

Department of Employment, Education, Training and Youth Affairs

Selected Asian Economies and Australia: An Overview of Educational Expenditure and Participation

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Executive Summary

This report is the result of a study of educational expenditure and participation in 11 Asian economies, commissioned by the Department of Employment, Education, Training and Youth Affairs (DEETYA) late in 1997. The Asian economies selected by the Department for consideration were China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand and Vietnam.

The report reviews:

- the population and income levels of the selected economies which provide a broad indication of educational need and of the capacity to finance it;
- the main features of the level of provision, the degree of public and private provision and the extent of public and private finance;
- the distribution of finance and resources in the education systems; and
- education strategies in the Asian economies.

There are considerable deficiencies in the data available which means that the information presented and the findings of the report must be considered as tentative. The report relies mainly on UNESCO data. Despite UNESCO's collection of data to a common framework, its capacity to ensure compliance to its standards appears to be limited. The report also draws on other international sources and reports from individual economies. There is a danger in using data from diverse sources that we will be comparing data collected with differences in scope. Drawing on a range of sources though has provided some tentative impression of aspects of the education systems not covered by UNESCO and also highlights the large differences sometimes occurring among the various data compilations.

Comparisons across the economies are also affected by the great differences in population and population growth rates, income and income growth. The selected economies include small population high-income economies like Hong Kong, Singapore and Australia and one large population high-income country, Japan. China has a huge population and a very low average income per head. Indonesia, Vietnam and the Philippines have, by comparison with Australia, large populations and low-incomes. Educational and other needs vary among the economies and the capacity to meet them is inverse to the need.

Educational participation and, to some extent, expenditure as a percentage of Gross Domestic Product (GDP) are related to the level of income per head. Malaysia, Taiwan and Australia appear to make the largest commitment of public expenditure. Australia has high rates of educational participation and high ratios of staff to students in these comparisons.

Hong Kong and perhaps Singapore have lower public expenditures than other high-income economies. This may be accounted for by the relatively low ratios of staff to students in those economies' schools and by their somewhat lower levels of tertiary participation compared with the other high-income economies.

Data on private outlays are sparse. In particular, South Korea and Japan, which have much of their higher education in the private sector, have relatively large private expenditures on education. The economies in this study vary considerably in the extent of the private provision of education, the degree of government subsidy of private education and the charging of fees in public education. Better data are needed on all of these factors if more precise comparisons are to be undertaken.

The lower the economy's income per head the lower its educational participation tends to be in upper secondary education and in tertiary education. There are exceptions. The Philippines, for example, has a much higher level of participation than might be expected. It appears to achieve this by very low rates of staff per student and by a large private sector.

The report analyses the distribution of students in tertiary education by level and by field of study. However, the insights gained with the available data are limited.

Indeed the data compiled on educational participation and expenditures in this report did not give a good indication of the strategies adopted in the Asian economies or the effectiveness of those strategies. The identification of effective strategies requires a detailed analysis of the interrelationships among the data tabulated in this report and an analysis of each economy's economic development and educational provision. Such a study was not possible in the time available for this project. In order to extend our commentary beyond the limited insights available from the data we have reported, we have drawn on the findings of other studies which have reviewed the educational strategies of high performing Asian economies. The main issues identified for educational strategies include:

- the emphasis the economies place on particular levels of education;
- the emphasis on vocational education at secondary school levels and on fields of study at tertiary;
- the extent of public and private *financing* of education and public and private *provision* of education;
- the unit costs of education at various levels and the salaries of teachers; and
- mechanisms to ensure efficiency, quality and equity.

The early successful Asian economies placed considerable emphasis on universal primary education. If there is a message for today it is to ensure that the whole workforce is provided with an education sufficient to enter and learn in the workplace.

Economies differ in the extent to which they provide specialist vocational education at senior secondary level. The evidence is not favourable to specialist vocational schooling except where there are strong links with employers and subsequent successful placement of the graduates in employment. The evidence for the need to expand particular fields of study at tertiary (e.g. engineering) is not obvious from the UNESCO data or from the detailed studies we have reviewed. Economies' needs for engineers may well differ substantially according to the current pattern and pace of economic development.

The high-income Asian economies tended to pay relatively high average teacher salaries in the early years of their fast development and still do in recent years. They appeared to put more emphasis in the early years on paying teachers well, with their student teacher ratios tending to fall only as they approached high-income status.

Some of the high-income Asian economies, with the notable exception of Singapore in the 1980s, relied on private finance for a substantial part of their upper secondary and tertiary education. The ability to increase levels of funding for education may be related to obtaining private finance of various forms. Mechanisms to ensure quality and efficiency may involve increased private provision and market forces but the evidence reviewed is not conclusive. Governments in all economies remain the major source of educational funds and improved government administration is an important part of educational strategies.

A number of tentative generalisations have been drawn about the strategies of the—until recently—high performing Asian economies. Given the great variation in participation and expenditures among even the high-income economies, it is clear that more than one strategy is compatible with economic development. Strategies have to be developed appropriate to the particular economic and social needs of each economy.

Introduction*

Preamble

This report sets out the outcomes of a study that was initiated in September 1997 by the Commonwealth Department of Employment, Education, Training and Youth Affairs (DEETYA). This department prepared a project brief for a comparative study into investment and participation in education in certain Asian economies. The economies selected by the Department for consideration were China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, Thailand and Vietnam.

The Monash University–Australian Council for Educational Research Centre for the Economics of Education and Training was contracted by the Department to undertake the study. The Centre's project team comprised Bob Lenahan, Gerald Burke and Hing Tong (William) Ma.

Objective

Most international comparisons involving Australia draw on OECD data which includes mainly European and North American economies. Only Japan, South Korea and Australia from the list considered here are members of the OECD. In comparisons with other OECD economies Australia appears to have a high rate of economic growth, a relatively young and reasonably rapidly growing population, average levels of public expenditure on education, and a fairly high and growing level of private expenditure on education. This current study was framed to bring out comparisons with a broader range of economies, most of which had sustained very high levels of economic growth at the time this study was commenced.

The project brief required comparative information about the educational expenditure in the targeted economies, (together with Australia), and an economic analysis of the efficiency and effectiveness of the various strategies in education expenditure in these economies. The brief requested information for the past five years. The brief requested provision of a series of education indicators similar to those used by the Organisation for Economic Cooperation and Development

* Thanks for advice and comments to Sonnie Hopkins, Phillip McKenzie of the OECD, Rupert Maclean of UNESCO Bangkok, Mark Bray, Comparative Education Research Centre, The University of Hong Kong, Brendan O'Reilly and Michael Stapleton of DEETYA together with members of the Higher Education Division which commissioned the project. Responsibility for the content rests with the authors.

(OECD) in its publication *Education at a Glance*. A further requirement of the study was to provide some understanding of how the targeted economies spend their finances on education as well as the amounts they spend.

Methodology

In recognition of the relatively short time frame for the study, the methodology adopted has been to consult:

- authoritative international publications to obtain the main statistical data; and
- comparative studies of education and development in Asia for additional data and for the findings of research.

The statistical reports of UNESCO, OECD, the United Nations and the World Bank have been the principal data sources. The data in these reports have shortcomings as discussed below but they have the advantage of being compiled within a common reporting system. UNESCO is the major source of data in this study. UNESCO's resources to ensure compliance to its reporting standards appears to be limited compared with the OECD where considerable interaction with the country officials supplying the data can occur to lessen the likelihood of misclassification.

Some data have been obtained from the publications of the particular economies, such as statistical yearbooks, but there is even less likelihood of the data being comparable across economies. In some cases research publications and papers that contain references to statistical collections have also been used as a source of information. Due to the time limitations which have applied to the study, attempts to obtain information directly from the selected economies have been limited. Where a direct approach has been made significant time delays have occurred in obtaining responses.

Where possible the OECD indicators, which are the measurement criteria for that organisation's publication *Education at a Glance*, have been used as the framework for data collection in this study. However, to extend the range of statistical descriptors in the study other criteria have been used to supplement the OECD indicators. In cases where data have been found which purport to represent the same or similar attributes of a country, its education system or sources of finance for education, they have been cross-checked for compatibility. Where the data from one source seems to be highly divergent from other sources it has generally not been used.

