the East Asian economies—namely, Korea, Taiwan, Singapore, and Hong Kong—earned themselves titles such as “the Asian tigers,” “the little dragons,” and so on, and were recognized as “newly industrializing countries (economies)” (NICs), and together with Japan and China they are also described as high-performing Asian economies (HPEA). The gigantic China entered the race much later (in the 1970s) to compete with the NICs but is indeed performing more impressively. Between 1980 and 1990, China had registered a phenomenal rate of growth of 10.2 percent per year on average, followed by a still higher rate of growth of 12.8 percent.

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1 Korea refers to the Republic of Korea throughout the paper, unless otherwise stated. Taiwan and Hong Kong always refer to Taiwan (China) and Hong Kong (China), respectively.
during 1990–95, the highest rate of growth among the 133 countries on which such data are available. The service sector accounts for a major part of the GDP in several East Asian countries: it ranges between 50 percent in Korea and 85 percent in Hong Kong, China (1996). The share of the agricultural sector is less than 6 percent. It is only in China that the agricultural sector accounts for a high proportion (18 percent); the service sector is 28 percent of the GDP; and employment in the agricultural sector accounts for 72 percent (ADB 1997a, 1997b). These are indeed impressive achievements as many of the economies (except, say, China) have few natural resources; and in the early 1960s some of these economies—for example, Korea—were seen as having less development potential than many other developing economies including those in Africa. Furthermore, most of the high-income economies, in contrast, have been struggling with a rate of growth of under 4 percent. For example, the rate of growth in the United States had been around 2.6 percent during 1990–95, it was 1.4 percent in the United Kingdom and France, 1.1 percent in Spain, 1.0 percent in Italy, and 0.1 percent in Switzerland, and so on—not to speak of negative rates of growth in Sweden, Finland, and others. Similarly while most of the Western high-income economies have huge budget deficits, Korea and Singapore have surpluses. Most of the developing economies are much behind the East Asian economies. Based on performances from 1965 to 1995, it is further predicted that by 2025, Hong Kong, Singapore, Taiwan, and Korea will all have GDP per capita of about $25,000 (in 1985 PPP$), while many other Asian countries might at best have a per capita GDP of about $10,000 (ADB 1997a, p. 49). Further, if endogenous growth theory is more relevant with regard to East Asian economies—and experience has shown that it is, in that knowledge leads to more knowledge, without decreasing returns to investment, these may eventually overtake richer economies (ADB 1997a, p. 66).

It is not only in terms of economic growth, but also of income distribution and other indicators of human development, that the East Asian economies are far ahead of several developing economies and some industrialized economies. People in East Asia live longer, are more literate; most go to school for longer periods, and they eat better—compared with many South Asian and other developing economies. The life expectancy at birth is above 75 years in Japan, Hong Kong, and Singapore; 71.7 in Korea and 69 in China; while the world average is 63.6 and the average in developing economies is 62 in 1995. In terms of the human development index, Hong Kong, Korea, and Singapore, in addition to Japan, are in the top 20 percent of the 174 economies for which such an index was estimated by the UNDP (1998). The high growth in the index is also consistent during the last three-and-a-half decades as shown in figure 1.

The performance of the East Asian economies in terms of economic growth and human development, including in education, made them enviable for many developing (and probably some advanced) economies. Obviously other developing economies are eager to draw lessons from the East Asian experience. Until recently developing economies identified with Western economies as embodiments of their ideal goals, and have been trying to borrow and adopt their models of development in their endeavors toward transforming themselves from low- into high-income economies. But now, in the eyes of others East Asia has taken the place of the West. Some economies of East Asian are in transition—changing from one mode of development to another. Even in China the communist-socialistic mode of development is being replaced by a market-based version, known as a strategy based on the “socialistic market.” The other economies in the region are in motion as well, even though the pace of transition varies from one to the other. An examination of the performance of East Asian economies should be useful at this point for many developing economies, particularly those in transition.

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2 This is, however, not altogether surprising: with a given level of human capital, poor countries tend to grow faster than rich countries, so that incomes converge over time between the two (Barro 1991). In fact, Barro shows that growth rate is positively related to initial level of human capital, but negatively related to initial level of per capita GDP. Most of the high-income countries have a higher level of GDP per capita in both the initial and current periods of our study than several East Asian countries.

3 All these figures are from World Bank [a] (1997), except for the figures on Taiwan, which are drawn from several sources, including ADB (1997a, 1997b).

4 According to the endogenous growth theory that largely owes to Lucas (1988) and Romer (1986, 1990a)—the origins of which could be found in Arrow (1962); see Solow (1997)—returns to aggregate accumulation of human capital do not diminish; hence sustained economic growth is possible with endogenous growth factors, such as human capital.
The East Asian economic miracle is largely attributed, among other things, to the region’s sustained levels of investment in human capital over a long period. One can identify an “education miracle” behind the economic miracle (Haq and Haq 1998, p. 31). Accordingly, economic development in East Asia is aptly described as “human resource led development” (Behrman 1990). This is not to suggest that other factors have not been important in East Asian growth. Education is a necessary, but not necessarily a sufficient condition for sustained economic growth, for the reduction of poverty and improvement in income distribution. As the Asian Development Bank (ADB 1997a) concluded, East Asia benefited from rapid accumulation of physical capital, an increasingly sophisticated internal and international division of labor, rapid demographic transition, and endogenous growth factors (Romer 1986, 1990a, 1990b), including institutions, and values and human resource development—rather a high level of human resource development focusing on scientists and engineers that gave rise to technological progress. Investments in education seem to be central to the economic success of the East Asian economies (Wood and Berge 1994). Wood and Berge also argue that as, after all, trade policies are more or less similar throughout the world, it is human resource endowments that matter more than anything else. Since investment in human capital seems to be the main driving force of development in the East Asian economies, the paper focuses on investments in human capital, specifically education. While recognizing that education contributes to economic growth, it is widely held simultaneously that the fast economic growth in these economies also enabled them to maintain a high level of investments in human capital. In other words, investments in human capital contributed to high economic growth and also to better income distribution in East Asia; and human capital, in turn, received dividends from these two gains on the economic front. So an analysis of the pattern of investments in human capital in the region will be of considerable policy use to policymakers and

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5 It is important to note that though the human capital theory (Theodore Schultz 1961; Becker 1964; and Mincer 1972) and the UNDP approach to human development differ with respect to viewing human beings as an instrument or as an end in itself, both stress the importance of education. See Elson (1997) and also Sen (1997).

6 That other components of human capital such as health are important for development is well noted. But the scope of the present paper is deliberately confined to only one of the important components of human capital—that is, education—which according to many, is the most important of all components of human capital.
planners around the world. Accordingly, this paper presents an analysis of investments in human capital, specifically education, in East Asian economies. It presents a review of past trends in education, the policies followed by East Asian economies for the development of education, the emerging issues and lessons that the East Asian experience offers to other developing economies (particularly those in transition). Three important dimensions of patterns of expenditure on education that are given serious attention in this paper are (a) allocation of resources to education as a whole, (b) allocation of budgetary resources between different levels of education (primary, secondary, and higher), and (c) the role of the private sector in education.

The paper consists of eight sections, including this introduction. With the help of available research, the contribution of education to various facets of development, including economic growth, income distribution, agricultural productivity, health and nutrition, in the East Asian economies is briefly reviewed in the following section. Some of the results are fairly well known, while some are not. After presenting a brief description of the sociopolitical and historical factors of the East Asian economies that have had close interaction with education development in the third section, the performance of the East Asian economies during the last two to three decades in the development of education is analyzed in the fourth section, concentrating on a few important indicators of education development, including stock and flow variables. The financing of education has become an important aspect of educational policy everywhere; accordingly the fifth section analyzes a few important dimensions relating to investment policies in education. One important feature of the East Asian education system is the role of the private sector, which is the focus of discussion in the sixth section. A closely related aspect analyzed in the seventh section is the extent of household expenditures on education. The paper concludes with a short summary, and a few important concluding observations. That section also outlines a few important lessons drawn from the East Asian experience for other developing economies, particularly those in transition. The paper also features an appendix of statistical data.

The analyses in this paper are based mostly on data available from international sources; and they are supplemented with data collected from research studies and national sources of information. Differences, sometimes large, do appear between the information provided by national and international sources. This is partly because of differences in definitions and scope of various concepts and terms. This may have to be kept in mind when one focuses on the figures and their interpretation.

The analysis is focused on Japan, one of the most developed economies in the world, the Asian tigers—namely, Korea, Singapore, Hong Kong, and Taiwan—and the fast developing economy of China. In a sense, these economies capture the diversity of the region—Japan being the most advanced country, China being a developing country, and Korea, Singapore, Hong Kong, and Taiwan falling between the two, but racing toward becoming highly advanced economies in near future. Except Japan and China, the other four economies started their march in the modern phase of development about the same time, from about the same level. The Republic of Korea in the early 1960s was an economy that was in a depressed state after the division in 1945, the subsequent internal struggles and the bloody war (1950–53); Singapore in 1965 was a “devastated economy” (Castells 1992, p. 37); and Taiwan was not in a better position, being in the center of Cold War tensions and engulfed in territorial division issues. But all these economies performed remarkably well in the last three decades, took much less time in improving economic growth than what the European economies, or the United States or Japan did in the history of their economic growth (see Wade 1990).

Obviously there is no single East Asian model of development and social sector expenditures (Baker and Holsinger 1996). Even in the case of education there are significant differences between these several East Asian economies. Without losing sight of this aspect, an attempt is made here to discuss the patterns of investment in education. Such an analysis could be hoped to be extremely useful

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7 Hong Kong and Singapore, with per capita income of about US$ 20,000 (above purchasing power parity or PPP$ 22,950 in Hong Kong and PPP$22,770 in Singapore in 1995), were already classified as high-income countries along with Japan, according to the familiar classification of the World Bank [a].
in drawing lessons for many developing and developed economies, including transition economies, in moulding their policies regarding investment in social sectors, so that the payoffs from such investments could be maximized.

**Education and Development in East Asia**

Investment in education that leads to the formation of human capital is recognized as an "engine of economic growth." Human capital contributes to economic growth in two ways. First of all, the human capital embodied in a human being increases that individual's productivity, leading to an increase in total production and to economic growth. Second, the human capital embodied in an individual also contributes to the productivity of all other factors of production as well. These are respectively referred to as "internal" and "external" effects of human capital (Lucas 1988, p. 18).

It is widely held that the contribution of education to economic development in terms of both internal and external effects has been highly significant in East Asia. Rapid economic growth in Japan was attributed to the development of human capital at the very early stages (Emi 1968); so is the case of Taiwan (Singer 1983), and many other economies (see Easterlin 1981). Contemporarily, education played an important role in the rapid economic growth of the Asian region, particularly in the East Asian economies. Investment in education is also found to have contributed significantly to egalitarian income distribution in the East Asian region. Furthermore, the relatively high levels of social indicators—such as life expectancy, and physical quality of life—are attributable, at least partly, to the priority given to education in national development strategies, and investment in education in particular (Papanek 1988).

**Education and Economic Growth**

The contribution of education to economic growth is estimated in a variety of ways. According to Denison's (1962) growth-accounting equation, education accounted for 45 percent of growth in GDP in Taiwan during 1965–89 (Wang and Tallman 1994). Similar estimates for earlier periods were marginally higher (see Chow [forthcoming]). Simple coefficients of correlation are extremely high between expenditures on education and GDP per capita in China.\(^8\) The contribution of education to economic growth is reflected in individual earnings, which are believed to reflect the productivity of the labor force, though there are several other direct and indirect benefits of education. Earnings are found to systematically increase by increasing levels of education. For example, in Korea, a high school graduate earns 1.18 times the earnings of a middle school graduate; a junior college graduate earns 1.17 times the earnings of the high school graduate; and a four-year college graduate earns 1.52 times the earnings of the junior college graduate, as shown in table 1. On average, one year of additional schooling was earlier found to increase the individual earnings by six percent in Korea (World Bank [a] 1991, p. 57). The relationship between education and earnings is summarized crisply in terms of rates of return (estimated using costs and benefits of education or with the help of the Mincerian earnings function). Despite several limitations (see Theodore Schultz 1971; Paul Schultz 1988; Behrman 1990), the available estimates on rates of return are useful for understanding the contribution of education to economic growth, and for a variety of purposes in educational planning. A few salient features of these estimates—some of which are, however, dated—on East Asian economies deserve to be noted.

\(^8\) On the basis of data on 10 economically richest and 10 poorest provinces in China in 1990 (Leung 1995, p. 239), the simple coefficient of correlation was estimated to be as high as 0.94 between expenditure on education per capita and the GDP per capita; enrollment in universities (per 10,000 population) is also significantly correlated with the GDP per capita (r: 0.91). (See also Tilak 1990.)
Both private and social rates of return to education in East Asia are fairly high on their own, and also in comparison with other regions of the world. In every East Asian economy, all levels of education carry positive and high rates of return to the individual as well as to society, as we note in table 2.

Table 1. Education and Earnings (Relative to the Earning of Middle School Graduates) in Korea

<table>
<thead>
<tr>
<th>Year</th>
<th>High school graduate</th>
<th>Junior college graduate</th>
<th>Four-year college graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>1.69</td>
<td>2.46</td>
<td>3.89</td>
</tr>
<tr>
<td>1979</td>
<td>1.52</td>
<td>2.24</td>
<td>3.50</td>
</tr>
<tr>
<td>1982</td>
<td>1.43</td>
<td>1.87</td>
<td>3.17</td>
</tr>
<tr>
<td>1985</td>
<td>1.34</td>
<td>1.74</td>
<td>3.03</td>
</tr>
<tr>
<td>1988</td>
<td>1.22</td>
<td>1.48</td>
<td>2.47</td>
</tr>
<tr>
<td>1991</td>
<td>1.18</td>
<td>1.39</td>
<td>2.12</td>
</tr>
</tbody>
</table>


As all rates of return are positive, it is clear that investment in education in East Asian economies is one that is economically efficient; in fact, investment in education in East Asia yields higher returns than in high income in advanced economies of the world. Secondly, the rates of return are also mostly higher than the alternative, suggesting that investment in education yields comparable—in fact, higher—returns than investment in physical capital. These estimates on rates of return also fall in conformity with the universally well-documented phenomenon of declining rates of return by increasing levels of education—higher returns to secondary education than to higher education. Private rates of return are also higher than social rates of return in almost all economies and at each level. The differences between private and social rates of return, which are not particularly high, are due to public subsidization of education at all levels, which is also not quite high in the East Asian economies.

Table 2. Rates of Return to Education (percent)

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Social</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Primary</td>
<td>Higher</td>
</tr>
<tr>
<td>China</td>
<td>1993</td>
<td>14.4</td>
<td>12.9</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1976</td>
<td>—</td>
<td>15.0</td>
</tr>
<tr>
<td>Japan</td>
<td>1967</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td></td>
<td>1973</td>
<td>—</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td>1976</td>
<td>9.6</td>
<td>8.6</td>
</tr>
<tr>
<td></td>
<td>1980</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Korea</td>
<td>1967</td>
<td>—</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td>1969</td>
<td>—</td>
<td>11.0</td>
</tr>
</tbody>
</table>

(Table continues on the following page.)