Availability of Data

There are a large number of limitations with the data that has greatly restricted the analysis that could be undertaken. These limitations include the time lags involved in collecting and presenting data by the international agencies, inconsistencies in

the nature of data presented in the various international publications and absence of any data at all for certain time periods and certain economies.

Although a number of the publications which were consulted were of recent origin and were published in 1996 or 1997, the most recent data they contained were at least two years old and more often were as much as three or more years out of date. Wherever possible, the most recent data were used in the study, unless comparisons over time indicated that the data might not be reliable.

In some cases these difficulties have been partially overcome by drawing on data taken from more than one data source. Overall, it has been difficult to obtain full sets of data for analysis and in many instances the study has had to compromise by considering data sets that are incomplete in some way. These data deficiencies are evident in many of the tabulations that appear in this report.

These combined deficiencies have also caused problems with the development of time series representations over a period of five years as requested in the project brief. The international publications do not always contain complete sets of time series and when a full set of five years are reported, data for the selected economies are unavailable for some, or all, of the years in the series. As a result it has been necessary to take a modified approach in the study by selecting the period from 1990 to 1995 as the main time period under consideration. Point in time 'snapshots' have then been taken by targeting data for 1990 as the beginning year and data for 1995 as the end year, wherever possible.

Scope

The data compiled in this report relate to the formal education system. Data are not presented on private tutoring which is an important form of education in some of the economies and may be a factor affecting international comparisons of achievement. Bray (1998) cites a range of studies that show it to be a major activity that needs research. Nor is data presented on adult education, informal education and training, most private commercial training or on training in the workplace.

The expenditure data reported is for expenditure on formal education. It does not include private expenditure on books and uniforms which can be quite considerable (Bray 1996), or income foregone by students. It does not include expenditure on the living expenses of students though public outlays on student support are included in some public sector outlays and are not often separately identified in the data we have considered.

Structure of the Report

The remainder of this report is organised into four main sections. They cover details of:

- the population and income levels of the selected economies, which provide some indication of educational need and capacity to finance it;
- broad descriptions of the education systems including the level of provision, the degree of public and private provision and the extent of public and private finance;
- an overview of how resources are allocated in the education systems; and
- a discussion of education and training strategies in the Asian economies.

Population and National Product

Purpose

The purpose of this section of the report is to provide a brief overview of some aspects of the selected economies relevant to their needs for education and their capacity to provide it. The matters considered are the population size, growth and age structure and the GDP per head and its recent growth.

Population

The population of the selected economies varies enormously. Population data for the all of the selected economies, except Taiwan, for the year 1995 are included in the World Bank indicators drawn on for Table 2.1.

Table 2.1: Population, Millions, 1995

China	1200
Indonesia	193
Japan	125
Vietnam	74
Philippines	69
Thailand	58
South Korea	45
Taiwan	21
Malaysia	20
Australia	18
Hong Kong	6
Singapore	3

Source: World Bank 1997; Republic of China Yearbook

The huge range of population sizes is illustrated by these data.

China has a population nearly 70 times as large as Australia, but other economies such as Indonesia (11 times as large), Japan (7), Vietnam (4), Philippines (4) and South Korea (2.5) are also considerably more populous than Australia. Malaysia and Taiwan have populations about the same size as Australia. The only economies with smaller populations are Hong Kong and Singapore.

The rate of growth of population in most of the selected economies is slowing. Table 2.2 shows the annual rate of population growth in 1990 and 1995 and all have declining rates of growth except for Vietnam which has moved upwards from 2.2 per cent per annum to 2.5, and Thailand, which shows a marginal change from 1.1 to 1.2. These data show the largest fall in China, where the rate declined from 1.7 to 1.0. Following China, the decline in Australia is one of the largest, from 1.5 per cent in 1990 to 1.2 per cent in 1995.

The data in Table 2.2 show that the selected economies have a fairly wide range of growth rates. At the bottom end of this range, Japan had a growth rate in 1995 of 0.2 per cent per annum, but at the top end of the range Vietnam had a growth rate in the same year of 2.5 per cent. Australia, which has had a relatively high immigration programme, had a growth rate at about the middle of the range.

Table 2.2: Population Growth Rates

	<i>1990</i>	<i>1995</i>
Vietnam	2.2	2.5
Malaysia	2.4	2.2
Hong Kong	0.3	2.1
Philippines	2.3	2.1
Singapore	2.2	1.9
Indonesia	1.7	1.6
Australia	1.5	1.2
Thailand	1.1	1.2
China	1.7	1.0
South Korea	1.0	0.9
Taiwan	na	0.8
Japan	0.3	0.2

Source: United Nations 1996; na is not available

The growth rates in large part are reflected in birth rates shown in Table 2.3. Vietnam and Japan retain their spots at the top and bottom of the list. Crude birth rates were also high for Indonesia, Malaysia and the Philippines. The effect of migration is shown for Australia whose position is further down than in the list for population growth rates, above only Japan and Hong Kong (whose high reported growth rate in Table 2.2 appears to be due to immigration from China).

Table 2.3: Crude Birth Rates (Births per 1000 of Population)

	1990	1995
Vietnam	30	29
Malaysia	28	27
Philippines	27	26
Indonesia	26	24
Thailand	17	18
China	21	17
Taiwan		15
South Korea	16	15
Singapore	18	14
Australia	15	14
Hong Kong	12	11
Japan	10	10

Source: United Nations 1996; Philippines Statistical Yearbook

Student-age Population

The growth in population, and whether it is by natural increase or migration, affects the age distribution of the population. The OECD in its publication *Education at a Glance* makes use of its indicator on the relative size of the young population to provide some insights into the demand for education. This indicator expresses the number of persons in the 5 to 29 year age group in the population as a percentage of the total population.

Table 2.4 presents the latest data available.

Table 2.4: Percentage of the Population Aged 5–29, 1994

Vietnam	53
Philippines	52
Indonesia	52
Malaysia	51
Taiwan	50
Thailand	47
China	46
South Korea	45
Hong Kong	40
Singapore	38
Australia	38
Japan	34

Sources: OECD 1996 and United Nations 1996; Hong Kong Digest; Republic of China Yearbook. Data for Indonesia are for 1993 and Vietnam 1992.

Consistent with the data for population growth and crude birth rates, Japan has the smallest proportion of the population in the age groups that typically create the demands for educational services and facilities. Only one third of Japan's population is in this category. Again, in keeping with the other population data reported here, Vietnam has the largest proportion of young people, at a figure of almost 53 per cent in 1992. These data suggest high levels of demand for education in the selected economies: 9 of the 12 listed in Table 2.4 have 40 per cent or more of the population in the 5–29 young age group, and 5 of the economies have more than half of their populations under 30 years of age.

Australia, Japan and Singapore are the only other economies to have less than 40 per cent of the total population aged 5–29. It is worth noting that a different impression is created if Australia is compared, not with these 11 Asian economies, but with the other 26 members of the OECD. Australia is ranked fifth in the OECD by the percentage of the population aged 5–29 (OECD 1996, p. 45). It is in comparison with OECD economies that Niland (1997) argues that Australia's age distribution gives rise to above average needs for educational expenditures.

Financial Capacity

Measures of national income or national product are usually used to provide an indication of the standard of living in a country and at the same time a capacity to provide social services including education. In this context the national product measures are expressed as an amount per head of the population.

International agencies differ in their approaches to the collection of data to compile measures of national product per capita. In some instances, gross national product is converted to a per capita figure, but gross domestic product is also used. The presentation of these measures is further complicated by the method used to convert local currencies to a standard. In some cases conversions are made to United States dollars through the application of currency exchange rates, but this does not take into account differences in the purchasing power in different economies. Some agencies make conversions by applying purchasing power parity (PPP) ratios that adjust for these differences. The data in Table 2.5 show the gross national product per capita of ten of the selected economies converted by the PPP method. Because the growth rates in several economies have been so high the comparisons differ considerably from those presented in quite recent publications which present data from the early 1990s or late 1980s. Comparisons based on exchange rates will be grossly affected by the changes in exchange rates in late 1997.