9 The alternative rate of return or the rate of discount is generally estimated to be about 8–10 percent.
10 Owing to universal primary education, generally marginal returns to primary education could not be estimated in many countries (in table 2).
11 See also World Bank (1997) for a description of rates of return to education in a few selected countries such as Korea, Taiwan, China and Hong Kong. (See also Gannicott 1990.)
Estimates of private rates of return based on a Mincerian earnings function are also available for quite a few economies in East Asia, and they are presented in table 3. They also show that investment in education carries a high rate of return in East Asia. Though intertemporal comparisons of the various estimates need to be made with caution, it seems clear that the rates of return (Mincerian) are found to be increasing over time in Korea. One expects, in general, the rates of return to fall as education expansion overtakes demand for educated labor. But the evidence on Korea may be indicative of the fact that technological advances have created greater relative demand for (more) educated labor over uneducated (or less educated) labor, with demand for more educated labor increasing more rapidly than supply, suggesting the need to expand social investment in education (Psacharopoulos and Woodhall 1985; Paul Schultz 1988).

Comparative estimates on rates of return to women’s education do provide useful guidelines for educational planning, though there are problems involved, inter alia, in gender-wise comparisons of conventionally estimated rates of return to education (Paul Schultz 1988). Presently available estimates presented in table 4 indicate that contrary to general perceptions, investment in women’s education yields higher returns than investment in men’s education in Japan, Korea (particularly in the case of higher education) and Taiwan. The dated evidence on Singapore shows the contrary.

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a. Non-OECD.


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The rate of return in China was very low, “but accords with the most common complaint of the educated elite in China” (Byron and Manaloto 1990, p.791). In keeping with changes in the socioeconomic system, the rates of return also seemed to have increased considerably, as the estimates for 1993 reveal. Hossain (1997) has also estimated Mincerian rates of return to different levels of education in China, which are 18.2 percent for primary, 13.6 percent for secondary, and 18.9 percent for higher education.

At the same time, Paul Schultz (1988, p.604) himself notes that the available estimates on rates of return to women’s education “stand as the best evidence currently available.” See also Paul Schultz (1995).

---

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Primary</th>
<th>Secy.</th>
<th>Higher</th>
<th>Primary</th>
<th>Secy.</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>1985</td>
<td>—</td>
<td>7.6</td>
<td>14.5</td>
<td>—</td>
<td>7.6</td>
<td>14.8</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>—</td>
<td>9.0</td>
<td>11.0</td>
<td>—</td>
<td>9.5</td>
<td>11.6</td>
</tr>
<tr>
<td>Males</td>
<td>1994</td>
<td>—</td>
<td>7.3</td>
<td>7.2</td>
<td>—</td>
<td>8.1</td>
<td>6.9</td>
</tr>
<tr>
<td>Females</td>
<td></td>
<td>—</td>
<td>6.8</td>
<td>6.8</td>
<td>—</td>
<td>11.6</td>
<td>7.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>1966</td>
<td>6.6</td>
<td>17.6</td>
<td>24.1</td>
<td>—</td>
<td>20.0</td>
<td>25.4</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1970</td>
<td>27.0</td>
<td>12.3</td>
<td>15.0</td>
<td>50.0</td>
<td>12.7</td>
<td>15.8</td>
</tr>
</tbody>
</table>

---

OECD    | 1985 | 13.1   | 10.9  | 29.1   | 18.1    | 20.3  |

Asia*   | 19.9 | 13.3   | 11.7  | 39.0   | 18.9    | 19.9  |

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Not available (or not estimated).

---

*OECD.
Table 3.  

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Mean years of schooling</th>
<th>Coefficient (percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1985</td>
<td>3.0</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>1993</td>
<td>—</td>
<td>12.2</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1981</td>
<td>9.1</td>
<td>6.1</td>
</tr>
<tr>
<td>Japan</td>
<td>1970</td>
<td>7.6</td>
<td>7.3</td>
</tr>
<tr>
<td></td>
<td>1975</td>
<td>11.1</td>
<td>6.5</td>
</tr>
<tr>
<td>Korea</td>
<td>1976</td>
<td>—</td>
<td>6.5</td>
</tr>
<tr>
<td></td>
<td>1986</td>
<td>8.0</td>
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<tr>
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<td>1972</td>
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<td>6.0</td>
</tr>
</tbody>
</table>

—. Not estimated or not available.

Table 4.  

<table>
<thead>
<tr>
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<th>Year</th>
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<th>Women</th>
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<td>University</td>
<td>5.8</td>
<td>5.7</td>
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<td>Secondary</td>
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<td>13.7</td>
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<td></td>
<td></td>
<td>University</td>
<td>22.9</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>Middle school</td>
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<td>11.2</td>
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<tr>
<td></td>
<td></td>
<td>High school</td>
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<td>7.6</td>
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<tr>
<td></td>
<td></td>
<td>Junior college</td>
<td>14.9</td>
<td>13.2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>College and univ.</td>
<td>11.0</td>
<td>14.5</td>
</tr>
<tr>
<td></td>
<td>1994</td>
<td>Secondary</td>
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<td>7.3</td>
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<td>Vocational college</td>
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<td>5.5</td>
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<td></td>
<td>Universities</td>
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<td>7.2</td>
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<td>1966</td>
<td>Primary</td>
<td>3.8</td>
<td>9.4</td>
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<td>15.4</td>
</tr>
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<td>1982</td>
<td>Primary</td>
<td>16.1</td>
<td>8.4</td>
</tr>
</tbody>
</table>


To summarize, the wealth of evidence on rates of return to education in East Asian economies shows that social returns to education in Asian economies are at least as high as any reasonable measure of the opportunity cost of capital. In other words, investment in human capital, specifically in education, may be more conducive to economic growth than investment in physical capital; the more developed the country is, the lower are returns to education at all levels. For instance, the returns to education in Japan
are the lowest, compared with other economies; and finally, the positive and high rates of return also highlight the less-than “optimum” levels of investment in education in East Asian economies.

**Education and Agricultural Productivity**

The evidence on the contribution of education to economic growth and development is not confined to increases in earnings and rates of return. Significant effects of education on productivity in agriculture were found in several East Asian economies. The available research evidence dates back to the 1960s and 1970s; this is discussed in detail elsewhere (Tilak 1994). According to the available evidence, the contribution of education to agricultural productivity was quite high in Korea: one year of additional education was estimated to increase productivity by 2.22 percent (Jamison and Lau 1982). Education also influences the selection of technologies in farming. A better-educated farmer may be able to choose a superior technology than a less-educated farmer would, and thus the productivity levels obtained with the new technology may crucially depend on the level of farmers’ education.

With the help of a simple behavioral model applied to household data on the Hunan province in China, Lin (1991) had shown that education has a positive impact on the adoption of new technology. Education may favor the adoption of a new superior technology not only because of the role education can play in the faster discovery and assessment of new technologies, but also because it acts as a complementary input for the appropriate use of technologies (Cotlear 1990, p.76).

**Education, Poverty, and Income Inequalities**

Educational development in the East Asian economies has also contributed significantly toward improving equitable income distribution and reduction in poverty. After liberation, Korea made education accessible to all citizens, which contributed significantly to the increase in the supply of skilled and technical labor in the short run, and equitable income distribution in the long run. Though Korea emphasized growth relatively more than social welfare, it spent large amounts on education and on other social welfare programs. As a result, both absolute and relative levels of poverty declined, and income distribution improved over the years. The improvement in Korea is dramatic in comparison with the levels of poverty and strife of the years immediately following the Korean War. Table 1 on earnings by education levels also shows that over the years the inequalities have significantly declined. The impact of education on the reduction of poverty is higher in rural areas. It was found that education raised the productivity of small farmers in Korea considerably, and thereby reduced levels of absolute poverty. There are indeed several factors that explain poverty and inequalities. But research on that decomposed inequality (for example, in Taiwan, China) has found that education is either the most or the second most important determinant (Fields 1980, pp.116-17). Equity and growth have gone hand in hand in Japan, Taiwan, Korea, Singapore and Hong Kong, owing to various factors; an important one among them is certainly education (see Weiss 1996).

However, empirically, either limited or insignificant or even contradictory effects of education on income distribution were also found. Muta (1987) found that equalizing educational distribution does not completely reduce the income inequalities between several socioeconomic groups in Japan. Even in Singapore the equalizing potential of education was not reported to be large (Woo 1982). Rao (1996) observed that in Singapore educational expansion might not guarantee an eventual reduction in income inequality, even though it greatly assists in raising the living standards and improving the quality of life. But few deny that education is at least one of the many important factors reducing income inequalities.

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14 Not very surprisingly, the effect of education is higher in case of nonmechanized farms (2.33 percent), compared with mechanized farms (2.22 percent).
in the long run. Furthermore, it is possible that increases in levels of education might increase inequalities in the initial years. But as education expansion takes place, and a vast majority of the population is educated, as in several East Asian—and also in industrialized advanced—economies, the equalizing effect of education becomes strong and clear.

**Education and Health**

The contribution of education is obviously not confined to economic growth and distribution. The impact—whether economic, social, or political—of education on the whole fabric of development is significant. Education improves health practices, influences demographic patterns, and contributes to a better-quality and more prosperous life. The role of education in the basic needs framework—specifically, the effect of education on health, and nutrition—is well researched and documented (Noor 1980). The rather all-pervasive effects of education on health and development are summarized by Drèze and Sen (1989, p.267): Education has “a major role in the eradication of both undernourishment and preventable morbidity. This is not merely because education helps in the use of one’s personal means to buy food and medicine in a more informed way, but also because widespread elementary education leads to greater utilization of public health services. It can also generate more effective political demand that such services be provided.”

Review of earlier research on Korea, Taiwan, Japan, China and other economies (for example., Cochrane 1986, 1988; Powers 1975; Tilak 1989, 1994), highlights the significant effects of education on improving child survival, and general health conditions in East Asian economies. That education influences infant and child survival is well recognized. Life and death questions (for instance, infant mortality, life expectancy, crude death rate, and so on), in a country such as China could be explained largely with the help of literacy and education variables, apart from variables on health care facilities (Drèze and Sen 1989). For example, the life expectancy in China is only 69, while it is 80 in Japan and 77 in Singapore. Singapore and Japan have also higher rates of literacy than China (UNDP 1998). The effect of education on fertility and population growth is also found to be quite significant. While overall literacy and education pays, the education of women is found to have a more important effect on child survival and health conditions in general. On the whole, investment in education provides a passport to better health.

It may, however, be noted that some studies in the human capital framework did produce results contradicting this generally well-established evidence. For example, Pritchett (1996) found that increases in educational capital resulting from improvements in the educational attainment of the labor force have had no positive impact on the growth rate of output per worker. Mingat (1998) found negative contributions of secondary and higher education to economic growth. Besides, there are a few theories that question the productivity role of education and argue that education serves only as a credential mechanism and a screening apparatus (Arrow 1973; Spence 1973; Stiglitz 1975). It was also stated that the absence of a relationship between education and productivity is clear from the meaningless escalation of qualifications for jobs, making education “a great training robbery” (Berg 1970), and spreading the “diploma disease” (Dore 1976), which is still a valid point.15 But these theories formulated in “a highly mathematical abstract framework” (Klees 1989, p.259) lack empirical support, and still remain “a tantalizing but nevertheless unconfirmed conjecture” (Blaug 1987, p. viii). The screening role of education is found to be confined, if at all, to short periods, during the initial phases of employment.

On the whole, the contribution of education to development in the East Asian region seems to be highly significant, despite some limited evidence to the contrary. Quantitative evidence on the East Asian economies, on the whole, is still overwhelmingly in support of the human capital theory, a basic

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15 For example, it is referred to as “college fever” in Korea (Shin 1994, p. 3,169).
tenet of which is that education enhances productivity and thereby contributes positively to development. The contribution of human and social capital to the total wealth of East Asia (and the Pacific) was estimated to be as high as 75 percent (the rest being accounted for by natural and physical capital), while in Sub-Saharan Africa the corresponding proportion was only 31 percent, in the Middle East and North Africa it was 39 percent, and in Eastern Europe 41 percent (Haq and Haid 1998, p. 25). As the World Bank (1993, pp. 52-53) has shown, historical investments in primary and secondary education have been the two largest contributing factors to economic growth in Japan, Korea, Singapore, Taiwan, Hong Kong, and other East Asian economies.

As already noted, education is only one of the important factors that explain development. There are several complementary factors that help or deter education in yielding high returns. At the same time, it should be noted that human capital, essentially formed through investment in education, is a very important contributing factor to development. The dramatic increase in labor productivity at an annual rate of growth of 5.9 percent during 1953-92 in Taiwan was possible because of the massive spread of education (Lin 1994). As Nehru and Dhareshwar (1994) found, human capital accumulation (education) is 3-4 times as important as raw labor in explaining output growth; growth in total factory productivity is strongly related with the initial level of human capital; and these findings are found to be particularly true in several East Asian economies.

Education and Nation-Building

Education is a vital ingredient in building a nation. An important contribution of education in the East Asian economies is toward the development of a strong “nation-state.” The historical role of education in the process of state formation or “nation-building” in Japan in the 17th century after the Meiji Restoration is well recognized. As Passin (1965, p. 62) remarked, “educational reform ranks as one of the key measures in the transformation of Japan from a feudal to a modern nation state.” Education is also effectively used as an instrument of political socialization in Japan, China, Korea, and other economies. It fosters “national consciousness, group spirit, perseverance, egalitarianism, meritocracy and so forth” (Lee 1995, p. 38). The role education played in state formation in Korea, Taiwan, Singapore, and China in the second half of the 20th century is also quite significant. “Fostering a strong sense of national identity” has been the chief task of education in Japan (Lee 1995, p. 35). The only exception to this was Hong Kong, which was under British administration, where policies of laissez faire prevailed more and strong state formation was not emphasized much by the schools. “Nation building through education” was the goal of Korea, as well. The promotion of patriotism and support for national goals were emphasized as the chief goals of education in Korea and Taiwan. The contribution of education to the emergence of a strong state from a “fragile” one (of the period 1950-65) and to the transformation of Singapore into an orderly, cohesive, well-managed, and economically successful nation is significant (Gopinathan 1997). It was a vehicle for promoting a cohesive society and civic identity in Singapore and Taiwan. National identity and cohesion seemed to be the primary motive for education development in these economies. “The intensive process of state formation with which educational expansion has been associated in each of the four tigers has been about much more than economic development” (Green 1997, p. 45). Education played a crucial role in these economies in their emergence from the turbulent and devastated stages of their histories and each one to survive as a strong state and as a “resolute national society” in the increasingly globalized

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16 “Social capital signifies sound institutions and good governance, which, in turn, depend largely on the coverage and quality of education” (Haid and Haq 1998, p. 25).
17 The estimate for East Asia is the second largest one, next to South Asia where it was estimated to be 76 percent.
18 “Percent of predicted growth attributed to primary education” between 1960 and 1985 was estimated to be 58 in Japan, 67 in Korea, 69 in Taiwan, 75 in Singapore, and 86 in Hong Kong.
world economy. In Taiwan education expansion has raised the educational levels of middle classes, who took an active role in the process of modernisation (Young 1995).

A question that arises is this: what have been the educational policies and practices of the East Asian economies that could contribute to the accumulation of huge and efficient stocks of human capital—which, in turn, could create economic miracles? The remainder of the paper is concerned with this question. But first we will present a short sociopolitical and historical profile of these economies that relates to the development of education.

The Sociopolitical and Historical Factors

Most of the East Asian economies were subject to colonial rule by the United Kingdom, France, Spain, the Netherlands, the United States, or Japan (which itself had a long period of feudal rule); and became independent only in the middle of the twentieth century. Singapore gained independence from Britain in 1963 and from Malaysia in 1965. Taiwan was under the rule of Japan and China for varying periods. As colonies, these economies suffered severe economic deterioration under colonial rule. Historically some of these economies in the East were once very rich, industrially advanced, and materially prosperous. In fact, some of them are characterized as the cradle of civilization, of the world’s great religions, philosophies, and earlier education systems. But an interesting point of developments in the twentieth century is that most economies in East Asia were able to overcome their colonial legacies and march toward progress rather rapidly, compared with many developing economies of other regions such as South Asia and Sub-Saharan Africa.

The colonial rule had its own impact on the development of education in the East Asian economies. Development of education at all levels, including primary, secondary, and higher education, was retarded to a great extent under colonial rule. Modernization of education in those economies under colonial rule was either neglected or delayed for many years and indigenous educational reform got under way only after the granting of autonomy or complete independence in the latter half of the twentieth century (Kobayashi 1990, p. 204). For example, the colonial government did not open a college in Singapore until 1905. A major exception was Taiwan, where Japanese, with their keen interest in educational planning, helped Taiwan in formulating and executing outstanding educational plans (Tsurumi 1977, p. 224). Japan’s influence on education in Taiwan declined, however, after Chinese educational policy was enforced (Chen 1997, p. 347).

In this region, Japan and China are the only exceptions to colonial legacies. Historically, Japan had the advantage of high investments in education. The Meiji government, for example had made education one of its priorities. The establishment of an ambitious school system was announced as early as 1872. At the time there was a large network of informal education institutions. A large proportion, nearly a majority of children used to attend temple schools. As a result of formal and informal efforts, compulsory education was universal by the beginning of the twentieth century. Social obligation for education was recognized and compulsory education was made free in 1900, and it was gradually extended to nine years by 1947.20

Since most of the East Asian economies were under colonial rule for long periods, educational models in these economies could be largely described as borrowed or imposed ones. For instance, colonial governments showed interest in opening only English-language, fee-paying schools, not local language schools. It is only of after independence that, these economies could introduce major indigenous education reforms. In other words, these colonized economies were late entrants into the modernized education system; but they were able to catch up with the world’s advanced economies in establishing modern education systems during the last two or three decades. The education systems of

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20 See, among many scholarly studies, Shields (1989) for a brief description of the historical growth of education in Japan. See also Nakamura (1994) and Balatchandirane (1995).
East Asian economies evolved, though, during their colonial periods and became transplanted models of Western institutions; these alien models were reassembled, reconstituted, and restructured successfully in the post–World War II period to serve domestic national needs.

China did not experience colonial rule, but constrained by feudalism, its education system evolved slowly from its ancient roots. Confucianism has been, of course, a dominant philosophy of Chinese society. But the country was to borrow modern educational development models from Japan (see Abe 1987). The Chinese education system was also considerably influenced by the Soviet system (Orleans 1987). It is only in fairly recent times, described as the “brewing and starting” period (starting in 1978) that Western models of development of education have been introduced (Xiaochun 1997, p. 19).

Apart from colonial legacy, the economies in the region are also heirs to a heritage of common culture and civilization steeped that is rich in history, whose traditions are still found visible (see Huq 1965, 1975). Cultural continuities are clearly visible in China, Taiwan (Law 1995, 1996) and also in Hong Kong. These and other economies are religious in nature, which makes them tradition-bound societies in the modern, technologically developing world. For example in Japan, Korea, Taiwan, and China the Confucian ethic is combined with the religious principles of Mahayana Buddhism “in a religious and philosophical syncretism” which has become a characteristic of the region and formed the basis for debates on constructing social welfare systems (Goodman and Peng 1996, p. 195). The social welfare systems and even success of the region’s economies is related to the shared Confucian morals and ethical traditions. Furthermore, the Confucian and other traditional values are so strong in the system that people seek solutions to their problems from within their own traditional cultural framework rather than blindly adapting Western solutions.

The philosophy of the developmental state has been extremely strong in all of these cultures (White 1988). As Castells (1992, p. 56) observed, “behind the economic performance of the Asian tigers breathes the dragon of the developmental state.” The state in this region plays a strong role in ensuring the fulfilment of national goals, intervening extensively in the economy and actively promoting development. One cannot say that an excessive amount of trust has been placed in liberal market policies. Generally, the role of the state is either facilitative or directive. While in Hong Kong, the government plays a facilitative role, in all the other East Asian economies including Japan the state pursues a strong directive role in development (Yu 1997), and accordingly the growth is described as “government-led growth” (Soon 1994). In this overall picture the education sector is no exception.

Educational planning is still considered extremely important in the region. Indeed, as Green (1997, pp. 48–50) notes, there are two distinctive features of educational development in the East Asian countries: the role of educational planning and the emphasis on moral education. Government planning has remained absolutely central to development, with medium-term planning being a common strategy of development in Korea, Taiwan, and Singapore. Educational plans, including manpower (or human resources) plans are derived from economic plans on a regular basis. Human resource planning aims to reduce the mismatches between the output of the education system and the demands of the labor market. This is in contrast to other developing and developed economies that have virtually bid goodbye to planning, including educational and manpower planning.

The education curricula emphasize moral values and ethics, in addition to strong discipline. The emphasis on indigenous values is particularly striking. Education systems are moulded in such a way as to promote Confucian values, such as respect for one’s elders, sincerity, loyalty to superiors, paternal benevolence, avoidance of conflicts, dutifulness, lack of complacency, meritocracy, striving for learning, and respect for knowledge (see Postlethwaite and Thomas 1980). All of these traits have been found to have a strong influence on economic growth, as they permeate the work ethic. As Cummings (1995, p. 7) noted, the state in these economies coordinates education and research with a firm emphasis on the transmission of indigenous values.

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21 Among these countries, Hong Kong may be an exception as it has pursued somewhat laissez-faire policies (Rabushka 1979).
A closely related feature that distinguishes East Asian economies is the form of political system in use. While many developed and developing counties have—or pursue—democratic forms of governance, some the East Asian economies such as Singapore and Korea are subject to a somewhat authoritarian rule. Taiwan began as an outright oppressive regime, but turned into a development state in a short period of time. China is still in the middle of a transition from communism into a market economy. It is generally felt that authoritarian rule rarely recognizes the contribution of human capital to development and accordingly rarely gives high priority to education. One particular example is the education system in China. The system—particularly the higher education system—suffered the most in China during and after the Revolution. It is only of late, as the shortage of skilled labor is widely felt in the context of economic development plans (Xiao 1998) that the importance of higher education is being realized. By contrast, the authoritarian rule in Singapore and Korea could be described as “strong” or “hard” but also “benevolent” with progressive policies emphasizing economic growth and investments in human capital, compared with authoritarian and military rule in other parts of the world. And in Japan, social-democratic policies helped the creation of a “softly structured society” in the sense that its social stratification is flexible enough to allow upward social mobility (see Odaka [forthcoming]).

Some East Asian economies did experience political turmoil and economic shocks (including the one during 1997–98). But they could (and in the present case, it is hoped they would) overcome such shocks rather quickly and could be back on normal tracks of growth, partly because of the high levels of education their populations have acquired. After all, the vast spread of an educational base serves as the best safety valve to cushion such shocks. Earlier these economies were able to avoid the adverse effects of structural adjustment policies, essentially because of the wide availability of education, including higher education, while many developing economies suffered greatly because of such policies (Tilak 1997a).

The strong state apparatuses in these economies also enabled the rulers to pursue development goals single-mindedly without bothering about populist pressures; the authoritarian systems helped in executing the plans successfully, with a rather “hard” hand if necessary. Their ability to win consensus on and compliance to policies chosen and plans prepared should at least partly be attributed to the “strong state” philosophy. Trade unions, for example, are severely weak in several of these economies. All this is in contrast to the problems faced by many democracies in the West and as well as in the East (for example, South Asia) in implementing policies in the face of volatile electorates and powerful interest groups. As Goodman and Peng (1996, p. 211) observed, governments in such regions as East Asia are able to manipulate public support for their strong actions through the education system and mass media.

Many economies in East Asia (for instance, Japan, Korea, and China) practice centralized control in government and also in education; in small islands such as Singapore, this kind of control is effective (Sharpe and Gopinathan 1996). As decentralization has been an important issue more in the case of big economies and since many of these East Asian economies, except China, are relatively small in size, centralized education philosophies have had no major adverse effect on the development of their education systems. This is also in contrast to the worldwide emphasis on a decentralized system of planning, management, and development in education. At the same time, the role of not only communes in China, but also of prefectures in Japan is highly significant in the planning, administration, and financing of education. Significant efforts toward decentralization are being initiated in China (see Ming 1986).

Growth in Education during the Postindependence Period

It is interesting to note that in Western economies, particularly in Europe, a significant growth of formal education seems to have followed rather than preceded economic growth, particularly in the form of a
transformation from an agriculturally based to an industrially based economy. For example, though widespread literacy was prevalent on the eve of the industrial revolution in Europe, formal education expanded significantly only later. In developing economies in general, the process seems to be the other way around: economic growth follows the expansion of formal and informal education (Lewin, Little, and Colclough 1982). In East Asia’s case educational growth preceded economic growth—by the early 1960s we find high rates of literacy and enrollment ratios in schools—and economic miracles followed only later, confirming the theory of human capital that investment in education leads to economic growth. But subsequent economic growth enabled the economies to execute a more rapid expansion of formal education—including, specifically, higher education and science and technology. East Asian economies thus provide an interesting example of the symbiotic relationship between education and economic growth.

The economies in East Asia have recognized the critical role of human capital in economic growth and development. Taking a cue from the “human investment revolution in economic thought,” initiated by Theodore Schultz (1961), and recognizing that education is an extremely important factor in the economic modernization of their economies, East Asian governments accorded a high priority to investment in human capital in their developmental efforts in the postindependence period.

Consequently, there has been an explosion in numbers in the education systems of the developing economies in the post-war period, which led Patel (1985) to characterize it as a the “Third World educational miracle.” The East Asian economies have their own significant share in the education miracle, but not necessarily in terms of numbers, as many had started their development efforts with a stronger base than most. Education was compulsory in many of these economies and the duration of compulsory education is now nine years, exceeding the duration of primary education. As a result, for example, by 1960 primary education was universal or nearly universal in Japan, Singapore, Korea, Taiwan, Hong Kong, and China. Enrollment ratios in secondary education were above 20 percent in Hong Kong, China, and Korea, above 30 percent in Singapore and Taiwan, and above 70 percent in Japan. So the actual quantitative expansion during the postwar period took place in secondary—and more specifically in higher—education, as shown in figures 2 and 3. Starting with extremely low enrollment in higher education (less than five percent in all the economies in our group except Japan), all the economies of East Asia except China had progressed to above 20 percent enrollment ratios by the early 1990s; it was above 30 percent in Japan, Korea, and Singapore. As Behrman and Schneider (1994, p. 46) concluded, in the late 1980s the enrollment rates in primary education in these economies are not all that different from the average of all developing counties, but they did have particularly higher enrollment rates in secondary—and still higher rates in tertiary—levels of education compared with other developing economies. Similarly literacy rates also improved considerably in most of these economies to about 90 percent in Singapore, Hong Kong, and Taiwan. Nearly all adults in Japan and Korea are literate. Gender differences in literacy and education are extremely small.

The expansion of education systems contributed to the buildup of huge stocks of human capital in these economies in the form of a reservoir of highly educated population (table 5). According to the latest statistics available, every adult member in Japan, Taiwan, and Singapore has competed at least primary education; and at least one-fourth of the adult population in all the economies of the region have secondary education.

The higher-educated population constitutes more than 20 percent of the total adult population in Korea and this is comparable to Japanese figures. At the same time, a little above one-fourth of the adult population in China and a little less than one-fourth in Hong Kong had no formal schooling according to 1990—91 statistics.

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23 There are significant differences in the data on China provided by different sources. So the time-series trends presented here in several tables need to be interpreted with caution.

24 China intends to improve the ratio by increasing it to 8 percent by the turn of the century and to 11 percent by 2010 (State Education Commission 1997). See Hayhoe (1995) for interesting reflections on mass higher education in East Asia.

25 See Tilak (1993a; 1994) for extensive details.
Figure 2. Growth in Enrollment Ratios in Secondary Education

Source: UNESCO and national sources.

Figure 3. Growth in Enrollment Ratios in Higher Education

Source: UNESCO and national sources.
All this could as well be summarized in terms of mean years of schooling of the adult population. The figures shown in table 6 are quite high compared with many developing economies. A more important aspect, however, concerns gender differences, which, though not very high, seem to have not declined significantly between 1980 and 1992—which is quite surprising, as gender disparities in enrollment are not as wide. However, in comparison with other developing economies, gender differences in East Asian economies are not terribly high (see Tilak 1993b; and other papers in King and Hill 1993).

**Table 5. Educational Attainment of Adult (25+) Population (percent)**

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>No sch.</th>
<th>Primary</th>
<th>Secondary</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Incomp.</td>
<td>Comp.</td>
<td>Lower</td>
</tr>
<tr>
<td>China</td>
<td>1990</td>
<td>29.3</td>
<td>34.4</td>
<td>S</td>
<td>34.3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1991</td>
<td>22.8</td>
<td>29.3</td>
<td>S</td>
<td>14.8</td>
</tr>
<tr>
<td>Japan</td>
<td>1990</td>
<td>..</td>
<td>S</td>
<td>34.3</td>
<td>S</td>
</tr>
<tr>
<td>Taiwana</td>
<td>1995</td>
<td>6.0</td>
<td>1.0</td>
<td>22.7</td>
<td>17.8</td>
</tr>
<tr>
<td>Singapore</td>
<td>1990</td>
<td>..</td>
<td>S</td>
<td>53.3</td>
<td>S</td>
</tr>
<tr>
<td>Korea</td>
<td>1995</td>
<td>8.7</td>
<td>0.9</td>
<td>17.3</td>
<td>15.7</td>
</tr>
</tbody>
</table>

.. Nil or negligible.

a. Age-group: 15 +.

*Note:* S. Indicates that the data have been included in the subsequent category.

"Incomp.": those who did not complete a given level; "comp.": those who did.

**Sources:** Singapore: Gopinathan (1995, p. 93); Taiwan: MOE (1997); others: UNESCO [a] (1995 and 1997).

**Table 6. Improvement in Mean Years of Schooling of Adult Population (25+)**

<table>
<thead>
<tr>
<th>Economy</th>
<th>1980</th>
<th>1992</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
<td>Males</td>
</tr>
<tr>
<td>Singapore</td>
<td>3.5</td>
<td>4.3</td>
</tr>
<tr>
<td>China</td>
<td>4.8</td>
<td>6.0</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>6.2</td>
<td>7.4</td>
</tr>
<tr>
<td>Korea</td>
<td>6.6</td>
<td>8.1</td>
</tr>
<tr>
<td>Japan</td>
<td>10.4</td>
<td>10.7</td>
</tr>
</tbody>
</table>


More than the educational levels of the general population, the level of stock of human capital embedded in the labor force emerges as an essential characteristic feature for development. The rapid expansion of educational opportunities has contributed to a vast improvement in the educational levels of the work force. For example, in Taiwan the percentage of employed persons with higher education increased from 3 percent in 1964 to 18 percent in 1992; those with secondary education rose from 15 percent to 52 percent; and those with primary education dropped from 82 percent to 31 percent (Lin 1994, p. 77). This could also be summarized in terms of the mean years of schooling of the labor force, which is, in fact, a widely used summary statistic to gauge educational development in a society. Most recent data are not available in our case. But the available evidence depicted in figure 4 also shows that the absolute levels of mean years of labor force in East Asian economies are quite high. Furthermore, the levels have improved significantly—especially when compared with other parts of the world (see...
Kaneko 1984; Psacharopoulos and Arriagada 1986, 1992)—over the years. Among the six counties of the region on which data are presented, China is at the bottom, and Hong Kong and Taiwan are at the top after Japan. The mean figure for years of schooling of the labor force in Hong Kong, and Taiwan, is very close to the regional average of the developed market economies.