Table 2.5: Gross National Product (GNP) Per Capita, Purchasing Power Parity Dollars, 1995

High Income Economies	<i>Hong Kong</i>	22,950
	<i>Singapore</i>	22,770
	<i>Japan</i>	22,110
	<i>Australia</i>	18,940
	<i>Taiwan</i>	(11,456)
	<i>South Korea</i>	11,450
Upper Middle	<i>Malaysia</i>	9,020
Lower Middle Income Economies	<i>Thailand</i>	7,540
	<i>Indonesia</i>	3,800
	<i>Philippines</i>	2,850
Low Income	<i>China</i>	2,920
	<i>Vietnam*</i>	(190)

Source: World Bank 1997; Republic of China Yearbook. PPP means that the conversion to US dollars is at purchasing power parity rather than current exchange rates; * US dollars not PPP.

Major differences exist between the selected economies in their financial capacity to support educational services and this affects considerably any comparisons of their educational policies. At the upper end of the range for the selected economies there is a cluster of four affluent economies. These are Hong Kong, Singapore, Japan and Australia. They have Gross National Product (GNP) per capita figures between \$23,000 for Hong Kong and \$19,000 for Australia. South Korea, Taiwan

and Malaysia have values in the middle of the range (though South Korea and Taiwan are classified as high-income by the World Bank 1997).

Thailand, Indonesia and the Philippines are classified as lower middle income economies by the World Bank, though Thailand's income is closer to Malaysia than to Indonesia's and the Philippines'. China and Vietnam are clearly low-income economies. The four lowest income economies have GNP per capita approximately one seventh of the values of the four most affluent economies. And as shown in Table 2.4, Indonesia, the Philippines and Vietnam are at the top of the list in terms of educational needs as indicated by the percentage of the population aged 5–29.

Table 2.6 presents the average percentage increase in real GNP per capita over a period of ten years. The numbers in the table are rounded to integers to indicate the approximations with such data. Most of the Asian economies had very high rates of growth throughout this period and indeed up to 1997. The figure for Japan is about one half that of the fast growing Asian economies, and at 2 per cent per annum the Philippines had the lowest growth rate for the Asian economies considered. Australia's average annual per capita growth rate was the lowest of the selected economies at 1.4 per cent per annum.

Table 2.6: Growth in Real Gross National Product (GNP) per Capita 1985–1995

Thailand	8
South Korea	8
China	8
Taiwan	7
Singapore	7
Indonesia	6
Malaysia	6
Hong Kong	5
Japan	3
Philippines	2
Australia	1
Vietnam	na

Source: World Bank 1997; Republic of China Yearbook; estimates rounded to nearest whole number.

Recent Changes and Financial Crisis

There have been great changes in most of the selected economies in the economic setback of 1997 and 1998. Indonesia, Thailand and South Korea have suffered most but the impact is widespread.

The economic policy measures implemented as a result of the crisis will affect the financing of education and lead to considerable changes from the patterns documented in this report.

Education Systems and Aggregate Financing

Introduction

This section provides a broad overview of the structures of the education systems of the selected economies, the extent of participation, the main forms of financing and the broad levels of expenditure. More detailed analysis of finance and participation are presented in Section 4. Detailed diagrams and descriptions of the education systems are included in Postlethwaite (1995) and in the books produced by the National Office of Overseas Skills Recognition (NOOSR) and are not reproduced here.

Structure and Participation

The selected economies vary substantially in the levels of educational provision. Table 3.1 attempts a very broad and tentative indication of the recent attributes of the economies, which are listed in order of their per capita incomes as shown in Table 2.5. Table 3.1 is based on a range of sources including the UNESCO data presented later in this report. The table indicates whether the characteristic in the left hand column applies to that country. A question mark after a yes or no answer means that further confirmation is required.

The high and middle-income economies appear to have achieved universal primary education. The low-income economies are close to achieving it. Universal junior secondary schooling has been accomplished in the high-income economies and the wealthier of the middle income economies but has not yet been reached in the low-income economies. A roughly similar pattern holds for the achievement of 50 per cent completion of senior secondary education and participation of 40 per cent in some form of post-secondary education. The Philippines appears to be an exception in having secondary and tertiary participation rates above what might be expected from its level of income.

A part of secondary schooling is devoted to vocational education in nearly all the economies. In all but Australia this often takes the form of specialist technical or vocational schools, usually at senior secondary level. The OECD (1997, p. 157) shows Australia as having over 60 per cent of upper secondary students enrolled in vocational and technical programmes. This is the result of classifying a substantial proportion of TAFE enrolments as ISCED 3 (International Standard Classification of Education level 3) which is equated with upper secondary. In the formal secondary system in Australia, there are scarcely any schools that can be classified as vocational though there has been a rapid growth in the last five years in vocational programmes in senior secondary schooling, many of which yield a

vocational certificate and many involving industry experience. Around 10 per cent of Year 11 and 12 students in Australia are now engaged in such programmes (see Ainley & Fleming 1997).

Public and Private

Quite rapid change is occurring in a number of economies in the patterns of finance so the snapshot of recent provision may provide only a rough indication of either past or future arrangements.

There is considerable variation across the economies in the extent of:

1. fees charged for publicly provided education;
2. the private sector;
3. public subsidy to the private sector; and
4. student assistance.

Indeed the extent of public subsidy to private institutions and the charging of fees in public ones makes the division of institutions into public and private a somewhat unclear one.

Table 3.1 classifies economies on the first two factors. The classification on fees in public education is set at fees greater than 20 per cent of costs—an arbitrary dividing line. Some economies like Taiwan have fees for public primary education, but lower than 20 per cent. More detailed research is needed for a clearer understanding in this matter (see Bray 1998).

Public primary education is provided without significant tuition fees. Fees are more likely to be charged the higher the level of education. There is not a simple pattern as there was for participation. Some low-income economies, such as the Socialist Republic of Vietnam, have introduced fees for all but primary education. China has not officially introduced fees but they exist in practice (Bray 1996). Fees appear to be charged in most economies for public post-secondary education but only in a few of them do they exceed 20 per cent of costs, the indicator chosen here.

There is again substantial variation in the proportion of formal education that is privately provided (often with government subsidy) and in the level of education at which private provision is common. Australia is unusual in having substantial private provision at primary level. As in some other economies, a large part of costs in Australian private schools are covered by government grants. This means that the distinction of public from private is not the same across economies or even across levels within economies.

Nearly all Australia's and Singapore's university enrolments are in public institutions whereas in Japan, Taiwan and Korea most university students are in private institutions in which fees cover more than half the costs (Mingat 1995). Private provision at university level is also common in Thailand, Indonesia, the Philippines and Vietnam. Malaysia from 1996 has permitted the establishment of private universities including foreign owned universities but as yet they account for only small enrolments.

Expenditure

As income per head rises in a country so too will average wages and salaries in the community. This will affect the major cost of education, staff salaries, though not necessarily evenly across all sectors of education.

Because of this, the variation in expenditure per student across economies expressed in say US dollars may very much overstate the variation in teacher resources per student. Expenditures expressed as a percentage of GDP do not have this problem, though they tend to understate the purchasing power of non-staff expenditures in the richer economies. Information on teachers' salaries relative to national product per head are a useful indicator of relative teacher costs (see Mingat 1995, p. 47). It is notable that the OECD (1996, p. 145) does not present any teacher salary data for Japan, Korea or Australia (the three economies from this current study that are members of the OECD).

Table 3.2 provides data on total educational expenditures as a percentage of GDP for Australia, Japan and Korea as compiled by the OECD. Information on private spending is presented only for these three OECD economies. Korea has the highest private expenditure at 2.5 per cent followed by Japan at 1.1 per cent and Australia at 0.9 per cent. The large fee-paying private sectors in upper secondary schools and university in Korea and Japan explain much of the difference. The lack of data on private spending for the middle and lower income economies is a major problem for comparative study on expenditures.

Public expenditure data for the 12 economies, derived mainly from UNESCO data, are given in Table 3.3. The public expenditure on education in low-income economies is a small proportion of GDP. Most middle and high income economies show a higher proportion of GDP given to public expenditure on education but Hong Kong has a surprisingly low proportion in the data we have available. Australia, Malaysia and Taiwan have the highest percentage of public expenditure.

Table 3.3 also shows *public* expenditure on education as a percentage of all government expenditure. Singapore also appears to devote a large part of a relatively small public outlay to education. The difference in order in the list compared with Table 3.2 largely reflects differences in size of the public sector. In general, the Asian economies do not have large public sectors.

Table 3.1: Participation, Finance and Structure of Education: A Tentative Classification, about 1994

	<i>Hong Kong</i>	<i>Singapore</i>	<i>Japan</i>	<i>Australia</i>	<i>Taiwan</i>	<i>Korea</i>	<i>Malaysia</i>	<i>Thailand</i>	<i>Indonesia</i>	<i>Philippines</i>	<i>China</i>	<i>Vietnam</i>
Participation												
Universal primary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes?	Yes?	Yes?	Yes?	No
Universal junior secondary	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Senior secondary—greater than 50% completion	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	Yes	No	No
Post secondary -greater than 40% participation	No	No	Yes	Yes	Yes	Yes	No	No	No	Yes?	No	No
Vocational												
Specialist vocational senior secondary—20% or more of total	Yes*	Yes	Yes	No+	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Non-university tertiary—share of total greater than 30%	Yes?	Yes	?	Yes	Yes	Yes	Yes?	Yes	Yes	Yes	Yes	Yes
Private funds greater than 20 per cent in public education												
Primary	No	No	No	No	No?	No	No	No	No	–	No	No
Junior secondary	No^	No	Yes**	No	No?	No	No	?	Yes	–	No	Yes
Senior secondary	No^	No	Yes	No	No?	Yes?	No	?	Yes	–	No	Yes
University	No	No	Yes?	Yes	No?	Yes	No?	?	Yes	No	No	Yes
Non-university tertiary	No?	–	Yes?	No	No?	Yes	–	?	Yes	–	No	Yes
Private provision greater than 20 per cent of total enrolments												
Primary	No	No	No	Yes	No	No	No	No	No	No	No	No
Junior secondary	Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes	No	No
Senior secondary	Yes	Yes*	Yes	Yes	Yes*	Yes	Yes	No	Yes	Yes	No	No
Secondary vocational	?	Yes?	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes?
University	No	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes?
Non-university tertiary	–	No	Yes?	No	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes

Sources: National Office of Overseas Skills Recognition; Postlethwaite 1995; **Postlethwaite 1995; *Mingat 1995; ^ Cheng 1992; ? further data required to confirm; –data not found; +see discussion of Australia in text.

Table 3.2: Expenditure on Education as a Percentage of Gross Domestic Product (GDP), 1994

	<i>Public Outlays*</i>	<i>Government Assistance to Students</i>	<i>Private Expenditure not Financed by Government</i>	<i>Total</i>
Japan	3.8	na	1.1	4.9
Australia	4.8	0.5	0.9	6.2
South Korea	3.7	na	2.5	6.2

OECD 1997

Table 3.3: Public Expenditure on Education, about 1995

	<i>As a Percentage of GNP</i>	<i>As a Percentage of All Public Outlays</i>
Hong Kong	2.6	17
Singapore	3.0	23
Japan	4.7	11
Australia	5.6	14
Taiwan*	5.3	19
South Korea	4.5	17
Malaysia	5.3	16
Thailand	4.3	20
Indonesia	1.3	na
Philippines	2.2	na
China	2.3	12
Vietnam	2.7	7

UNESCO 1997;* Republic of China Statistical Yearbook

Allocation of Funds

This section of the report shows how funds are allocated within the education sectors of the economies.

Finance by Level of Education

Tables 3.2 and 3.3 provide some indication of the proportion of national income and of all government outlays given to education. The data was quite limited for most economies even for these broad levels of aggregation. The data difficulties are exacerbated when attempts are made to show differences in funding among the levels of education.

The OECD (1997) provides information about educational expenditure from public and private sources for educational institutions as a percentage of GNP by level of education. The data for the three selected economies which belong to the OECD are reproduced in Table 4.1.

Table 4.1 Public and Private Educational Expenditure as a Percentage of Gross National Product (GNP) by Level, 1994

	<i>Australia</i>	<i>Japan</i>	<i>South Korea</i>
Primary	1.6	1.4	1.7
Secondary	2.2	1.8	2.2
Non-university tertiary	0.3	0.1	0.3
University	1.5	1.0	1.5
All tertiary	1.8	1.1	1.8
All levels (including expenditures not elsewhere included)	5.7	4.9	6.2

OECD 1997

The data in this table show Australia and Korea to have a similar proportional allocation of the combined private and public funds. The allocation of part of Australia's TAFE expenditure to ISCED 2 and 3, and hence to expenditure on secondary schools, results in a smaller estimate for non-university tertiary than would be obtained directly from Australian data sources (such as ABS 5510.0).

The OECD presents expenditure at each level of education in United States dollars (using purchasing power parity. These are shown for the same three economies in Table 4.2.

Table 4.2: Expenditure per Full-time Student in Public and Private Institutions in US Dollars Purchasing Power Parity (PPP) by Level of Education, 1994

	<i>Australia</i>	<i>Japan</i>	<i>South Korea</i>
Pre-Primary	na	2,450	1,200
Primary	2,950	4,110	1,890
Secondary	4,760	4,580	2,170
Non-university tertiary	6,320	5,760	2,830
University	11,030	9,600	5,240
All Tertiary	9,710	8,880	4,560

OECD 1997, p. 101; PPP means that the expenditures are converted to US dollars at purchasing power parity rather than current exchange rates

Expenditure per student tends to increase from the primary level to the tertiary level. In Australia the factor is around three times. The OECD reports per student expenditure figures for early childhood education for Japan and South Korea which are consistent with the pattern.

Except at primary level, Australia spends more per full-time student than the other economies. However, the inclusion of some research funds in university expenditures may affect the apparent level of spending per student at that level in Australia at least (see Burke 1998). Japan spends much more than the other economies on primary education. It spends about one third more per student than Australia at this level.

As stated earlier, it can be expected that teachers' and other staff salaries will be related to the overall level of income per head in the economies considered. Hence expenditure per student to provide the same level of staffing could be expected to be much lower in South Korea. Table 4.2 confirms this expectation.

It is worth repeating that in their reports on educational expenditure, the international agencies provide little information about the private sector of education. This is undoubtedly due to the difficulties that exist in many of the selected economies in obtaining information about private education, especially through any consistent and reliable statistical collections. Consequently the data generally reported is for public expenditure on education. The largest component of

public expenditure is the recurrent cost which must be allocated from government budgets each year. UNESCO data on the distribution of public current expenditure at each level of education is reproduced in Table 4.3 for selected economies.

Table 4.3: Distribution of *Public Current Expenditure* by Level of Education

	<i>Pre-Primary</i>	<i>Primary</i>	<i>Secondary</i>	<i>Tertiary</i>	<i>Other</i>	<i>Total</i>
Hong Kong	1	26	39	30	3	100
Singapore		27	35	33	0	95
Australia	1	30	42	27		99
Malaysia	0	33	38	17	6	94
Thailand	2	51	22	17	3	93
Indonesia		33	47	18	1	99
China	1	36	32	17	15	100

Source: UNESCO 1996. Note that not all expenditures are accounted for in this table

This table suggests that a range of environmental factors and government policy affect the way in which public funds are allocated within the education sector. Thailand allocates one half of its budget for education to the primary level. Amongst the other economies the financial distribution is more even across the primary, secondary and tertiary sectors, but the allocation to secondary is the highest. The middle and lower income economies tend to have a small proportion of their resources devoted to tertiary education.

UNESCO provides information about enrolments at each of the educational levels. The data are head counts and therefore do not give an indication of part-time enrolments which are important in pre-school and in post-secondary education in some economies.

The relative enrolment at each level gives some indication of the resource requirements. UNESCO provides estimates of gross enrolment ratios which are total enrolments, regardless of the age of students, divided by the population of the official age group which corresponds to a specific level of education. Net enrolment ratios, which are the enrolments of the official age group divided by the population of that age, are also provided for some economies. Gross enrolment ratios are shown in Table 4.4 and some net enrolments ratios are given in italics.