**Figure 4. Educational Levels of the Labor Force**

![Graph showing educational levels of the labor force in various countries: China, Singapore, Korea, Taiwan, Hong Kong, Japan. The bars for China and Singapore show about 6 years of schooling, for Korea and Taiwan about 8 years, and for Hong Kong and Japan about 9 years.]

*Note:* Latest available estimate.


More recent evidence, if available, may put Korea and Singapore also in this category. These are not small achievements for developing economies that took off only during the 1960s or so.

Alternative methodologies and corresponding estimates of human capital reveal a similar picture: according to Nehru, Swanson, and Dubey (1995), the level of human capital stock in East Asian in 1987 is the second-highest (next to Latin America) among the developing regions of the world; and the rate of growth in the stock between 1960 and 1987 in the region is the highest (along with Sub-Saharan Africa). Similarly, Dubey and King (1997) estimated that while in 1960 the stock of human capital in the East Asia and the Pacific region was equal to the stock in Middle East and North Africa, and was only marginally better than South Asia, by 1987 East Asia has surpassed all other regions of the developing world (except in case of female human capital stocks in Latin America). Hence it is natural that such high levels of stocks of human capital, reflected in the form of education of the labour force in these economies have contributed to higher productivity and higher levels of economic growth. After

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26 See table A.3 in the appendix.

27 For example, according to the 1985 population survey, the ratio of higher-educated graduates in the labor force in Korea exceeded 10 percent (Seong-Chul 1987, p. 303). Similarly in Singapore, postsecondary and higher-educated labor force constituted 17.3 percent of the total labor force in the late 1980s (Tee 1990, p. 577).

28 The region is so defined as to include China, Hong Kong, Indonesia, Japan, Korea, Malaysia, Philippines, Singapore, Taiwan, and Thailand.
all, large stocks of human capital facilitate rapid technological progress (Romer 1990a, 1990b; Azariadis and Drazen 1990; Barro 1991; Nelson and Phelps 1966).²⁸

**Investment in Education**

The education sector in the East Asian economies owes its impressive performance at least partly to the pattern of investment in education. In fact, many argue that expansion of the student population at all levels of education was made possible by the continuous growth of government expenditure on education—for example, in Korea (see Seung-Chul 1987, p. 304). A cursory examination of the investment patterns in education in the East Asian economies highlights a few important aspects:

The East Asian economies have firmly believed in the importance of education for economic growth and accordingly made huge allocations to this sector. The growth in education spending is nearly the same as the growth in the GDP in East Asian economies during 1980–90, except in Japan. Public expenditure on education has increased in real prices at an annual rate of 9.5 percent in Korea between 1980 and 1990, while the GDP grew at a rate of 9.7 percent. In Singapore and Hong Kong, the expenditure on education increased faster than the GDP (table 7). The rapid growth in public spending on education has predictably resulted in rapid growth in enrollment. However, there is no systematic relationship between economic growth and public expenditures on education. As Paul Schultz (1988, p. 546) rightly noted, certain regions have increased public spending on education more rapidly or slowly than would have been foreseen, based on incomes. It is not only Korea, but also many East Asian economies that are overachievers in this regard.³⁰ With overall high rates of growth in expenditures on education, in general, and with specific patterns of allocation of resources, inequalities between different regions and between the sexes and social groups could also be reduced to “tolerable,” if not to negligible levels.

<table>
<thead>
<tr>
<th>Economy</th>
<th>GDP</th>
<th>Expenditure on education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Japan</td>
<td>6.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Singapore</td>
<td>6.4</td>
<td>7.1</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>7.1</td>
<td>7.6</td>
</tr>
<tr>
<td>China</td>
<td>9.5</td>
<td>8.4</td>
</tr>
<tr>
<td>Korea</td>
<td>9.7</td>
<td>9.5</td>
</tr>
</tbody>
</table>

*Sources: World Bank [a] (1992); UNESCO [b] (1993).*

**Intersectoral Allocation of Resources to Education**

An intriguing aspect is that in the 1960s, all East Asian tigers had not necessarily started their phase of rapid development with heavy investments in education in relation to their respective national income. For example, in 1960 Hong Kong invested only 2.1 percent of its GNP in education, and Taiwan 2.4 percent, while a developing country such as India invested 2.3 percent in fiscal 1959–60 (Tilak 1993a, 1995).

²⁸ In those countries that are not on technological frontier, large stocks of human capital facilitate the acquisition of technological capability (Romer 1990b). This could be noted in the case of other East Asian countries such as Malaysia as well.

³⁰ See also Paul Schultz (1987).
While Korea invested 4.8 percent in 1960, this share came down significantly in the immediately following years, to as low as 1.8 percent in 1965. China continues to invest relatively a small proportion (less than 3 percent), but it intends to reach 4 percent by the end of the century and equal the average in developed economies by 2010 (State Education Commission, n.d.). Singapore and Japan are exceptions. They started with reasonably high proportions, but in Singapore the high levels could not be sustained. Others such as Korea have steadily increased their share over the years. In Japan the share of education in GNP has remained high (above 5 percent) since 1970. According to the latest statistics, Taiwan invests more than 6 percent of its GNP on education, Japan and Korea invest about 4 percent, and Singapore invests 3 percent.31

On the whole, recent figures in East Asian economies are high, but not particularly high, in comparison with other developing and advanced economies of the world, as shown in figure 5.32 Based on similar trends, the World Bank (1993, p. 198) observed that in both the initial and recent years, public expenditures on education as a proportion of GNP was not much higher in East Asia than elsewhere. But probably because of (a) historical investments and (b) relatively steady investments in the postwar period, some of these economies were even able to afford in the very recent years to reduce their spending on education, particularly as a proportion of GNP, as GNP itself has been increasing rapidly in East Asia.

**Figure 5. Growth in Allocation of Resources to Education in East Asia**

(percent of GNP)

![Graph showing growth in allocation of resources to education in East Asia](image)

*Source: UNESCO and other sources.*

The share of education in the government's total spending (budget) is a more important indicator of governmental efforts related to education spending, as the government has more direct control on government expenditure than on GNP or GDP. This proportion is reasonably high in many of the East

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31 All these figures refer to public spending only.

32 For example, many advanced countries allocate above 5 percent of their GNP for education; Canada allocated 7.6 percent in 1992. Among developing countries, India spends higher than Singapore and Hong Kong in relative proportions of the GNP. The current figures on India are comparable with that of Korea. After all, differences in magnitude of the denominator—namely, the national income—are large.
Asian economies, except for in Singapore and China, as shown in figure 6. While in China the share increased remarkably from less than 3 percent in 1970 to above 12 percent in 1993, in Singapore it was around 10 percent until 1985, when it suddenly increased. Between 1975 and 1985, Korea nearly doubled its proportion from 15 percent to above 28 percent. The figures on Japan were the highest during the high growth period (1960s and 1970s); and they experienced a decline in the 1980s and 1990s, a period characterized by low growth (Tajika and Yui [forthcoming]). The corresponding proportions in many Western developed economies are somewhat comparable (in the range of 15–20 percent).

Many economies in the region do not have any norms or goals regarding the proportion of GNP or of total government expenditure that has to be allocated to education.

Figure 6. Growth in Allocation of Resources to Education in East Asia
(percent of Total Government Expenditure)

Source: UNESCO and other sources.

The only exception seems to be Taiwan where the central government is required by law to set aside at least 15 percent of the total national budget for education—the provincial governments not less than 25 percent of their budgets and municipal and county governments not less than 35 percent (Boyd and Lee 1995, p. 195). Accordingly, we find in figure 6 a more steady flow of budgetary resources to education in Taiwan than in other economies, but still the actual levels seem to be just about in keeping with or lower than the norms. However, such norms might help in protecting the education sector from frequent ups and downs in the allocations.

The above-listed proportions—share of education in the GNP or in total government expenditure—have not had an unfluctuating history. But on the whole, education spending in absolute

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33 Both these figures stand relatively low in international comparisons.
34 While there are no rigid norms of this kind, some countries do have their own targets. For example, China aims at allocating 15 percent of national expenditure, 20 percent of provincial, and 35 percent of country expenditures to education in the eighth five-year plan (State Education Commission, n.d.).
35 Both have their own utility for comparisons, but also have inherent weaknesses. Higher rates of growth in the GNP and total public expenditures (than rates of growth in expenditure on education) will push these proportions down.
terms has increased over time remarkably in real terms in many East Asian economies, as already noted in table 7.36

**Intrasectoral Allocation of Resources**

In addition to the total overall investments in education—and of equal or greater importance—is the intrasectoral allocation of investment resources; that is, the pattern of investments in different levels of education relative to one another. The East Asian economies have accorded a very high priority to basic (primary and secondary) education, relative to higher education. This is not a recent phenomenon. As far back as in 1885 Japan invested 84 percent of its educational budget on six years of elementary education (Education Commission 1966, p. 864). For a long time primary education enjoyed a high priority in Japan as well as in other East Asian economies. About three-fourths of the total education budget in Japan, Hong Kong, and Singapore and as high as 87 percent in Korea were allocated to school (precollege) education in 1975. It is only of late that higher education seems to be getting a high priority; but still school education receives a major share of the total budget in East Asian economies. It is above 40 percent in Korea, one-third in China, and one-fourth in Hong Kong and Singapore. Hong Kong, Singapore, and Japan also allocate a little more than one-third of the total educational budgets (currently) to higher education; and the share is one-fifth in Taiwan. The share of secondary education is also around one-third (table 8). Thus all three levels of education seem to be receiving nearly equal weight in the allocation of resources (figure 7). Assigning equal priority to higher education is thus possible and it also seems to be efficient, as primary and secondary education are universal or nearly universal. The present pattern of intrasectoral allocation of resources also reflects a somewhat a “balanced” nature of educational development.

| Table 8. Intrasectoral Allocation of Expenditure on Education (percent) |
|-----------------------------|--------------------------|----------------|--------------------------|-----------------|--------------------------|
|----------------|-----------|--------|----------|-----------|--------|----------|
| China          | 27.6      | 34.3   | 20.0     | 35.5a     | 31.5a  | 16.5a    |
| Hong Kong      | 33.7      | 35.7   | 24.6     | 21.4      | 35.0   | 37.1     |
| Japan          | 75.1      | 22.8   | 2.1      | 36.0b     | 42.2b  | 13.5b    |
| Korea          | 49.9      | 33.2   | 7.8      | 44.5a     | 34.4+  | 7.9a     |
| Singapore      | 35.8      | 41.1   | 17.1     | 25.7      | 34.6   | 34.8     |
| Taiwan         | 28.4      | 26.4   | 19.5     | 24.5      | 31.7   | 21.1     |


Note: Taiwan figures in the 1995 column refer to 1996.


With a good pattern of intrasectoral allocation of budgetary resources, a reasonable level of balance could be maintained in terms of investments in different levels of education, as exhibited by ratios of expenditure per student at different levels of education (namely, expenditure per student of higher education over expenditure per student in primary or secondary education, or expenditure per student at a given level of education as a proportion of the GNP per capita), in addition to the intrasectoral pattern

36 It is exceptionally low in Japan, 1.6 percent, as it is in many other developed countries.
of allocation of expenditures. The balanced nature of educational investment becomes clearer if one looks at the ratios of unit costs of education at different levels and the degree of unevenness\(^{37}\) (table 9). In Japan and Korea the differences in the expenditures per student between higher and primary education is the smallest among East Asian economies. The differences in Singapore are not high either, compared with many developing economies. It is only in China that the unevenness is high, though this is also rapidly declining over the years. Similarly expenditure per student in secondary education is not all that different from the expenditure on primary education. These ratios are favorably comparable with those in OECD economies. All this reflects the evenness in public spending on education, which is a very important strength of balanced education systems.\(^{38}\) This is a quite an impressive feature compared with many developing economies, where the degree of unevenness is alarmingly high.

**Figure 7.** Intrasectoral Allocation of Expenditure on Education, 1995

![Intrasectoral Allocation of Expenditure on Education, 1995](image)

*Source: UNESCO and national sources.*

Why and how were East Asian economies able to ensure a balanced development of their education systems? Among the reasons we can count are (a) historical factors, (b) enactment of compulsory education acts, (c) strong belief in the contribution of education to development, and (d) political commitment to education. Compulsory education acts in Japan, Korea, and other economies made it imperative on the part of governments to allocate sizeable resources. The duration of the compulsory education cycle was also gradually increased to nine years in Japan, Hong Kong, China, and Taiwan, covering a portion of secondary education. Once primary education was expanded, secondary and higher education followed suit owing to demand built up through primary education; and economic growth also helped these economies to pay adequate attention to secondary and higher levels of education. In this sense, therefore, educational expansion in East Asia was largely sequential. At the same time, the balanced nature of investment in education is also reflective of the economies' recognition of the interdependent relationship between the three layers of education. Good-quality

\(^{37}\) The degree of unevenness is measured simply as a ratio of expenditure per student (or expenditure per student as a proportion of GNP per capita) at different education levels described above.

\(^{38}\) The expenditure per student in higher education in China and Korea seems to have declined sharply (relative to GNP per capita and also relative to expenditure per student in primary education), reducing the overall unevenness significantly between 1980 and 1995.
primary and secondary education delivers good students into higher education. In turn, the quality of primary and secondary education critically depends on the quality of higher education. After all, it is the higher education sector that provides teachers, administrators, and planners for school education.

Table 9. Expenditure on Education per Student (percent)

<table>
<thead>
<tr>
<th>Economy</th>
<th>1980</th>
<th>1995</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>As a proportion of GNP per capita</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>Secy</td>
</tr>
<tr>
<td>China</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>5</td>
<td>11</td>
</tr>
<tr>
<td>Japan</td>
<td>13</td>
<td>17</td>
</tr>
<tr>
<td>Korea</td>
<td>11</td>
<td>10</td>
</tr>
<tr>
<td>Singapore</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Africa a</td>
<td>13</td>
<td>46</td>
</tr>
<tr>
<td>South Asia</td>
<td>15</td>
<td>27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Degree of unevenness</th>
<th>Hr/Pry</th>
<th>Hr/Secy</th>
<th>Secy/Pry</th>
<th>Hr/Pry</th>
<th>Hr/Secy</th>
<th>Secy/Pry</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>92.0</td>
<td>27.6</td>
<td>3.3</td>
<td>13.5</td>
<td>5.8</td>
<td>2.3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>8.6</td>
<td>3.9</td>
<td>2.2</td>
<td>8.7</td>
<td>4.3</td>
<td>2.0</td>
</tr>
<tr>
<td>Japan</td>
<td>1.6</td>
<td>1.2</td>
<td>1.3</td>
<td>0.9</td>
<td>0.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Korea</td>
<td>1.5</td>
<td>1.6</td>
<td>0.9</td>
<td>0.4</td>
<td>0.5</td>
<td>0.8</td>
</tr>
<tr>
<td>Singapore</td>
<td>6.1</td>
<td>3.3</td>
<td>1.9</td>
<td>4.6</td>
<td>2.5</td>
<td>1.9</td>
</tr>
<tr>
<td>Taiwan</td>
<td>5.2</td>
<td>2.1</td>
<td>2.4</td>
<td>4.4</td>
<td>1.9</td>
<td>2.4</td>
</tr>
<tr>
<td>Africa a</td>
<td>61.2</td>
<td>17.3</td>
<td>3.5</td>
<td>25.5</td>
<td>7.5</td>
<td>3.4</td>
</tr>
<tr>
<td>South Asia</td>
<td>5.6</td>
<td>3.1</td>
<td>1.8</td>
<td>8.9</td>
<td>4.2</td>
<td>2.1</td>
</tr>
</tbody>
</table>

a. Sub-Saharan Africa.