The data for pre-primary are highly variable and show that Hong Kong and South Korea have high proportions of young children in educational programmes. The ratio for Australia is 73. It is important to remember that UNESCO presents head count data, not full-time equivalent.

Table 4.4: Gross Enrolment Ratios, 1995

	Pre-Primary	Primary	<i>Net Primary</i>		Secondary	<i>Net Secondary</i>		Tertiary	
Hong Kong	84	96	91		75	71		22	(1993)
Singapore	na	na	na		na	na		34	
Japan (1994)	49	103	100	(1993)	99	96	(1993)	40	
Australia	73	108	98		147*	89		72*	
Taiwan	24	na	na		na	na		45	
South Korea	85	na	na		101	96		52	
Malaysia	35	91	na		57#	na		11	(1993)
Thailand	58	87	na		55	na		20	
Indonesia (1994)	19	114	97		48	42		11	
Philippines (1994)	13	116	100		79	60		27	(1994)
China	28	117	98		62	na		4	4
Vietnam (1993)	30	111	na		36	na		2	2

Source: UNESCO 1997, Republic of China Yearbook.

Gross enrolment ratios are total enrolments at the level, regardless of the age of students, divided by the population of the official age group for the specific level of education.

* Recent changes in classification of TAFE enrolments affect the Australian data.

Data for Malaysia appears to be for publically assisted schools only.

The data in this table for primary education are reasonably consistent. All of the economies appear to be implementing policies of universal primary education. The ratios vary within a narrow range from 87 in Thailand to 117 in China, and indicate that, in the main, the vast majority of students of primary school age in the selected economies are enrolled at schools.

In Indonesia and Vietnam less than half of the students of secondary age are enrolled, but virtually all students at this level in Japan and South Korea are enrolled. The gross rate for Australia has been affected by the distribution of TAFE enrolments across secondary and tertiary education. Also note that around 85 per cent of TAFE students are part-time.

Japan and Korea appear to have a somewhat higher net secondary enrolment rate than Australia, as each of the three economies uses ages 12 to 17 in the calculation of the net rate. Hong Kong uses 12 to 18, affecting the comparison with the other economies.

Korea, Taiwan and Japan have rates of 40 per cent or more in tertiary education. The very high rate for Australia, of over 70 per cent, is the result of the inclusion of some TAFE enrolments as already mentioned. Of lower-middle income economies, the Philippines has a high rate of secondary enrolment and a quite high rate of tertiary enrolment. It achieves this through fairly low unit expenditures and by considerable private finance. Hong Kong has notably lower level of tertiary enrolments than would be expected from the level of income per head in that economy. However, the substantial number of their tertiary students who study in other economies affects the data for Malaysia and Hong Kong. Both of these economies had about 35,000 students studying abroad in 1994 (UNESCO 1996, Table 3.14). This compares with about 100,000 university and non-university tertiary students in Hong Kong and 120,000 in Malaysia. On the other hand, overseas students make up about 10 per cent of university students in Australia, though a smaller proportion of non-university tertiary enrolments (Department of Employment, Education, Training and Youth Affairs 1997).

These data for tertiary are supplemented with data showing the number of tertiary students per 100,000 in the population. The list is headed as expected by Australia, Korea, Taiwan and Japan with the low-income economies of China and Vietnam at the bottom of the list.

The data in Table 4.5 suggest that tertiary participation is generally increasing. Only the Philippines shows a small decline. All of the other economies for which data are available show increases. Some of the increases are substantial. Malaysia, China and Vietnam show the largest increases in the 1990s, all from a very low base.

Table 4.5: Number of Tertiary Students per 100,000 Population, 1990 and 1995

	<i>1990</i>	<i>1995</i>
Hong Kong	1484	1635
Singapore	2058	2522
Japan	2340	3139
Australia	2872	5401*
Taiwan	2979	3527 (1994)
South Korea	3946	4955
Malaysia	679	971
Thailand	1738	2096
Indonesia	995	1167
Philippines	2813	2760
China	329	461
Vietnam	293	404

Source: UNESCO 1997; Republic of China Yearbook

* Major change in classification of Australian data for vocational education and training since 1990.

Finance for Education

Although obtaining reliable, consistent data for the selected economies has been a pervasive problem for this study, it has presented particular difficulties in obtaining an overview of how finance is allocated to obtain the resources needed in each country to support education. The combined problems of using multiple sources to compile data sets, or the absence of any data at all, have made analysis of this aspect especially difficult.

The major components of public finance for education are:

- current expenditure for staff, equipment and materials and for building maintenance; and
- capital expenditure, which adds to the stock of educational buildings or provides improvements in the quality of facilities through replacement.

Data provided by UNESCO, for 1990 and 1994, shows the allocation of public finance for education to the major expenditure category, current or operating costs. These allocations are set out in Table 4.6.

Table 4.6: Public Current Expenditure as Percentage of Total Public Expenditure on Education, 1990 and 1994

	<i>1990</i>	<i>1994</i>
Australia	92	91
China	93	90
Hong Kong	na	92
Indonesia	69	67
Japan	na	na
Malaysia	77	84
Philippines	92	89
Singapore	87	73
South Korea	89	80
Taiwan	72	76
Thailand	84	80

Source: UNESCO 1996

In general, the changes in Table 4.6 indicate a slight decrease in the proportion of overall funds for education assigned to current items. Of the economies reported, only Malaysia and Taiwan have increased the allocation to current items. In the other economies, most of the decreases have been by a small percentage. However, the reduction of 14 per cent reported for Singapore needs further analysis.

OECD and UNESCO statistical reports provide information about the allocation of current expenditure for education to the various resources needed for the operation of schools and tertiary institutions. Because education is so labour intensive, the costs of staff salaries, especially for the teaching workforce involved, is a major component of current expenditure. OECD data are shown in Table 4.7. The data show how labour costs consume a large part of the current budget for education. The selected economies allocate between 60 and 68 per cent of tertiary recurrent expenditure to staff and over four fifths of school expenditures.

Table 4.7: Compensation of Staff as Percentage of Current Public and Private Expenditure, 1994

	<i>Primary and Secondary</i>	<i>Tertiary</i>
Australia	81	67
Japan	87	60
South Korea	85	68

Source: OECD 1997

Full-time and part-time teaching staff make up 3.9 per cent of the employed population in OECD economies, with 2.9 per cent in primary and secondary teaching (OECD 1997, p. 123). This is higher level than shown in Table 4.8 for eleven of the selected economies (even allowing for the denominator as 'labour force' in Table 4.8 rather than 'employment' in the OCED statistics. The unweighted average for the eleven economies is 2.3 per cent. Australia has a high proportion of its workforce involved in school education as does Malaysia. Less than 2.0 per cent of the workforce are teaching staff in China, Hong Kong, Singapore, Thailand and Vietnam..

Table 4.8: Teaching Staff Employed as a Percentage of Total Labour Force

	<i>1990</i>
Australia	3.0
Malaysia	3.0
Indonesia	2.8
Japan	2.6
Taiwan	2.5
Korea	2.2
Thailand	1.9
Hong Kong	1.8
China	1.7
Singapore	1.7
Vietnam	1.7

Source: OECD 1996; Country Year Books; United Nations 1996. Most data are for 1993 to 1995.

Teachers are the most important resource in education and the ratio of students to teachers is an important indicator. Table 4.9 gives student-teacher ratios for primary and secondary schools. Tertiary ratios are not presented as the ratios are affected by the large numbers of part-time students and teachers in some economies at that level. Pre-primary enrolments are affected by part-time attendance and are also not presented here.

Table 4.9: Ratio of Students to Teaching Staff by Level (around 1995)

	<i>Primary</i>	<i>Secondary</i>
Hong Kong	24	20
Singapore	26	18
Japan	18	14
Australia	18	13
Taiwan	22	20
South Korea	32	25
Malaysia	20	18
Thailand	19	21
Indonesia	23	14
Philippines	35	35
China	23	16
Vietnam	34	na

Source: UNESCO 1997; Country Year Books.

The average student to teacher ratio for primary education in OECD economies is 18. In the selected economies only Australia and Japan are at this level. Thailand and Malaysia have ratios not much higher but the levels extends upwards to 34 in Vietnam and 35 in the Philippines. Although earlier analysis indicated that these economies are all pursuing policies of universal primary education, it seems clear that many of the economies in Asia are unable to resource primary education at the same level as Australia or Japan. The reported student teacher ratio for South Korea is surprisingly high.

Data for the secondary level again show Australia at the lowest ratio at 13 which compares favourably with the OECD averages of 16 for lower secondary and 13 for upper secondary. Indonesia, Japan and China have relatively low ratios, but most of the remaining economies have ratios in the low twenties. The Philippines again has a high ratio which is explicable by its low income and relatively high participation rates.

UNESCO also provides some information about the policy emphasis in the selected economies in their third level or tertiary programmes. It uses the International Standard Classification of Education (ISCED) level 5 (the non-university tertiary), level 6 (any programme that leads to a university degree), and level 7 (programmes for students who have completed a first university degree). It shows student numbers in each of eighteen fields of study categories. These data are summarised in the following tables to indicate the emphasis placed by various

economies on the different third level programmes. UNESCO also provides data in a similar format for graduates in each of these fields but these are less complete and are not reported here. Data are not available for all economies.

Table 4.10: Distribution of Tertiary Students by ISCED Levels

	Percentage of Students		
	<i>Level 5</i>	<i>Level 6</i>	<i>Level 7</i>
Hong Kong	30	58	12
Australia	44	44	12
Thailand	1	94	6
South Korea	28	67	5
Malaysia	52	44	4
Japan	20	77	3
Philippines	11	87	2
China	62	36	2
Indonesia	61	39	not identified

UNESCO 1999). Although the data are the latest published, they vary in time from 1990–91 to 1995–96.

ISCED 5: the non-university tertiary level

ISCED 6: any programme that leads to a university degree

ISCED 7: programmes for students who have completed a first university degree.

Note that ISCED has been revised (see UNESCO 1997a): the old classification is used here. For an outline of the old ISCED see OECD (1996, pp. 388–89).

Gross enrolment ratios and student participation at the third level of education as a proportion of the total population were set out in Tables 4.4 and 4.5. These showed that economies vary considerably in their support for this level of education and consequential participation by students at this level. Table 4.10 shows the distribution of students across the three ISCED levels that are reported by UNESCO as making up the third level of education. Table 4.12 shows the same type of distribution for graduates.

The distribution of students across the three ISCED levels varies considerably amongst the selected economies. Six of the nine reported economies have the highest proportion of their students in level 6, or the first degree at university stream. Australia and Hong Kong have the highest proportions at graduate level—level 7. A relatively high proportion of enrolments is in level 5—the non-university tertiary level—in China, Indonesia and Malaysia.

If it could be assumed that the flow of students through courses was fairly steady, without enrolment bulges in particular years, or variation in student drop-out or

repetition rates, the distributions of graduates would be similar to the distribution of students. However, with the exception of China, the distributions for students and graduates in the other economies are different. Some of the variations are large. Without a more thorough analysis of the graduate data, they are not helpful in revealing the emphasis placed by economies on third level courses and they are not reported here.

UNESCO data are available for eighteen fields of study categories. Difficulties have obviously been experienced in allocating students to some of the categories. UNESCO notes that in some cases, where it has been unable to make entries, student numbers have been allocated to another category. No data were available for Singapore, Taiwan and Vietnam.

The one field of study that appears to have support across most of the selected economies is business administration, which has a range from 14 to 27 per cent of students. China and Thailand do not report participation in this field of study suggesting that their business students are classified elsewhere. The two others that are widely supported are education science with a range from 6 to 25 per cent of students and engineering with a range from 6 to 26.

Table 4.11 reports the three economies with the highest percentages of students enrolled in each of the main fields of study. The economies are presented in decreasing order of percentage of the students enrolled. There is considerable variation amongst the selected economies but some of it may be due to differences in classification procedures.

Table 4.11: Economies with a High Percentage of Students in Major Fields of Study

<i>Field of Study</i>	<i>High Percentage</i>
Education Science	Malaysia, China, Indonesia
Humanities and Religion	Japan, South Korea, Malaysia
Law	Japan, Thailand, Indonesia
Social and Behavioural. Sciences.	Thailand, China, Indonesia
Business Administration.	Indonesia, Philippines, Malaysia
Communication and Documentation	Australia, Malaysia, Indonesia
Natural Science	Hong Kong, Australia, Malaysia
Health-related Programmes.	Philippines, Australia, China
Engineering	China, South Korea, Hong Kong

UNESCO 1996

Table 4.12 shows the position for Australia. This tabulation shows the student distribution across the main fields of study and the rank order position of Australia in relation to the eight Asian economies for which data are available. Australia's lowest ranking is for social and behavioural sciences. It is ranked sixth for law, business administration and service trades. The worry about these data is that they show 14 per cent of Australian tertiary students in business administration. Australian data show that by the early 1990s over 20 per cent of university students were in business administration and economics and the same or higher percentage of TAFE students (DEETYA 1996; National Centre for Vocational Education Research 1997).

Australia is shown to have a relatively high proportion of students (rankings of 1, 2 and 3) in fine and applied arts, communication and documentation, natural science, health related programmes, architecture and town planning, and transport and communication. Although 13 per cent of students are in engineering courses, Australia's position is fifth in the group of nine selected economies reported here.

Australia in the late 1980s was seen as lagging behind Asia in the technologies. An indication of this was the apparently high levels of science and engineering enrolment in Asian economies. The poor quality of the data available for such comparisons was extensively reviewed by Williams (1988). Depending on the data source Williams could show Australia to have a relatively low or high proportion of engineers in the labour force!

Table 4.12: Distribution of Australian Students by Field of Study, 1994

<i>Main Field of Study</i>	<i>Percentage of Students</i>	<i>Rank Order in Nine Economies</i>
Communication and Documentation	16	1
Business Administration.	14	6
Engineering	13	5
Education Science	9	5
Health-related programmes.	9	2
Humanities and Religion	8	5
Natural Science	8	2
Architecture and Town Planning.	4	1
Transport and Communication.	4	1
Social and Behavioural Science.	3	7
Maths and Computer Science.	3	4
Agriculture	3	5
Fine and Applied Arts	2	3
Law	2	6

Some detail on the percentage of tertiary students in the sciences and engineering fields are shown in Table 4.13. China and South Korea have the highest proportions in engineering and Korea the highest combined total. Japan is shown to have the third highest proportion in engineering but a very small proportion in other sciences. The problem of missing data is highlighted: there are no data here on Singapore and Taiwan. Mingat (1985, p. 31) shows Singapore as having 45 per cent of its students in engineering in 1985 and Taiwan with 37 per cent in 1993. Both economies had used the manpower-requirements technique to guide enrolments.

Hong Kong and Malaysia would move up the list for engineering if their overseas students were included. Business courses are the leading single destination for their overseas students but over 40 per cent of Malaysian overseas students study engineering or science courses and about 30 per cent of Hong Kong students. If we combine science and engineering, Australia ranks in the middle of the list. Note that OECD (1997, p. 342–345) shows that with a broad definition of science graduates, Australia had over 1000 science graduates per 100,000 of the labour force aged 25–34 compared with less than 500 for Japan.

Table 4.13: Distribution of Third Level Students by Selected Fields of Study, 1994

	<i>Natural Science, Maths and Computing</i>	<i>Engineering</i>	<i>Total</i>
Hong Kong	14	17	31
Japan	3	17	20
Australia	11	13	24
South Korea	12	21	33
Malaysia	11	10	21
Thailand	5	6	11
Indonesia	2	11	13
Philippines	1	13	14
China	6	26	32

UNESCO 1996

Strategies

The education and training strategies of the Asian economies are not obvious from the basic statistical data assembled by international agencies and reported here. The considerable deficiencies in data contribute to the difficulty in drawing out what the strategies have been and whether they have been effective. A further issue is that the data show very great variability in participation and expenditure even among economies with fairly similar income levels or growth rates. Hence very close analysis is needed of the relationships among the variables and the economic and social development of the economies to tease out what the strategies have been and the apparent consequences of them. Such analysis was beyond the time frame for this study.