Investment in the Quality of Education

An equally important aspect of education spending is that—since education has expanded reasonably well—the East Asian economies, like their Western developed counterparts, and unlike other developing economies in South Asia and Sub-Saharan Africa, were able to afford sufficient emphasis on the quality of education. In this vein they spent reasonably high amounts on textbooks and other teaching and learning materials, in addition to spending considerably on direct subsidies such as financial and nonfinancial incentives to students. With a reasonable level of good investments—and more important, declining growth in population pressures—real expenditure per student in education was able to increase remarkably in several East Asian economies over the years, contributing to significant improvements in educational quality (both in terms of content and environment). Student-teacher ratios in primary schools are small in many economies, ranging between 18 in Japan and 28 in Korea. It is around 20 in others. In contrast, the ratios in developing economies are more than double these figures. All this has a tremendous effect on the effectiveness of schools. The cognitive levels of children in schools in Japan, Korea, and Hong Kong

39 For example, it is 41 in Sub-Saharan Africa, and 62 in South Asia. As it is in the East Asian countries, the ratio in advanced countries is also low, 17 on average (about 1990).
are reportedly extremely high; they exceed those in other developing economies and match, or exceed, those in high-income economies (World Bank 1993, pp. 70-72).

Most of the economies in the East Asian region also assign high priority to high technology in education and training systems. Schools are given good technical equipment and also technical expertise, well-trained teachers, and so forth. More than 60 percent of the lower secondary schools in Japan have computers; and on average there are more than 20 computers in each school (Plomp, Brummelhuis, and Pelgrum 1997, p. 436). Resources are made available for innovative research and experimentation (Thomas and Postlethwaite 1983). However, the available figures on allocation of current expenditure on education broken down by items (table 10) do not show any pattern that is significantly different from other developing and developed economies. Generally teaching and learning materials (textbooks, audio visual materials, and so on) are found to have a significant impact on quality of education (Fuller 1985; Fuller and Clarke 1994). While China and Japan allocate 6 percent of their total current expenditure on education to such items, in other economies the corresponding proportion is very small.  

<table>
<thead>
<tr>
<th>Table 10.</th>
<th>Expenditure on Education on Selected Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Percent of Total Expenditure on Education)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Teaching-learning materials</th>
<th>Scholarships and welfare</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1980</td>
<td>4.7</td>
<td>8.5</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>5.8</td>
<td>6.7</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1980</td>
<td>1.3</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>1984</td>
<td>1.9</td>
<td>1.5</td>
</tr>
<tr>
<td>Japan</td>
<td>1980</td>
<td>6.5</td>
<td>6.2</td>
</tr>
<tr>
<td>Korea</td>
<td>1981</td>
<td>1.4</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>1994</td>
<td>1.1</td>
<td>7.9</td>
</tr>
</tbody>
</table>


In the context of intrasectoral allocation of expenditures on education, an equally important question concerns expenditures on scholarships and other welfare services. Information on spending on these items is available on four of region's five economies. In Hong Kong this figure is very small; in Korea there has been a steep increase in the relative share of these items in the total expenditure on education. In Korea, Japan, and China the share is about or above 7 percent. In many advanced counties such as France, Denmark, Sweden, and the Netherlands, the corresponding proportion varies between 10 and 19 percent. Particularly with high private costs of education, as discussed later, there is a need for spending sizeable amounts on scholarships and other welfare services in education to ensure that economically weaker sections among the population are not placed at a disadvantage in getting access to education, particularly higher education.

Vocational and Technical Education

Another striking feature of the pattern of investment in human capital in East Asian economies relates to the emphasis on vocational and technical education. As Haq and Haq (1998, p. 96) observed, unemployment rates in the East Asian economies remained low essentially because the population possessed employable vocational and technical skills. Polytechnic institutions, vocational schools,  

However, it should be noted that this proportion is not significantly high even in developed OECD countries; it is around only 2-3 percent.
institutes of technical education, and technical colleges figure prominently in the educational systems in Japan, Korea, Taiwan and Singapore. Vocational and technical schools received serious attention in Japan even during the nineteenth century (Yamamoto 1995). The “Taiwan miracle” owes to its vocational and training system (Boyd and Lee 1995, p. 195). The rate of return to vocational and technical education in Taiwan was estimated to be as high as 27.4 percent (in 1970), the highest figure among the available estimates on various economies (except for Colombia); it was also higher than the rate of return to general secondary education, which was 26.2 percent (Tilak 1988). One-third of the student enrollments in secondary education in Taiwan, and 10 percent in Hong Kong and China were in vocational schools; the corresponding proportion was 19 percent in Korea in 1990; and 13 percent in Japan in 1991. These figures are quite high compared with many other developed and developing economies. Enrollment in vocational education in the region was substantial until a threshold level of the GNP per capita (for instance, about $8,000) was reached; thereafter the share of vocational education in senior secondary education seems to have declined (Mundle 1998a, p. 664). The current levels of public expenditures on vocational education are not particularly high. Only 5.7 percent of the (current) total education budget goes to vocational education in Korea, 4.5 percent in Singapore, and about 3 percent in China and Hong Kong. In Taiwan, however, it is somewhat high—8.2 percent in 1995 (MOE 1996). On the whole, these figures are relatively high compared with those in developing economies, but rather low compared with the figures in developed economies. Many OECD economies spend 11–18 percent of their total educational spending on vocational education.

It appears that public expenditures on vocational education and training are not particularly high in East Asian economies, but private sector expenditures on training may be high, on which unfortunately no detailed and comprehensive macro-level data are readily available. For example, training is provided by enterprise in Singapore through the operation of the Skill Development Fund established in 1979 and financed through a levy on employers amounting to 2 percent of the salaries of all employees earning less than S$750 per month (Haq and Haq 1998, p. 102). It is obligatory for the companies in Korea to finance public vocational and training programs (Lijima and Tachiki 1994). Moreover, in several East Asian economies, the emphasis was not on formal vocational and technical secondary schools, but on training institutions outside the formal school system, and on-the-job training. In fact, in many of the economies of the region, employers are responsible for specific-skill training. It is also important to note that vocational education in Japan and Korea is fairly general in character. General skills, broad attitudes, and discipline are more valued than vocational skills per se in the labor market. Accordingly schools, even vocational schools emphasize—in Korea, for example—moral education and discipline (Green 1997, p. 50). The East Asian experience suggests that the modes of vocational-technical training are more important than technical education itself. Earlier research (for instance, Tilak 1988) also concluded that technical-vocational training is important, but this type of education in formal secondary schools might not yield as attractive returns as general secondary education, and that it would be better to provide it separately from the formal school system.

*Investment in Research and Development (R&D)*

Another related important characteristic feature of investment patterns in human capital in East Asian economies relates to their relatively heavy investments in what can be called “specialized human capital” (Theodore Schultz 1988)—namely, research and development (R&D), or science- and technology-related activities. These economies have established key laboratories to break into the forefront of global science development.
and technology (S&T). Reasonable stocks of scientific and technical human resources (scientists, engineers, and technicians) are built up in some of the economies of the region. The share of these resources per thousand population in economies such as Japan, Korea, and Singapore is much higher than in many developing economies. More important, a sizeable proportion of such labor is actually engaged in R&D activities.

Investment in R&D has been identified as the critical facilitator of human resource development in Korea's industrialization. Expenditures on R&D in Korea, for instance, grew faster than the GNP during the 1980s, and currently it forms nearly 3 percent of the GNP. Korea has invested so heavily in S&T and the technological transformation of society that the investments it has made are comparable to the industrial revolution in Europe. The government has had a dominant role in promoting S&T in Korea (until 1980 it had top investment responsibility). It is only later that private sector began playing an important role (Lee 1988).

The spirit of competition with economies such as China and the newly industrializing economies (NIEs) and the zeal to stay ahead of them made economies such as Korea and Singapore invest substantial resources in R&D. Chinese investment in R&D is by contrast very small; it constituted only 0.5 percent of the GNP in 1990 (table 11). Developed economies on average spent 2.9 percent of their GNP on R&D during 1995–96.

### Table 11. S&T Labor Force and Expenditure on R&D

<table>
<thead>
<tr>
<th>Economy</th>
<th>S&amp;T labor force(^a) (mid-1990s)</th>
<th>Expenditure on R&amp;D (percentage of the GNP)</th>
<th>Expenditure on R&amp;D per capita (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>350</td>
<td>1.50</td>
<td>1.40(^b)</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>98</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Korea</td>
<td>2636</td>
<td>0.77</td>
<td>1.58</td>
</tr>
<tr>
<td>Singapore</td>
<td>2728</td>
<td>0.20</td>
<td>0.70</td>
</tr>
<tr>
<td>Japan</td>
<td>6309</td>
<td>1.91</td>
<td>2.49</td>
</tr>
<tr>
<td>Taiwan</td>
<td>—</td>
<td>0.72</td>
<td>1.01</td>
</tr>
<tr>
<td>United States</td>
<td>3732</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>France</td>
<td>2584</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>United</td>
<td>2417</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

\(^{a}\) Not available.
\(^{b}\) Excludes technicians.

**Note:** S&T labor force includes scientists and engineers per one million population.


Furthermore, the number of patents granted by the United States to foreign inventors (which is another important indicator of progress regarding R&D) has increased manyfold in the economies of the region in such areas as computers, industrial machines, radio and television, electrical and communications equipment, motor vehicles, aircraft, and so on. The progress during 1980–93 is indeed remarkable.\(^{46}\)

---

\(^{46}\) See World Bank (1997, p. 111) for details.
Most of the R&D activities in East Asian economies are not university-based. They are based in specialized institutions or more commonly in industries—public and private. In Japan's case, it was found that financial support for R&D in universities has not risen appreciably since 1982, and as a result, R&D in universities indeed suffered a lot. Basic research capabilities of universities is now regarded as a far more serious problem than even the mismatch between academic priorities and industrial needs (Irvine, Martin, and Isard 1990).

The governments of Korea, Taiwan, and Singapore have taken strong initiatives particularly in cases involving product and technology development. They have made huge investments in the creation and refinement of new technologies, setting up government-funded R&D facilities, which have been used by private companies (Appelbaum and Henderson 1992). Education and research are thus coordinated to ensure the mastery of foreign technology.

The Role of the Private Sector and Cost Recovery in Education

Among the several dominant aspects of the education systems in East Asia, the private sector's role in the development of education figures prominently. This has been a more important feature particularly in the last one or two decades. The economies in the region exhibit highly divergent patterns on this aspect. The private sector is relatively significant in terms of education, particularly concerning secondary and (even more so) higher education in some of the economies of the region—such as Japan and Korea, where the public provision of education is based on a “safety net approach.” By contrast, the sector’s role is negligible in a few others such as Singapore and Hong Kong where the provision of education is based on an “entitlements approach.”

Primary education everywhere is provided almost exclusively by the government; private sector has a limited or negligible role. Even in the case of secondary education, the role of the latter is limited. But a quarter of the total enrollment in primary and secondary levels in Singapore and 40 percent of the enrollment in the secondary level in Korea are in private schools. In the absence of information on the nature of private schools, it could be argued that most, if not all, of them could as well be those that are financially supported by the state. Hong Kong changed its policies later in favor of public schools and as a result, private primary schools had almost disappeared by the end of the 1990s (table 12).

Table 12. Private Enrollment as Percentage of Total Enrollment in Education

<table>
<thead>
<tr>
<th>Economy</th>
<th>Pre-primary</th>
<th>First</th>
<th>Secy</th>
<th>Higher</th>
<th>Pre-primary</th>
<th>First</th>
<th>Secy</th>
<th>Higher</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>100</td>
<td>94</td>
<td>96</td>
<td></td>
<td>100</td>
<td>10</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Japan</td>
<td>75</td>
<td>0</td>
<td>13</td>
<td>73</td>
<td>80</td>
<td>0</td>
<td>16</td>
<td>73</td>
</tr>
<tr>
<td>Korea</td>
<td>54</td>
<td>1</td>
<td>39</td>
<td></td>
<td>78</td>
<td>2</td>
<td>37</td>
<td>79</td>
</tr>
<tr>
<td>Singapore</td>
<td>69</td>
<td>24</td>
<td>28</td>
<td></td>
<td>72</td>
<td>24</td>
<td>27</td>
<td>0</td>
</tr>
<tr>
<td>China</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>—</td>
<td>1</td>
<td>7</td>
<td>58</td>
<td>79</td>
<td>1</td>
<td>29</td>
<td>70</td>
</tr>
</tbody>
</table>

—. Not available.


47 According to the "safety net" approach, government intervention is restricted to cases of hardships, providing a "safety net" while the individual in normal circumstances pays out of his or her own resources for education. By contrast, the "entitlements approach" assumes that all individuals are entitled to receiving education, and its is the responsibility of the state to provide it. See Ergass (1988).
A more noticeable role assumed by the private sector is in higher education. Private institutions in education, particularly higher education, have been growing rapidly in East Asia, including in China. The private sector meets a large part of the demand for higher education in Japan and Korea: its share in total enrollment in higher education is above 70 percent in Japan, Korea, and Taiwan. As high as 73 percent of all universities, 84 percent of all junior colleges, 90 percent of "special training schools" and 97 percent of the "miscellaneous schools" in Japan are private, enrolling 73–98 percent of total students in these institutions in 1992 (Fujimura-Fanselow 1997, p. 142). 48 Korea provides yet another example of extensive higher education operated by the private sector: 84 percent of higher education institutions and nearly 80 percent of higher education enrollment were in the private sector in 1993 (Lee 1997, p. 316). 49 Private higher education institutions in Taiwan outnumber public institutions 2 to 1, capturing 70 percent of the enrollment (Chen 1997, p. 247). 50 The share of private enrollment in higher education in Japan, Korea, and Taiwan are among the highest in the world; and no country except the United States has enrollment in private institutions adding up to more than 10 percent of the total enrollment in higher education, and even there the figure is only 10 percent (see also Mingat 1998).

Hong Kong was able to resist pressures to allow the establishment of private universities (Bray 1993). The private ("independent") higher education sector is emerging slowly in China and a system of non-government-run higher education institutions is gradually taking shape, as nonstate or private (or sponsored) institutions begin to take root (State Education Commission 1997). In Singapore, which has a very limited role for the private sector, the government takes the bulk of the responsibility for education, including higher education.

But the quality aspects of private higher education do not seem to be satisfactory. It is observed that private higher education institutions in East Asia capitalize on student demand and needs. Despite flourishing growth and government support, private institutions in the region have failed to become top-quality institutions such as the ones found in the United States. This shows us what happens when quality controls are weak and profit motives dominate other considerations. The universities in Korea are found to be producing "half baked graduates," necessitating huge investments by the government and the industry in R&D. 51 That the quality of private sector education could be inferior to public education is also supported by the evidence on per student expenditures. Generally spending per student is considerably less in private schools than in government schools, as the evidence on Taiwan, depicted in figure 8, shows. That student-teacher ratios are higher in private schools and colleges than in government schools and colleges partly explains this. At every level of education, student-teacher ratios are much higher in private schools than in public schools in Taiwan (table 13). As Yee and Ghee (1995, p. 179) observed, "private higher education in East Asia provides a classic example of the supply-demand principles of economics."

As private universities cater to the demands of the large population, neglect of public higher education goes unnoticed. More important, since higher education is allowed to be guided by market signals, most higher education in Japan concentrates on professional fields. As Clark (1995, p. 159) notes, humanities and social sciences are thrown aside; doctoral programs in not only social sciences but also in physical sciences are "surprisingly weak," most advanced-level education is "radically underdeveloped," and the research-teaching-study nexus has become highly problematic. This is believed to be mostly attributable to the dominant role of industry or private sector in general in higher education.