To offer a commentary on the strategies of these economies it has been necessary to draw on the research literature and in particular the overviews provided by Bray (1998), Mingat (1995), Middleton, Ziderman and Van Adams (1993) and Ziderman and Albrecht (1995). These studies draw on international data, mainly UNESCO's, but also on a range of other data and research analyses. After considering this literature in conjunction with the data presented in this report, we have identified several issues that are important in the education strategies of the economies considered. They are:

- the emphasis the economies place on the various levels of education;
- the emphasis on vocational education at secondary levels and on particular fields of study at tertiary;
- the extent of public and private *financing* of education and *provision* of education;
- the unit costs of education at various levels and the salaries of teachers; and
- mechanisms to ensure efficiency, quality and equity.

These matters are now reviewed. It is important to remember throughout the extreme variations in demography and economic development among the economies considered in this report.

Emphasis on Particular Levels of Education

Nearly universal participation in primary schooling is suggested by the data in this report. It is to be noted that because of repetition rates a gross enrolment rate of 100 per cent may hide a less than universal coverage.

Mingat (1995) in an analysis of *high performing Asian economies*—Japan, South Korea, Singapore and Taiwan—finds that an early commitment to primary and basic education, relative to other levels of education was common among those economies. This however does not have obvious direct implications for current policy; though it may point to the need for the whole labour force to achieve minimum standards to facilitate flexibility and mobility.

The economies differ in the extent to which they have universal coverage in secondary education but this is mainly linked to the level of development. Among the high-income economies, there is universal junior secondary education but some differences in the proportion completing secondary education. The economies differ in the ways of supporting enrolments: Singapore has provided nearly all the finance for both government and non-government school expansion. Korea, Japan and Taiwan have relied to a substantial extent on private finance. Singapore has relied more than other economies on explicit manpower forecasting to plan its enrolments.

There appear to be more notable differences in the tertiary enrolment ratios among high-income economies, even though data problems make it hard to be precise about the size of the differences. It is notable that economies such as Japan, Korea and Australia that have high tertiary enrolment ratios appear to make the large calls on private finance. Singapore and Hong Kong have relatively low enrolment rates among the high-income economies.

Emphasis on Vocational Education in Secondary School Secondary Level and Particular Fields of Study at Tertiary

Mingat (1995) notes that vocational education at upper secondary school level was emphasised at early levels of economic development in Japan, Korea and Singapore but has declined somewhat in recent years. The exception among high performing economies are Taiwan and Hong Kong where the majority of upper secondary enrolments were still recently classified as vocational. Thailand has had over 40 per cent of its enrolments in vocational education but Malaysia, at a slightly higher level of development, has a low rate of vocational enrolment. China rapidly expanded vocational schooling in the late 1980s and early 1990s.

There are considerable differences across economies in the extent to which vocational education includes general and academic education. In Malaysia the term technical school has been used only for schools providing a strong academic education in mathematics and science supplemented with preparation in the engineering field and leading to higher studies.

The case for vocational secondary schooling is reviewed in Middleton et al. (1993) and Ziderman (1997). Middleton et al. (1993, p. 16) find that employers want the competencies that general or academic education can provide, but with the attitudes that ‘practical’ education is thought to supply. Ziderman (1997) notes that there is no correlation of provision of vocational secondary education with

economic growth, but such a finding tells us nothing about the value of particular forms of vocational education in different economies. In general, studies in individual economies have not shown school level vocational education to be a good investment compared with general education, but there are exceptions. Where employment is growing strongly and vocational schooling is well linked with employers and to the available jobs, the pay-off to vocational schooling can be quite good (Middleton et al. 1993, p. 50). When vocational education is leading effectively to job entry Middleton et al. (1993) find it can also be useful in pursuing social objectives such as providing for the less able or helping less advantaged groups. But it is of little value for the less advantaged in periods of high unemployment and when there is little direct connection to employers. Ziderman (1997, p. 362) concludes that vocational schools in the ongoing period of rapid economic change will need to concentrate on broader training, emphasising the capacity for subsequent worker training and with links to the workplace.

Australia is a peculiar case in that it has very few secondary schools that are classified as vocational. Because of the allocation of a large number of TAFE enrolments to the ISCED 2 and 3 categories, Australia is seen in the OECD data as having quite high senior secondary vocational enrolments. As discussed, vocational courses have expanded as a part of the curriculum in the final years of regular secondary schooling in recent years in Australia, not in specialist vocational schools. In Australia, there has been the concern to combine general schooling, where a number of the key competencies such as communication skills may be fostered, together with specific vocational modules and workplace experience. The broad structure in Australia seems compatible with Ziderman's (1997) views on the desirable attributes of school level vocational training.

The prevailing view (Bray 1998, p. 12) is that vocational education is considerably more expensive than general education because of smaller practical classes and expensive equipment. Recurrent cost per vocational school student in Malaysia and Thailand in the 1980s was two to three times that of general secondary education (Middleton et al. 1993, p. 67–68). It is not clear that the teaching of vocational units in Australian schools is markedly more expensive than general secondary school subjects (Bluer et al. 1997). Vocational courses generally have to be provided with only relatively small supplementation to normal school budgets and much of it can be provided with regular school facilities or in liaison with TAFE institutes. A significant burden to schools is the organisation of experience in industry, seen as a highly desirable element in vocational education.

Australia in the late 1980s was seen as lagging behind Asia in the technologies. An indication of this was the apparently high levels of science and engineering enrolment in Asian economies. Mingat (1995) shows that Singapore and Taiwan had very high enrolment in engineering, and that the lower levels in South Korea and Japan were still higher than most OECD economies, including Australia. However, as discussed, the OECD shows that with a broad definition of science graduate, Australia had many more per 100,000 of the labour force aged 25–34 than Japan. The further point is that the need for engineers may well be much higher in economies expanding at 8 per cent per annum compared with those expanding at 3 per cent.

Training in the workplace was outside the scope of this paper but is important in any assessment of the success of education and training strategies. There may be substantial differences in the extent of workplace training and in government regulation or funding of it. Ashton and Green (1996, p. 162–72) attach particular importance to the Singaporean government support for basic skills programs for mature workers in the 1980s, and see the links among industry and education and training policies in that country as important to its success as a high-skill economy.

Public and Private Finance and Provision of Education

Private finance is one means of funding the expansion of enrolments in education and training in a period of tightened government budgets. Australia's experience of declining public funds per student in higher education, that commenced in the middle 1970s, has been mirrored across the world. Ziderman and Albrecht (1995, p. 23) document that the decline has occurred across economies at all income levels though the experience has been worst in the poorest economies. The restraint—sometimes called crisis—in public finance increases the need for alternative forms of finance and for greater economy in the use of resources.

Private finance is advocated in post-basic and non-universal education as a means of lessening the spending of government funds on those in the community already well off. It is advocated along with private provision as a means of promoting competition and efficiency in education, though there are counter arguments concerning lack of information, externalities and thin markets. The force of these counter-arguments is strongest at the lowest levels of education.

As already discussed, private finance is particularly important in Korea, Japan and Taiwan where tertiary participation rates are high. Over 70 per cent of students in higher education in these economies are in private institutions and fees provide the main part of expenditures. The private share of enrolments is high at senior secondary school in these economies, exceeding 50 per cent in Taiwan and Korea and again fees provide the majority of funds (Mingat 1995, p. 20). Among low-income economies, Vietnam has made the expansion of its education system dependent on fees, despite being a socialist economy.

Bray (1998) notes that governments remain the main providers overall of resources for education. He notes that the extent of the various forms of private finance is not well documented and as a result may be underestimated. Of particular note in Asian economies is private tutoring. It may also be important in Australia but there is little information on it. It may be an important factor in differences in educational achievement within and across economies.

Among the economies considered, private education is often subsidised by government and fees are often charged in government institutions. A range of different forms of assistance is made to private institutions with a view to influencing the forms of provision. The major issues may be the extent of private finance and the autonomy of the institution—both of which can be substantial with

private or with public ownership. In some economies (e.g. Taiwan and Indonesia), there have been constraints on *private* universities including the rate at which fees are charged. In Australia the *public* universities have had a growing level of autonomy with the major exception being restriction on fees for undergraduate Australian students.