The role of the private sector in managing education is different from its role in financing it. Private institutions are of two kinds: those that are supported by the state and those that are self-reliant. In many

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48 Technical colleges are an exception: 95 percent of them are public, accounting for 94 percent of all students (Fujimura-Fanselow 1997, p. 142). See Kaneko (1997) for a discussion on recent policies on higher education in Japan.

49 For related details, see McGinn and others (1980), and Lee (1987).

50 However, private sector expenditure on education in Taiwan was only 1.3 percent of the GNP, compared with public expenditure that accounts for 5.5 percent in 1995 (MOE 1996).

developing economies the former category accounts for most private institutions. Detailed data are not available separately on these two types of private schools; however, in East Asian economies private institutions that do not rely on state funds seem to be sizeable in number, though the other category also

![Expenditure per Student in Public and Private Schools in Taiwan, 1996](image)

**Figure 8.** Expenditure per Student in Public and Private Schools in Taiwan, 1996

![Chart showing expenditure per student in public and private schools in Taiwan, 1996.](image)

*Source: Ministry of Education (1998).*

**Table 13.** Student-Teacher Ratios in Taiwan, 1996–97

<table>
<thead>
<tr>
<th>School type</th>
<th>Primary</th>
<th>Junior higher</th>
<th>Senior higher</th>
<th>Universities</th>
<th>Colleges</th>
<th>Junior colleges</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public</td>
<td>21</td>
<td>18</td>
<td>18</td>
<td>12</td>
<td>12</td>
<td>16</td>
</tr>
<tr>
<td>Private</td>
<td>28</td>
<td>23</td>
<td>24</td>
<td>24</td>
<td>17</td>
<td>21</td>
</tr>
</tbody>
</table>

*Sources: Bureau of Statistics (1997, p. 36) and MOE (1998).*

has significant presence. The government lends partial assistance to private universities in Japan. Such assistance formed 30 percent of the total budget of the private institutions in 1980, and it declined to 15 percent in 1989 (Kanaya 1994, p. 3,083). Private financing of education, particularly higher education, has been an important development in the recent past in most developing and developed economies, and so not surprisingly, East Asian economies exhibit great contrasts, as shown in figure 9. Korea and Japan in particular depend on private financing, such as fees in education, especially in the case of higher education and more so in private higher education. For example, student fees covered 50 percent of higher education costs in public universities in 1985 in Korea; it was 82.3 percent in private institutions. Similarly in Japan, fees funded 66 percent in private four-year institutions in 1985, while the figure was 8.8 percent in 1987 in public institutions. In contrast, in the United States it was only 15 percent in public universities and 39 percent in private universities during 1986–87. In most European economies, the corresponding figures are much less. On the whole, private financing in terms of student fees accounted for one-fourth of total education funding in Japan in 1989, which is the highest
proportion among OECD economies. In a sense, the Korean and Japanese experience combined seems to be in sharp contrast to the traditional welfare-state approach—not to mention the traditionally important role of the state in the provision of education that dominates the pattern of educational development in European economies such as the United Kingdom, Sweden, Switzerland and Italy, and in the United States and Canada as well.

Figure 9. Cost Recovery in Public Higher Education (Late 1980s to Early 90s)

The other economies of the region—Singapore, Taiwan, Hong Kong, and China—do not rely on private financing to the extent that Korea and Japan do. It is generally felt that rapid growth in public sector spending on education resulted in rapid growth in public sector enrollment everywhere, including in East Asia, and that such a relationship between private sector investments and enrollment in private institutions cannot be found.

In addition, excessive reliance on—if not a monopoly of higher education by—the private sector might lead to neglect of public higher education by the government and society at large. For instance, it has been reported that Japanese public universities have suffered considerably since the 1980s: public

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53 Generally the share of private spending in total spending on education seems to be higher in low-income countries compared with middle-income and high-income countries. For example, private spending as a share of total education spending is about 5 percent in Austria, about 10 percent in Israel, and about 25 percent in the United States; in contrast, it is about 25 percent in Sri Lanka, 40 percent in Kenya, nearly 60 percent in Uganda and Vietnam, and 80 percent in Haiti (World Bank [a] 1997, p. 55; and Psacharopoulos and Nguyen 1997).
allocations to universities were frozen in 1983; and capital budgets for national universities subsequently declined (Yamamoto 1995).

In Singapore, by contrast, not only primary and secondary education, but also junior college and higher education are heavily subsidized by the state. The government subsidizes 95 percent of the costs of school education, including junior college education. Subsidies in tertiary education are also substantial, but seem to be declining over the years. Currently the rate of subsidy varies between 75 percent and 87 percent in various universities (and institutions of tertiary education) (Morris and Gopinathan 1997). On average, the fees in higher education institutions cover less than 20 percent of the cost in Singapore, and the government's long-term strategy is to raise it to 25 percent (Selvarathnam 1994, p. 81).

Taking all the contributions of private sources (mostly fees but including “other” contributions), private funding of education is found to be substantial in Korea, Japan, and Taiwan. Yet they do not equal the expenditure from public sources, as shown in figure 10, though exact details are not available on the nature and composition of “public” and “private” sources. Such private contributions seem to be rather small in many advanced economies.

Figure 10. Expenditure on Education by Source. 1991


Several changes are taking place in the pattern of funding education all over the world in terms of the introduction of financial aid, student loans, and similar cost-recovery measures along with scholarships and other protective measures (see Ziderman and Albrecht 1995). Scholarships and other incentives are an important spending item in Singapore. The EduSave Account introduced in 1993 in Singapore (Yeoh 1994; Tan and Gopinathan 1996) helps people to meet school-related costs. Significant changes are, however, confined to spending on and financing of higher education. Universities (including public ones) are being required to generate resources on their own, and as a result, many universities are making several innovations in the mobilization of resources. For example, Hong Kong had a target of increasing the cost-recovery rate to 18 percent through fees in higher education (Mak and Postiglione 1997, p. 66). China provided free higher education for a long time and also provided
students with dormitory lodging and stipends for food and other allowances, but now marketization and quasimarketization (Niklasson 1996) processes are on in post-Mao China (Mok and Chan 1998). Fees, therefore, are introduced and gradually increased in all levels of education. And in higher education student loan programs are launched. Furthermore, China shifted its emphasis from traditional higher education to short-cycle programs, in which enrollment tends to increase rapidly; it has been shown that students are ready to pay for this kind of curriculum (Hayhoe and Zhong 1995, p. 125). Nonformal and on-the-job training are also preferred in China as these forms of training quickly fulfill the demand for skilled labor (Xiao 1998). As a result of some of these changes, 23 percent of the higher education budget was internally generated by corresponding institutions in 1993 in China, compared with nil or negligible amounts during 1985–86 (Min 1997, p. 44). Some of the predominant ways of generating money in Chinese universities include (a) running factories, shops, stores, and so on; (b) selling research to industrial establishments; (c) procuring contracts and commissions for research and training; (d) offering consultancy services of the staff for a variety of activities including interpretation and translation; and (e) selling computer services. The system of financing higher education is gradually changing from one dominated by the state to one of multisource funding, with the state taking care of the lion’s share with the stipulation that it would be supplemented by multiple channels, including fund-raising campaigns and donations by individual citizens, enterprises, and other social bodies in addition to student fees (State Education Commission 1997). On the whole, more than 10 percent of higher education costs are recovered from students in several East Asian economies (Lewin 1998).

An overall shift is taking place from financing the provision (or supply) of education to financing the demand for education all over. Through such measurers as scholarships including student loans, and vouchers, the pattern of financing of education is changing. Fiscal measures such as a special education tax are also common. Methods of mobilizing nongovernmental resources are being talked about essentially because of financial considerations (and in particular, because of the increasing inability of governments to meet rapidly rising social demand for higher education). At the same time it is also clear that the contributions of the nonstudent private sector (in other words, donations, endowments, and the like) is not very significant. Private institutions depend on student fees as their major source of funding. But it should be realized that high fees might adversely affect the demand for higher education, as some limited scattered evidence tends to suggest, though systematic data are not available on this aspect.

To sum up, primary and secondary schools are mostly financed by the state in all the economies of the East Asia region. Hong Kong was the only exception; it relied on private sector for a long time for primary schooling, but this policy was subsequently reversed, and with the near-abolition of private schools, the government assumed a major role. With respect to higher education there are two distinct patterns: higher education is predominantly financed by the state in Singapore, Hong Kong, Taiwan, and China, while Korea depends on students’ fees to a large extent; and in Japan higher education in private universities, which account for a sizeable share of higher education, is financed mostly by the students in the form of fees, and public universities are mostly financed by the state. But all systems of higher education in the region are undergoing rapid changes. The “profit syndrome” (Henze 1992, p.129) is no more uncommon in Chinese, Japanese, Korean, and other universities in the region.

Why is higher education in Korea and Japan mostly privately financed, while in Singapore, Hong Kong, and China it is mostly subsidized by the state? There are no straight answers. It seems that

54 “Additional fees” were introduced in China even in basic education, which along with other fees was found to account for 17 percent (in addition to normal fees which accounted for 8 percent) of the total expenditure on basic education in 1988 (Ahmed and others 1991). Average “miscellaneous” fees as a proportion of unit costs ranged between 9 percent (in primary schools) and 19 percent (in rural vocational schools) in 1993 (Bray 1996, p. 18).

55 But as incomes rise above a given level, short duration courses might give way to standard, full-duration university courses, as it happened in other advanced East Asian countries (see Mundle 1998a).

56 For example, an additional education tax is charged in Korea for the improvement of quality in elementary and secondary schools.

57 The only exception is Singapore, where motives other than scarcity of budgetary resources are behind the attempts to introduce financial reforms in social sectors, including specifically higher education.
noneconomic gains are perceived to be extremely important in Singapore and China. It has been found that higher education helps in the formation of a strong state in these societies. Political gains and social benefits seem to be considerable and hence the state willingly finances higher education to a substantial extent. Hong Kong has followed the British mode of welfare statism to some extent. Japan and Korea, by contrast, seem to be attaching more value to individual economic gain (and thereby to the economic growth of the country) and expect the market to respond to economic incentives that higher education comes with. At the same time it may be wrong to argue that the principle of individual choice, a principle that is assigned a lot of weight by the state in European and North American economies, has been the guiding principle of state policies in financing (or rather underfinancing or not financing at all) higher education in Japan and Korea.

**Household Spending on Education**

An aspect of educational spending that is closely related to what we have been discussing is student or family expenditure on education. Investment in education is made in two complementary domains: households and institutions. It is necessary that investments made in these two domains match each other for the social investment in education to be optimum. Unless they match each other there will be either overcrowded or empty classrooms. Households in East Asian economies tend to spend a lot on education at all levels. This may be a recent phenomenon in some economies such as China, where household expenditure on primary education accounts for about 20 percent of the total (social including government) expenditure on primary education (Bray 1996, p. 32).

The share of education in total household spending is an important indicator of the level of family investment in education. Available data on East Asian economies summarized in table 14, surprisingly are not particularly different from those of other developing and developed economies, though the general impression is that households in East Asian economies tend to spend more generously on educating their children than their counterparts in Western economies. For example, Odaka observes in this volume that the average proportions of educational expenditures by households have ranged anywhere from 5 to 10 percent of total private spending. The problem lies with the availability of data. For example, the household expenditure on education is clubbed together often with expenditure on recreation, culture, and entertainment in the United Nations' (1987, 1996) National Accounts, as in the cases of Japan and Korea in recent years. Such a total constitutes 16 percent of total private spending in Singapore in 1993, while spending on education accounts for only 1.6 percent. In the case of Japan and many other economies, information is available on education and other activities together, but not exclusively on education. In view of the large share of noneducational activities in this total, there is no meaning in using these statistics while discussing household expenditures on education. It is only in Korea in 1980 that the proportion of household spending on education as a proportion of total household spending was rather high. According to available statistics, while there has been a steady and high growth in household expenditures on education in Singapore, there is a significant decline in real terms in Hong Kong between 1980 and 1993, the index falling from 100 in 1980 to 84 in 1993—a decrease that amounts to -1.8 percent per year.

In general, households with low income invest in education a higher proportion of their total expenditure (and thus, income), even though absolute levels of expenditure are not necessarily higher. In urban China, the poorest quintile spends about 14 percent of their total nonfood expenditure on education. (figure 11) The proportion declines to 5.5 percent for the richest income quintile. In rural areas the corresponding proportions are higher. Among all the quintiles, tuition costs for basic education

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58 See several papers in Cohn (1997).
59 For example, in India, the household expenditure on education accounts for 2.2 percent of the total private final consumption expenditure in 1993 (United Nations 1997).
accounts for nearly half of the total expenditure on education. In the Guangdong province of China it was found that education expenditure amounts to 29 percent of the household income of the poorest households in 1994, declining to 19 percent and 14 percent among the middle and rich income groups respectively (West 1995).

**Table 14.** Household Expenditure on Education as percent of Total Private Final Consumption Expenditures

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>2.3</td>
<td>2.0</td>
<td>1.7</td>
<td>1.1</td>
<td>1.2</td>
<td>1.2</td>
<td>1.1</td>
<td></td>
</tr>
<tr>
<td>Korea</td>
<td>1.6</td>
<td>0.8</td>
<td>2.3</td>
<td>3.0</td>
<td>4.8</td>
<td>—</td>
<td>—</td>
<td>1.1</td>
</tr>
<tr>
<td>Singapore</td>
<td>0.9</td>
<td>1.3</td>
<td>1.1</td>
<td>0.8</td>
<td>0.8</td>
<td>1.1</td>
<td>1.5</td>
<td>1.6</td>
</tr>
</tbody>
</table>

— Not available.


**Figure 11.** Household Expenditure on Education in China, 1993*

Recent evidence on Korea (table 15) indicates that households spend a lot on education, more than what the state spends, particularly on school education. One of the most important items of household spending refers to private tuition. With the increasing stress on examinations, many students resort to private tutoring. This phenomenon is growing in many economies in the Asian region, not only in Japan and Korea but also in South and Southeast Asia (Bray 1998). A high level of expenditure on households on private tuition may be indicative of (a) poor quality of education such as the one offered in many developing economies, or (b) the urge on the part of the students and parents to excel and stay ahead of others in the “mad competition” for higher scores in “examination hell.” Thus a high level of household expenditure on education is not necessarily a positive aspect of education systems. Furthermore, it would also be important to examine the relationship between public and private expenditures on education. It could be hypothesized that during normal periods of economic stability or progress private expenditures are lower, while during periods of economic distress they may rise sharply.

*See also Lee (in this volume) and Rao (1998) for similar details. But these statistics do not give any idea of their size relative to total household expenditures.*
expenditures might supplement public expenditures, while during periods of economic difficulties, private expenditures might fill in for public expenditures. Further, it might be proper to argue that when government provision of education is efficient in terms of quantity as well as quality, households might be willing to come forth with their own contributions as in the East Asian economies; but if the government's provision is niggardly and inefficient, households may not be willing to spend on education voluntarily on their own, but may feel compelled to do so, to safeguard their individual benefits. Since private expenditures are found critically important in both the East Asian and the Western developed economies, this question is significant.