One common finding is that private institutions on average operate at lower recurrent costs than public institutions. This will be considered further in the sections on unit costs and efficiency.

Financing of students is a major form of government outlay in a number of economies including Australia. Most of the economies under consideration have student loan schemes which involve some degree of government subsidy. Ziderman and Albrecht (1995) review these schemes, including the Australian higher education contribution scheme (HECS). They estimated the HECS scheme to recover 43 per cent of the loans made after allowing for the interest subsidy and administrative charges. This was a higher than the recovery rate for Japan mortgage loans for education and somewhat lower than for Hong Kong where repayment in five years was required. The recovery rate on the HECS scheme would have increased considerably since the 1997 reduction in the income threshold at which loan repayment is required. In addition, the HECS has the virtue of being income contingent and hence more equitable in its repayment requirements than nearly all other forms of education loans.

Unit Costs of Education, Pupil Teacher Ratios (PTRs) and the Salaries of Teachers

Mingat (1995) analyses the unit costs in relation to the per capita GDP of a range of Asian economies. He finds that unit costs have tended to grow slightly as a ratio of per capita GDP implying a substantial growth in real expenditure. Concentrating on Japan, Korea, Singapore and Taiwan, he finds that at early stages of development they did not place much emphasis on lowering primary pupil-teacher ratios. Rather they have tended to pay their teachers relatively well in comparison to wages in the manufacturing sector. His analysis also suggests that teachers in the four Asian economies are relatively better paid than teachers in economies at similar levels of development. Work can be undertaken to link Australian data on unit costs (Burke 1998) to this analysis.

Australia has been very active in its introduction of computers in education. Distance education is an important sector of higher education and vocational education and training. Detailed research on the effects on relative costs and learning is not yet available. For the Asian economies under review there is information about a wide range of activities (Bray 1998, p. 23). Where education is delivered by distance mode the unit costs are usually relatively very low but caution is required in the absence of estimates of learning outcomes. It appears that mixed-mode teaching which could combine on- and off-campus activities and the

use of new technologies may offer the most prospects for lower costs and better learning (Rumble 1997).

Mechanisms to Ensure Efficiency, Quality and Equity

A range of indicators can be presented on the performance of education systems, including pupil performance at various ages and school retention rates. The overall performance of Asian economies could have been taken as an endorsement of their educational policies—until the recent crisis. Given the variations noted in the participation and expenditures it appears that many different forms of education and training systems may be compatible with economic development.

Mention has been made of the lower unit cost in private institutions. This is not necessarily an indicator of efficiency. In some instances, this may even reflect government control of the private institution, as in Taiwan's private universities. It could also reflect lower quality, in the absence of effective monitoring. On the other hand, studies of pupil performance tend to suggest higher achievement in private secondary schools even after controlling for socio-economic background (e.g. Jimenez & Lockheed 1995). The problem is that such controls can never fully compensate for the motivation of persons of similar social background who choose, or do not choose, private education. Nor does it account for the widespread use of private tutoring which is not accounted for in the private school costs. Bray (1996a) warns against generalisations about private schools which range from high quality elite academic schools to low resourced, low quality, second-chance schools for students not catered for in the public system.

Advocates of competition argue that it is the primary way to ensure efficiency in all areas, including education. However, externalities and equity justify some government finance even in post-secondary education and training. Lack of knowledge and 'natural monopoly' provide a case for government regulation and possibly provision.

The types of data reviewed in this study provide only a little insight into these issues. There are so many factors associated with the high levels of student achievement in the more successful Asian economies and their period of high economic performance that it is a risky exercise to draw too precise a conclusion.

Conclusion

This paper has reviewed a wide range of data on the educational participation and educational finance of the selected economies. To provide a context for the review, it first presented summary data on the population and income levels of the selected economies to provide an indication of educational need and of the capacity to finance it. The main parts of the report considered the levels of participation, the distribution of resources in the education systems and the strategies underlying educational expansion

There are deficiencies in the data available and so the findings of the report must be considered as tentative. Comparisons across the economies are also affected by the great differences in population and income. The high-income economies like Australia tend to have a relatively low proportion of their population in the main education age groups as well as the greater financial capacity to meet educational needs.

Educational participation and, to some extent, expenditure as a percentage of GDP, are related to the level of income per head. Malaysia, Taiwan and Australia appear to make the largest commitment of public expenditure. Australia has high rates of educational participation and high ratios of staff to students in its schools. Hong Kong and, perhaps, Singapore have lower public expenditures than other high-income economies, which may be accounted for by the relatively low ratios of staff to students in those economies' primary and secondary schools and middling levels of tertiary participation.

Data on private outlays are sparse but South Korea and Japan, which have much of their higher education in the private sector, have relatively large private expenditures. South Korea is reported to have very low ratios of staff to students at primary level, which may be a means of containing its public outlays. The economies under consideration vary in the extent of the private provision of education, the degree of government subsidy of private education and the charging of fees in public education. Somewhat surprising is socialist Vietnam which has fairly recently embraced fees as a means of expanding its educational participation. More data is needed on all of these factors if precise comparisons are to be undertaken.

Educational participation tends to be lower in upper secondary education and tertiary education the lower a country's income per head, though there are anomalies. The Philippines, for example, has a much higher level of participation than might be expected, achieved by very low rates of staff per student and by a large private sector, so that most of its public outlays are directed at primary education.

One of the issues to be remembered is that the economies under consideration differ widely not only in matters such as population and income but also in history, religion, politics and culture. One should be wary of comparisons even if we had more comprehensive data.

There are a number of areas in which specific research on particular economies could lead to a better understanding of the variations across economies. For example:

- the extent to which education in public institutions is supported by fees;
- the extent of student assistance for living costs or support for fees;
- the extent to which the private sector is subsidised by the government;
- the level of teachers salaries relative to income per head in each country;
- the nature of vocational education in upper secondary education;
- consideration of alternative groupings of the data by field of study;
- more precise documentation of recent policy changes in educational finance; and
- measures of educational performance and of outcomes in relation to social and economic needs.

The identification of effective strategies requires a detailed study of a wider range of data than available for this report and an analysis of each economy's particular experience and needs. Such a study was not possible in the time available for this project. To offer commentary on the strategies of the Asian economies, we have supplemented the data in this study with the findings of a range of reviews of education and development. The main issues identified for educational strategies include the:

- emphasis the economies place on particular levels of education;
- emphasis on vocational education at secondary school levels and on fields of study at tertiary;
- extent of public and private *financing* of education and public and private *provision* of education;
- unit costs of education at various levels and the salaries of teachers; and
- mechanisms to ensure efficiency, quality and equity.

The early successful Asian economies placed considerable emphasis on universal primary education. This can be taken to imply that the whole workforce needs to be provided with an education sufficient to enter and learn in the workplace.

Countries differ in the extent to which they provide specialist vocational education at senior secondary level. The evidence suggests relatively poor returns to specialist vocational secondary schooling, except where there are strong links with employers and successful placement of the graduates in employment. The evidence for the

need to expand particular fields of study at tertiary (e.g. engineering) is not obvious. Countries needs for engineers may well differ substantially according to the current pattern and pace of economic development.

The high-income Asian economies tended to pay relatively high average teacher salaries in the early years of their fast development and still do in recent years. They appeared to put more emphasis in the early years on paying teachers well, with their student teacher ratios tending to fall only as they reached higher levels of development.

Some, but not all of the high-income Asian economies, relied on private finance for a substantial part of their upper secondary and tertiary education. The ability to increase levels of funding for education may be related to obtaining private finance of various forms. Mechanisms to ensure quality and efficiency may involve increased private provision and market forces but the evidence reviewed is not conclusive. Governments in all economies remain the major source of educational funds and improved government administration is an important part of educational strategies.

The data compiled for this study provide only a partial view of the nature of education and training in the economies under consideration. Comparative studies need to be based on more detailed and wide ranging data than are likely to be provided by international agencies, even by the OECD which is concerned with only a limited number of economies. More detailed studies which focus on a small number of economies and consider a particular aspect of education and training may yield greater insight into their strategies.

The great variation in participation and expenditures reported in this study imply that more than one strategy may be compatible with economic development. Strategies have to be developed appropriate to the particular economic and social needs of each economy.

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