### Table 15. Public and Household Expenditure on Education in Korea, 1985 (percent)

<table>
<thead>
<tr>
<th>Level</th>
<th>Public</th>
<th>Household</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kindergarten</td>
<td>44.9</td>
<td>55.1</td>
<td>100 (424.5)</td>
</tr>
<tr>
<td>Primary</td>
<td>49.5</td>
<td>50.1</td>
<td>100 (643.4)</td>
</tr>
<tr>
<td>Middle</td>
<td>46.1</td>
<td>53.9</td>
<td>100 (650.5)</td>
</tr>
<tr>
<td>High school</td>
<td>45.7</td>
<td>54.3</td>
<td>100 (869.2)</td>
</tr>
<tr>
<td>Junior colleges</td>
<td>51.6</td>
<td>48.4</td>
<td>100 (1658.1)</td>
</tr>
<tr>
<td>Colleges and univ.</td>
<td>58.5</td>
<td>41.5</td>
<td>100 (2081.0)</td>
</tr>
</tbody>
</table>

*Note: Figures in parentheses are in 1,000 won.*


With a large private sector in higher education that critically depends on student fee contributions, coupled with the fact that households have to incur huge expenditure on education-related items, it would be valuable to look at the regressive nature of the higher education system, if there is any, in Japan and Korea. But no evidence is available on these aspects, though “equity versus efficiency” questions are often raised (for example, Kim 1990). What is clearly known is that household expenditures on education are increasing steadily. For example, in Taiwan household expenditure on education as a proportion of GNP increased from 0.3 percent in 1961 to 1.48 percent in 1997 (figure 12). 61

If a medium-income family in Japan has to spend 19–24 percent of the family income to send one child to a public university, or 22–34 percent to a private university, as shown by recent estimates (OECD 1997, p. 51), household costs would seriously affect the decision of the household to send a child to college or not. It is already feared that households' willingness to pay for university education might decline (OECD 1997, p. 40). Further, if women's rate of participation in paid employment is not as high as that of men, the high costs of university education might deter women's demands for higher education more than they do men's. These are some of the aspects that educational policymakers in the region have to be cautious of.

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61 The components of private or household expenditure are not clear. In contrast, the government expenditure increased from 2.22 percent to 5.37 percent during the same period. Thus the total—government and private—expenditures as a proportion of the GNP increased from 2.52 percent in 1961 to 6.85 percent in 1997 (MOE 1997).
Summary and Concluding Observations

East Asia is an extremely dynamic area both economically and sociopolitically. Starting from very low levels of development in the 1950s and early 1960s, several economies in the region—particularly Korea, Singapore, Taiwan, and Hong Kong—produced economic miracles. The role of education in this is highly significant. Educational expansion in the region was also dramatic during the same period. These economies had high levels of literacy and nearly universal primary education in the early 1960s; subsequently expansion in secondary education took place, followed by a rapid growth in higher education. Today these economies rank fairly high in terms of educational development at all levels among the economies of the world. An attempt has been made in this paper to present a brief account of the educational progress of the region, concentrating on Japan, the Republic of Korea, Singapore, Taiwan, Hong Kong, and China. The treatment of the educational issues in the paper has neither been exhaustive nor thoroughly in-depth. A few select, somewhat dominant aspects of educational policy and practice have been critically examined. An important issue that has been given somewhat greater attention is the financing of education. The analysis is based on data on a few select indicators of educational development collected from different sources, mostly international, but also others including national sources and research material. Caution needs to be exercised in interpreting the data, as there could be differences in the definition, scope, and nature of various indicators, including various levels of education, used here on various economies. Nevertheless it is hoped that these differences do not affect our overall analysis and observations.

There is no single East Asian model of educational development. The half-dozen economies are rich in diversity; and are varied with reference to demography, religion, culture, ethnicity, and of course, education. They have followed different policies and adopted different strategies and approaches over time. Without losing sight of the rich diversity in the region, an attempt has been made to discuss the issues that concern the whole region, as there are a lot of common features in the policies adopted by these economies, with a view to draw lessons for other developing economies. Since some of these
Asian economies are in a rapid phase of transition, their experience should be useful for other transition economies.

East Asian economies have enjoyed tremendous success in human capital formation (which further contributed to "economic miracles"), social development, and political transformation. What have been the main factors that account for East Asia's extraordinary performance in investments in human capital?

Among the several factors, a few economic, demographic, political, and cultural factors seem to be strikingly important in terms of providing a highly conducive environment for sustained heavy investments in education. These are (a) rapid economic growth, (b) significant decline in population growth (which is also resulting in a fall in age-cohort children enrolment in schools), (c) equitable income distribution and (d) cultural and political factors. These factors not only allow the economies to spend more and more on education, but also to restructure their education budgets away from areas of quantitative expansion and in favor of improvements in quality and equity. Among the cultural factors, the Confucian values that respect knowledge and education are important. On the political side, the commitment of rulers to support education and link it to socioeconomic and political development is one important determinant of educational expansion. All these factors have been considerably influenced by education, have positively influenced both the demand and supply factors relating to educational investment, and even transformed education system into a potentially significant instrument of development.

At individual levels also, education is viewed as the key to social status and economic mobility. As individuals are ranked largely according to their educational levels rather than by their family status, individuals have come to realize the importance of education. Furthermore, the ideologies of meritocracy and classlessness in some of these economies have meant that those who fail in society have little to fall back on and hence everyone cares about his or her education more than anything else (see Goodman and Peng 1996, p. 197).

The policies and approaches adopted by different economies inevitably differ. Yet there are some common features in addition to vital differences, indicating that there is no consensus on the "Washington Consensus." Some important similarities and differences are summarized as follows, starting with the former.

**Similarities in Conditions and Approaches**

A fierce sense of competition between several East Asian economies (if not antagonism and a strained and insecure relationship with each other, as Morris and Sweeting (1997, p. 11) observed), competition with other economies in the Asia-Pacific region, and a strong desire to equal the development levels of industrial, advanced economies, are features commonly prevalent in the region. This competition was also seen as compatible with regional cooperation activities. The competition necessitated the economies to pursue vigorous growth policies, and to invest heavily in instruments of growth, such as human capital.

Political will and social commitment to education is one particular feature that explains the growth of the education system in East Asian economies during the second half of the twentieth century. In every country that we examined, education was an item of national obsession; it is regarded as the most important means of achieving social status, occupational mobility, and economic advancement—individually and as a society. The social value of education is traditionally high in most of these economies. Accordingly, investment in human capital has been regarded as the cornerstone of nation-building and the key factor of economic development in East Asia. This realization is critically important.

---

A significant aspect of educational policies of East Asian economies is that education is viewed as an essential instrument of economic development. It does not mean that education has not been used for political purposes. But economic development has been the chief national priority for these economies, and education is meant to serve this purpose. In Singapore, Korea, Japan, or China, most of the educational reforms, including curricular reforms in the recent past, clearly aimed at forging strong links between education and economic development. Education systems are made functional and pragmatic. While primary education is viewed as providing a basic foundation, secondary and higher education have aimed at national priorities, particularly the fulfillment of human resource needs. For example, Korea has pursued economic development as its chief national priority and education, higher education is particularly meant to serve this goal. East Asia's economies also understand the importance of science and technology in the technologically dynamic world. Accordingly, huge investments are made in R&D. More and more emphasis has been given to advanced science and technology, especially in information technology (Kim and Ahn 1995, p. 117). Universities in China were called to serve economic modernization (Hayhoe 1989). As education is viewed as an instrument of industrialization and economic progress, education systems in the region often responded to the needs of the industrial system, though the development of the education system could not keep pace with industrialization all the time (Yamamoto 1994). Education is viewed as a "prime national investment."

This has prompted governments to allocate substantial amounts of public resources for education. Historical investments in Japan, and significant public sector investments in other economies during the postwar period, led to expansion in public school enrollment. Primary education was universalized by the early 1960s, and secondary education expanded reasonably well. An important aspect of East Asian economies is that economic growth provided excellent opportunities for higher educated people. As a result, demand for secondary and higher education increased dramatically.

A closely related aspect is this: it is not only the development of a good-quality education system, but also the efficient utilization of the graduate output for economic development that has been an important factor in the success of East Asian economies (Park 1994). Korea, Singapore, and Taiwan have had elaborate and efficient manpower planning systems and development plans with a high degree of coordination between educational planning and human resource planning (see Islam 1987; Kim 1987). Five-year plans have been an integral part of economic development strategies in Korea. It is being realized only now that strict manpower planning in a developed and advanced economy might be difficult (Lim 1995, p. 81).

Finally, all of the region's economies with the exception of China have limited natural resources. This also compelled them to concentrate on the development of human resources, and they reaped rich dividends. Singapore has not only limited natural, but also limited human resources, so it tried to convert every single human being into valuable human capital (Yeoh 1994). Economic growth in the region, constrained by the availability of natural resources, flourished through its strong education system and high-quality educated and skilled workforce.

**Differences in Policies and Approaches**

Now for a few striking differences: One of the major differences relates to the role of the private sector in education, particularly higher education. The realization of the critical role of education in industrial development prompted the private sector to make huge investments in education, specifically in higher education in Korea and Japan. While Japan and Korea stand as examples where private sector can contribute to an increase in access to higher education quite significantly (by increasing the supply and also by safeguarding the quality to a great extent), the Singapore case clearly illustrates that a heavy state presence in higher education, including controlled admission policies, need not impede the successful functioning of higher education and its contributing effectively to development. China presents another
contrast: government domination has restricted the growth of higher education, and the emergence of the private sector, though slow, is causing quality-related problems.

Second, the Chinese experience in general, and serious regional disparities in China in particular, stress the need for decentralization in the planning, management, and financing of education systems. The "communes" play a significant role in school education in China. The case for decentralization does not clearly emerge from other economies. This may be partly attributable to the fact that decentralization is important in geographically big economies, but not necessarily in small economies.

Third, Japan, Korea, and Taiwan on the whole, seem to have followed expansionist policies in higher education, allowing rapid growth with public or private investments; but on the other side of the coin, China and Singapore have adopted restrictive policies. Singapore followed a controlled admission policy to reduce possible mismatches between the supply of and demand for graduate manpower. But in the future, strict manpower planning in a developed advanced economy might be difficult. While China had to relax its policies in the 1990s, Singapore's policies seem to have paid off without causing any significant problem.

Fourth, the systems of education in Korea, Hong Kong, Taiwan, and Japan operate with a high degree of efficiency, but often at the expense of equity. China's emphasis, in contrast, was more on equity. And then there is the system in Singapore: efficient as well as equitable.

Lessons from the East Asian Experience

The experience of the few East Asian economies that we have reviewed here holds several key lessons for other economies, some of which may be highlighted as follows:

- At the outset the experience of East Asian economies is highly reassuring to the newly independent developing transition economies. Colonial legacies are no more decisive in the erstwhile colonies of East Asia. These economies have shown that with firm determination and social commitment accompanied by appropriate public policies, colonial legacies can be overcome, and economies can march toward rapid socioeconomic progress. This is an important message for the formerly colonial economies of the developing world.

- While historical factors helped economies such as Japan to spread education rapidly—for example, at the beginning of the present century when Japan effectively universalized primary education—the experience of other economies in the region demonstrates that even historical drawbacks are not unsurmountable. Developing counties can build high-quality human capital that they need for socioeconomic development in a couple of decades.

- In the context of educational expansion in general and racial and gender dimensions in cases of educational development in particular, social, cultural, and religious factors are often cited in developing economies as impeding factors. Again, the economies in East Asia have proved that such factors also can be overcome relatively easily. Highly tradition-bound societies can at the same time have highly modernized education systems. Another important aspect that emerges from an analysis of the education situation in East Asia is that rapid growth in education also helps in reducing gender disparities in education to a substantial extent.

- The success of East Asian economies in building huge stocks of human capital and in utilizing this capital for national development could be explained in terms of a "national obsession" with education. Developing economies have to note that investment in human capital—particularly education—needs to be regarded as a critical factor for development. National economic policies have to accordingly pay due attention to the education sector. When education is viewed as an integral dimension of economic development strategies, success in human capital formation can be achieved, and this capital can be directed to economic development. Education has to be
moulded as an effective instrument for reducing income inequalities, and for fostering economic growth and social development.

Once education is regarded as a critical factor for development, this has to be reflected in the pattern of resource allocation. In particular, economies that do not have the historical advantage of having made huge investments in education in the past, have to allocate a reasonably high proportion of their national income (for example, 6 percent), and a reasonably high proportion of their government budget (about one-fifth to one-fourth) to education.

- Generally it is argued that the higher the level of the GNP per capita, the higher is investment in education, stressing the point that it is economic growth that helps education systems flourish. The East Asian experience shows that this is only partially true. For example, Korea at the time of its takeoff in the early 1960s lacked every factor that is normally associated with such output, except for an educated and skilled labor force, which made all the difference for its growth in subsequent decades. The same is true to varying degrees in the cases of Taiwan and Singapore. So even economically poor developing economies can afford to make huge investments in education and thereby create economic miracles.

- The pattern of intrasectoral allocation of resources is also important. Unit cost ratios between different levels of education in East Asian economies have been somewhat modest, reflecting a balanced education system. The degree of unevenness is rather minimum in Korea, Hong Kong, and Japan. It is only in China that it is relatively high. The resource allocation mechanism has to promote balanced investments in education to produce a balanced education pyramid.

- Primary and secondary education was greatly emphasized in East Asia. Public investments were poured generously into school education. It is evident that developing economies need to accord high priority to primary and secondary education. Almost all the economies in the region (except Singapore) have passed legislation making education compulsory. The duration of the compulsory cycle is 9 years—years beyond the length of primary education. Developing economies that aim at universal basic education may have to enact compulsory education laws; more important, these need to be strictly enforced.

- The expansion of secondary education has paid rich dividends in East Asia. As McMahon (1998, p. 166) concluded, higher rates of public investment in secondary education early on in East Asia has paid off. So it is not adequate for fast economic growth to exclusively concentrate on primary education.

- In addition to providing access, the quality of education is a crucial issue that, among other things, (a) influences demand for education, and (b) improves the contribution of education to development. In addition, equity in education needs to be ensured. In short, the quantity, quality, and equity aspects in education have to be given high priority. Even though the available statistical evidence on East Asian economies does not refer to this point, it is important that adequate investments are made in the inputs that have significant potential of enhancing the quality of education. Such inputs are textbooks and other teaching and learning materials, including training for teachers.

- The East Asian evidence is clear with respect to the importance of teachers. Small pupil-teacher ratios (number of pupils per teacher) are necessarily good. Developing economies, since they have alarmingly high pupil-teacher ratios in primary education, have to plan for an increase in the supply of their teachers. Small pupil-teacher ratios might even probably compensate the low levels of investment in other physical inputs in education.

- East Asian economies have demonstrated the potential of vocational and technical training for economic growth. Other developing economies may have to recognize it, and accordingly give due priority to this type of training, which does not have to be provided in formal secondary schools.
The progress of higher education in East Asian economies is also stupendous. Japan, Korea, and Taiwan have massive higher education systems—and Singapore and Hong Kong are expanding their systems fast. Attemps are being made by every country in the region to provide higher education universally to all. Developing transition economies cannot ignore higher education. East Asian economies could ignore higher education for some time, as they did during the 1950s, 1960s, and 1970s, when globalization and international competition were not such a strong phenomenon as they are today. In the context of globalization and international competition, higher education also becomes critically important. Higher education cannot wait until primary and secondary education are completely universal or well-expanded. While primary education serves as a threshold level of human capital development for economic growth (Azariadis and Drazen 1990), it is secondary and higher education (including investments in science and technology) that accelerates and sustains high economic growth (see McMahon 1998). In addition, due emphasis on vocational-technical education and adequate investments in R&D are important. Otherwise, in the technologically competitive world economy, one may lag far behind, and the gap between advanced and developing economies might increase.

While some of the East Asian economies such as Japan and Korea highlight the importance of the private sector in higher education, other economies such as Singapore stress how important it is for the government to finance higher education. Thus the evidence on the role of the private sector in higher education in East Asian economies is mixed. Initial government investments on a large scale are important in primary, secondary, and higher education, but after some time and after a certain level of educational and economic development has been attained, private sector could complement state efforts in higher education to some extent. This also depends on the role of the private sector in economic development in general.

To conclude, the important lesson—for developing economies that are growing rather slowly—that emerges from a review of East Asia’s experience is loud and clear: faster economic growth is possible. Better performance will depend on, among other things, investments in human capital—specifically education. Underinvestment in education results in severe losses in economic growth and development (see Birdsell, Ross, and Sabot 1993). Economic miracles do not happen out of the blue; they are based on education miracles. There are no shortcuts.

As a final note, it may be added that while a few general lessons are drawn here from the East Asian experience for the benefit of transition economies (and other developing economies in general), in the final analysis, each economy has to make its own appropriate policy choices based on its own sociopolitical and economic contexts. International experience provides only guidelines, not exact prescriptions. The success of certain policies depends on institutional setups; indiscrete replication of policies imported from other economies may not produce the same results everywhere.

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The word processed describes informally reproduced works that may not be commonly available through libraries.


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Statistical Appendix

Tables A.1 through A.10 below demonstrate various trends discussed in the paper.

**Table A.1. Trends in Human Development Index**

<table>
<thead>
<tr>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>(1998)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Japan</td>
<td>0.686</td>
<td>0.875</td>
<td>0.906</td>
<td>0.929</td>
<td>0.940</td>
</tr>
<tr>
<td>25</td>
<td>Hong Kong</td>
<td>0.561</td>
<td>0.737</td>
<td>0.830</td>
<td>0.875</td>
<td>0.909</td>
</tr>
<tr>
<td>28</td>
<td>Singapore</td>
<td>0.519</td>
<td>0.682</td>
<td>0.780</td>
<td>0.836</td>
<td>0.896</td>
</tr>
<tr>
<td>30</td>
<td>Korea</td>
<td>0.398</td>
<td>0.523</td>
<td>0.666</td>
<td>0.859</td>
<td>0.894</td>
</tr>
<tr>
<td>106</td>
<td>China</td>
<td>0.248</td>
<td>0.372</td>
<td>0.475</td>
<td>0.644</td>
<td>0.650</td>
</tr>
</tbody>
</table>

*Source: UNDP (1998).*

**Table A.2. Enrollment Ratios in Education in East Asia (percent)**

<table>
<thead>
<tr>
<th>Economy</th>
<th>Primary</th>
<th>1960</th>
<th>Higher</th>
<th>1994–96&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Secy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hong Kong</td>
<td>87</td>
<td>20</td>
<td>4</td>
<td>91</td>
</tr>
<tr>
<td>Japan</td>
<td>103</td>
<td>74</td>
<td>10</td>
<td>100</td>
</tr>
<tr>
<td>Korea</td>
<td>94</td>
<td>27</td>
<td>5</td>
<td>100</td>
</tr>
<tr>
<td>Singapore</td>
<td>111</td>
<td>32</td>
<td>6</td>
<td>100</td>
</tr>
<tr>
<td>Taiwan</td>
<td>96</td>
<td>33</td>
<td>4</td>
<td>99</td>
</tr>
<tr>
<td>China</td>
<td>109</td>
<td>21</td>
<td>0.6&lt;sup&gt;b&lt;/sup&gt;</td>
<td>99</td>
</tr>
<tr>
<td>Developing economies</td>
<td>73</td>
<td>15</td>
<td>2.0</td>
<td>99</td>
</tr>
<tr>
<td>Developed economies</td>
<td>102</td>
<td>62</td>
<td>13</td>
<td>103</td>
</tr>
<tr>
<td>World total</td>
<td>62</td>
<td>38</td>
<td>8</td>
<td>100</td>
</tr>
</tbody>
</table>

<sup>a</sup> Most recent estimates available in 1997.

<sup>b</sup> 1975.

*Note: 1994–95: Enrollment ratios in primary and secondary are net enrollment ratios, except in the case of secondary education in Singapore.*

*Sources:* Taiwan (1994): IDE (1994, p. 143), MOE (1997); others: UNESCO [a] (several years).
Table A.3. Education Levels of the Labor Force

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Total labor force (mlns)</th>
<th>No sch</th>
<th>Incomp.</th>
<th>Comp.</th>
<th>Incomp.</th>
<th>Comp.</th>
<th>Hr.</th>
<th>S</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>1982</td>
<td>521.4</td>
<td>28.3</td>
<td>13.1</td>
<td>21.3</td>
<td>25.8</td>
<td>10.7</td>
<td>0.9</td>
<td>4.5</td>
</tr>
<tr>
<td></td>
<td>1988</td>
<td>800.0</td>
<td>7.2</td>
<td>14.5</td>
<td>18.1</td>
<td>19.8</td>
<td>7.4</td>
<td>13.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1981</td>
<td>2.0</td>
<td>7.6</td>
<td>17.6</td>
<td>19.1</td>
<td>21.3</td>
<td>26.2</td>
<td>8.1</td>
<td>8.8</td>
</tr>
<tr>
<td></td>
<td>1988</td>
<td>2</td>
<td>8.1</td>
<td>11.7</td>
<td>17.5</td>
<td>19.9</td>
<td>33.9</td>
<td>8.8</td>
<td>9.1</td>
</tr>
<tr>
<td>Japan</td>
<td>1969</td>
<td>—</td>
<td>0.0</td>
<td>3.9</td>
<td>66.5</td>
<td>12.4</td>
<td>10.6</td>
<td>6.6</td>
<td>7.6</td>
</tr>
<tr>
<td></td>
<td>1979</td>
<td>54.4</td>
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<td>0.0</td>
<td>39.3</td>
<td>20.3</td>
<td>22.4</td>
<td>18.0</td>
<td>9.8</td>
</tr>
<tr>
<td>Korea</td>
<td>1969</td>
<td>—</td>
<td>44.9</td>
<td>9.1</td>
<td>30.2</td>
<td>7.3</td>
<td>6.1</td>
<td>2.4</td>
<td>3.9</td>
</tr>
<tr>
<td></td>
<td>1980</td>
<td>12.7</td>
<td>14.8</td>
<td>1.1</td>
<td>33.2</td>
<td>18.5</td>
<td>23.4</td>
<td>9.1</td>
<td>8.0</td>
</tr>
<tr>
<td>Singapore</td>
<td>1974</td>
<td>0.8</td>
<td>40.3</td>
<td>4.9</td>
<td>21.9</td>
<td>16.0</td>
<td>8.3</td>
<td>8.5</td>
<td>5.3</td>
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<tr>
<td></td>
<td>1980</td>
<td>—</td>
<td>21.9</td>
<td>3.0</td>
<td>46.4</td>
<td>18.4</td>
<td>6.3</td>
<td>4.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>1980</td>
<td>—</td>
<td>9.3</td>
<td>4.5</td>
<td>30.2</td>
<td>18.9</td>
<td>24.3</td>
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<td></td>
<td>1983</td>
<td>—</td>
<td>8.9</td>
<td>5.1</td>
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<td>24.0</td>
<td>11.5</td>
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<td>8.3</td>
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<td>12.3</td>
<td>34.4</td>
<td>13.2</td>
<td>9.0</td>
</tr>
</tbody>
</table>

- Not available.

"Incomp.": those who did not complete a given level; "comp.": those who did.
a. Male population only.

Note: S: Mean years of schooling of labor force.


Table A.4. Growth in Allocation of Resources to Education in East Asia
(percent of GNP)

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>China</td>
<td>3.1</td>
<td>1.3</td>
<td>1.8</td>
<td>2.5</td>
<td>2.7</td>
<td>2.3</td>
<td>2.3</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>2.0</td>
<td>2.6</td>
<td>2.7</td>
<td>2.5</td>
<td>2.8</td>
<td>3.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Japan</td>
<td>4.3</td>
<td>3.9</td>
<td>5.5</td>
<td>5.8</td>
<td>5.1</td>
<td>4.7</td>
<td>6.3</td>
</tr>
<tr>
<td>Korea</td>
<td>1.8</td>
<td>3.4</td>
<td>2.2</td>
<td>3.7</td>
<td>4.3</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Singapore</td>
<td>4.3</td>
<td>3.1</td>
<td>2.9</td>
<td>2.8</td>
<td>4.4</td>
<td>3.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>2.4</td>
<td>3.4</td>
<td>3.1</td>
<td>3.6</td>
<td>4.1</td>
<td>4.8</td>
<td>5.6</td>
</tr>
<tr>
<td>Developing economies</td>
<td>2.9</td>
<td>3.3</td>
<td>3.6</td>
<td>3.8</td>
<td>4.0</td>
<td>4.0</td>
<td>3.9</td>
</tr>
<tr>
<td>Developed economies</td>
<td>5.9</td>
<td>5.7</td>
<td>6.4</td>
<td>5.3</td>
<td>5.1</td>
<td>5.2</td>
<td>5.1</td>
</tr>
<tr>
<td>World total</td>
<td>4.8</td>
<td>5.4</td>
<td>5.8</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
<td>4.9</td>
</tr>
</tbody>
</table>

**Table A.5.** *Growth in Allocation of Resources to Education in East Asia*  
(Percent of Total Government Expenditure)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>8.2</td>
<td>2.9</td>
<td>4.2</td>
<td>6.1</td>
<td>8.1</td>
<td>12.8</td>
<td>12.2</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>14.8</td>
<td>22.8</td>
<td>20.7</td>
<td>14.6</td>
<td>18.7</td>
<td>—</td>
<td>17.0</td>
</tr>
<tr>
<td>Japan</td>
<td>22.7</td>
<td>20.4</td>
<td>22.4</td>
<td>19.6</td>
<td>17.9</td>
<td>16.5</td>
<td>16.6</td>
</tr>
<tr>
<td>Korea</td>
<td>15.4</td>
<td>21.4</td>
<td>13.9</td>
<td>23.7</td>
<td>28.2</td>
<td>—</td>
<td>17.4</td>
</tr>
<tr>
<td>Singapore</td>
<td>—</td>
<td>13.6</td>
<td>8.6</td>
<td>7.3</td>
<td>9.6</td>
<td>18.7</td>
<td>23.4</td>
</tr>
<tr>
<td>Taiwan</td>
<td>13.2</td>
<td>16.5</td>
<td>14.2</td>
<td>15.1</td>
<td>16.3</td>
<td>17.5</td>
<td>19.5a</td>
</tr>
</tbody>
</table>

—. Not available.

a. 1996.

Sources: China (1965): Leung (1995); Taiwan: MOE (1997); Others: UNESCO [a] (several years); UNESCO [b] (1998).

**Table A.6.** *Expenditure per Student in Public and Private Schools in Taiwan, 1996*  
(NT$)

<table>
<thead>
<tr>
<th>Schools</th>
<th>Public</th>
<th>Private</th>
<th>Public/private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary schools</td>
<td>64,432</td>
<td>55,540</td>
<td>1.16</td>
</tr>
<tr>
<td>Junior high schools</td>
<td>82,244</td>
<td>72,827</td>
<td>1.13</td>
</tr>
<tr>
<td>Senior high schools</td>
<td>89,060</td>
<td>70,311</td>
<td>1.27</td>
</tr>
<tr>
<td>Senior vocational schools</td>
<td>108,737</td>
<td>83,028</td>
<td>1.31</td>
</tr>
<tr>
<td>Junior colleges</td>
<td>100,096</td>
<td>62,305</td>
<td>1.61</td>
</tr>
<tr>
<td>Universities and colleges</td>
<td>213,401</td>
<td>134,124</td>
<td>1.59</td>
</tr>
<tr>
<td>All</td>
<td>72,891</td>
<td>63,681</td>
<td>1.14</td>
</tr>
</tbody>
</table>

### Table A.7. Share of Fees in Costs of Higher Education (percent)

<table>
<thead>
<tr>
<th>Economy</th>
<th>Year</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>1985</td>
<td>49.6</td>
</tr>
<tr>
<td>Private</td>
<td></td>
<td>82.3</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Private four-year inst.</td>
<td>1971</td>
<td>75.8</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>65.8</td>
</tr>
<tr>
<td>Public</td>
<td>1970</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>1987</td>
<td>8.8</td>
</tr>
<tr>
<td>All</td>
<td>1971</td>
<td>31.7</td>
</tr>
<tr>
<td></td>
<td>1985</td>
<td>35.8</td>
</tr>
<tr>
<td>Singapore</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>1992</td>
<td>&lt;20.0</td>
</tr>
<tr>
<td>Hong Kong</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>1988–89</td>
<td>6.5–12.1</td>
</tr>
<tr>
<td>China</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>1997</td>
<td>17.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>Late 1980s</td>
<td>7.0</td>
</tr>
<tr>
<td>Private</td>
<td>Late 1980s</td>
<td>50.0</td>
</tr>
</tbody>
</table>


### Table A.8. Expenditure on Education by Source, 1991 (percent)

<table>
<thead>
<tr>
<th>Economy</th>
<th>Public</th>
<th>Private</th>
</tr>
</thead>
<tbody>
<tr>
<td>Korea</td>
<td>70.0</td>
<td>30.0</td>
</tr>
<tr>
<td>Taiwan</td>
<td>83.4</td>
<td>16.6</td>
</tr>
<tr>
<td>Japan</td>
<td>73.9</td>
<td>26.1</td>
</tr>
<tr>
<td>United States</td>
<td>78.6</td>
<td>21.4</td>
</tr>
<tr>
<td>Denmark</td>
<td>99.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Canada</td>
<td>90.1</td>
<td>9.9</td>
</tr>
<tr>
<td>France</td>
<td>89.7</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Table A.9. Share of Expenditure on Education in Total Nonfood Expenditure of Households in China, 1993

<table>
<thead>
<tr>
<th>Income quintile</th>
<th>Rur</th>
<th>Urban</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bottom (poorest) quintile</td>
<td>19.0</td>
<td>14.2</td>
</tr>
<tr>
<td>Second quintile</td>
<td>15.6</td>
<td>10.5</td>
</tr>
<tr>
<td>Third quintile</td>
<td>18.2</td>
<td>9.3</td>
</tr>
<tr>
<td>Fourth quintile</td>
<td>16.7</td>
<td>7.4</td>
</tr>
<tr>
<td>Top (richest) quintile</td>
<td>14.4</td>
<td>5.6</td>
</tr>
</tbody>
</table>


Table A.10. Expenditure on Education in Taiwan (Percent of the GNP)

<table>
<thead>
<tr>
<th>Year</th>
<th>Public</th>
<th>Private</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1961</td>
<td>2.22</td>
<td>0.3</td>
<td>2.52</td>
</tr>
<tr>
<td>1966</td>
<td>2.76</td>
<td>0.62</td>
<td>3.38</td>
</tr>
<tr>
<td>1971</td>
<td>3.69</td>
<td>0.88</td>
<td>4.57</td>
</tr>
<tr>
<td>1976</td>
<td>3.26</td>
<td>0.69</td>
<td>3.95</td>
</tr>
<tr>
<td>1981</td>
<td>3.69</td>
<td>0.85</td>
<td>4.54</td>
</tr>
<tr>
<td>1986</td>
<td>4.21</td>
<td>0.93</td>
<td>5.14</td>
</tr>
<tr>
<td>1991</td>
<td>5.34</td>
<td>1.15</td>
<td>6.49</td>
</tr>
<tr>
<td>1996</td>
<td>5.62</td>
<td>1.33</td>
<td>6.95</td>
</tr>
<tr>
<td>1997</td>
<td>5.37</td>
<td>1.48</td>
<td>6.85</td>
</tr>
</tbody>
</table>

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